HỌC VIỆN CÔNG NGHỆ BƯU CHÍNH VIỄN THÔNG

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BÀI TẬP

TIẾNG ANH

CHUYÊN NGÀNH CNTT

(Dùng cho sinh viên hệ đào tạo đại học từ xa)

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BÀI TẬP
TIẾNG ANH CHUYÊN NGÀNH CNTT

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CÂU HỎI

Câu 1: Hãy đọc kỹ đoạn văn sau và trả lời câu hỏi

Throughout the ages people have sought to understand the world around them and to explain it in a systematic way. A *system* is simply a group of elements which work together to achieve a purpose. Systems can be very large, such as the system of courts and laws we call our 'legal system', or very small, such as the system involved in cleaning your teeth. Systems can occur in nature or be designed by people. The water cycle (described below) is an example of a natural system. Banking systems and computer systems are examples of systems designed by people.

Input-process-output

Processing systems accomplish a task: they take one or more *inputs* and carry out a *process* to produce one or more *outputs*. An input is something put into the system, a process is a series of' actions or changes carried out by the system, while an output is something taken from the system. All systems can be represented by the following input-process-output *(IPO)* diagram.
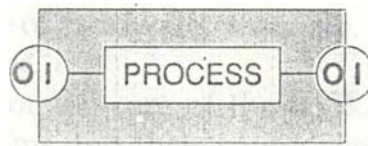
The shaded area in the diagram represents the system. The letter 'I' stands for input and the letter '0' stands for output. The input into this system is an output from another system and the output from this system is an input into another system.

To develop these ideas further we will consider three systems: coffee making the water cycle and the shop.

THE WATER CYCLE

Water circulates between the earth and the atmosphere; this is an example of a system occurring in nature. It is driven by. the heat of the sun which causes evaporation from bodies of water and transpiration from plants. The water vapour in the atmosphere forms clouds under certain conditions. When these clouds have more water vapour than they can hold, precipitation occurs and the water is returned back to the earth as rain;' hail, dew or snow. This process of moving water from the earth into the atmosphere and back to the earth is called the water cycle.

The inputs are the heat from the sun, and water from oceans, lakes, rivers and plants. The process consists of actions such as evaporation, transpiration and precipitation. The output is the circulation of the water between the earth and its atmosphere.

THE SHOP

A shop is a retail system designed by people; its purpose is to allow customers to purchase goods or items. The inputs are the goods to be sold. The process consists of actions such as

receiving goods from the warehouse, packing the goods into the shop and selling the goods at the counter. The output is the *goods* sold to the customers.
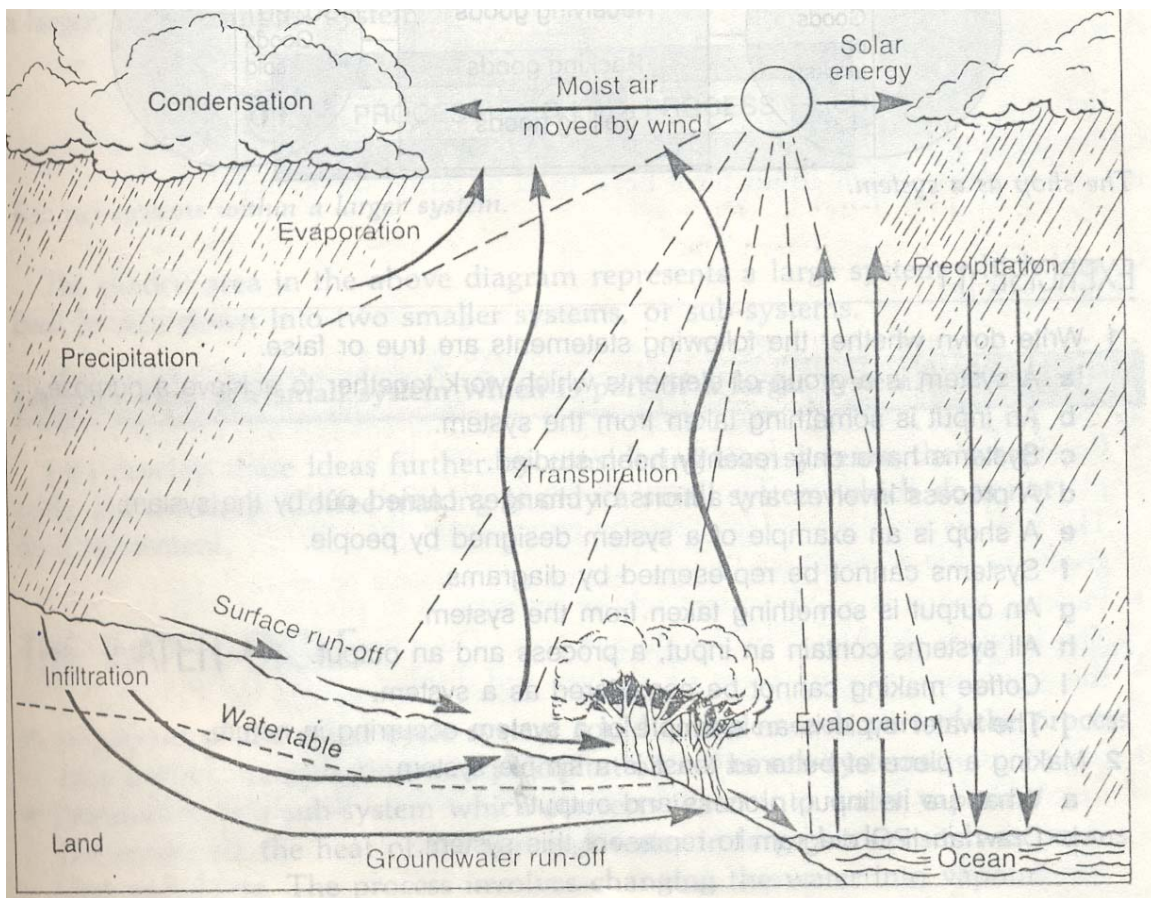
1. Write down whether the following statements are true or false.

   a. A system is a group of elements which work together to achieve a purpose.

   b. An input is something taken from the system.

   c. Systems have only recently been studied.

   d. A process involves any actions or changes carried out by the system.

   e. A shop is an example of a. system designed by people.

   f. Systems cannot be represented by diagrams.

   g. An output is something taken from the system.

   h. All systems contain an input, a process and an output.

   i. Coffee making cannot be considered as a system.

   j. The water cycle is an example of a system occurring in nature.

2. Making a piece of buttered toast is a simple system.

   a What are its input, process and output?

   b Draw an IPO diagram to represent this system.

3. Planting a tree bought from the nursery can be considered a system.

a What are its input, process and output?

b Draw an IPO diagram to represent this system.

4. A recorded music system involves using a record, cassette or compact disc to

listen to music.

a What are its input, process and output?

b Draw an IPO diagram to represent this system.

5. Every action we take can be considered as a system. Do you agree?

Câu 2: Refinement and synthesis

Refining a system means analysing it in more detail and breaking it down into smaller components. Each part of the process may be considered either as a system in itself, or as a *sub-system.* A sub-system is a small system which is part of a larger system. It also contains a group of elements which work together to achieve a purpose.

Synthesis is the reverse process; it involves combining simple sub-systems into a larger, more complex system.
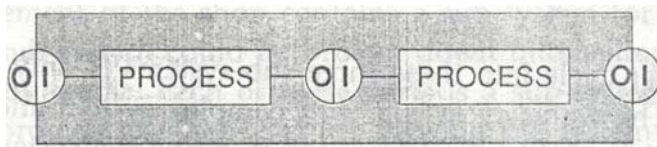
The shaded area in the above diagram represents a large system which has been broken down into two smaller systems, or sub-systems.
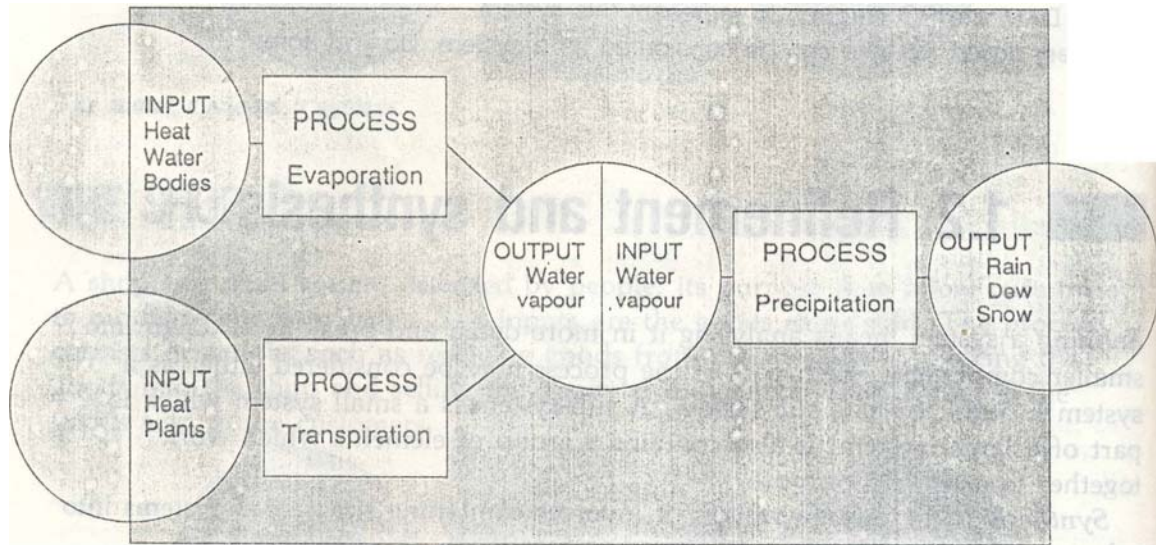
THE WATER CYCLE

A refinement of the water cycle system could consider each part of the process - evaporation, transpiration and precipitation - as sub-systems.

. Evaporation is a sub-system which converts water into water vapour. The inputs are the heat of the sun and water in large' bodies such as oceans, lakes and rivers. The process involves changing the water into vapour.The output is the water vapour.

. Transpiration is a sub-system which converts moisture in plants and other bodies into water vapour. The inputs are the heat of the sun, and plants and other bodies. The process involves changing the moisture from plants into vapour. The output is the water vapour.

. Precipitation is a sub-system which converts water vapour into water in the form of rain, hail, dew and snow. The input is the water vapour in the form of clouds. The process involves changing the water vapour into water. The output is rain, hail, dew and snow.

Refining the water cycle into these three sub-systems is only one way of understanding it. The water cycle is a very complex system and contains many other processes which could have been used to refine the system.
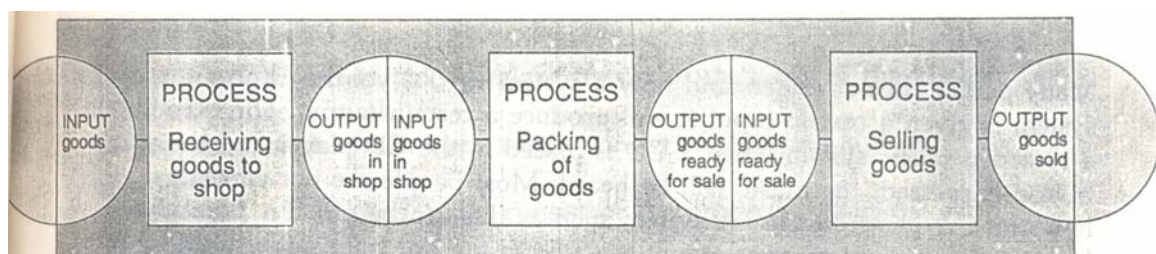
THE SHOP

A shop could be refined by considering each part of the process - receiving goods, packing goods and selling goods - as sub-systems.

. Receiving goods is a sub-system whose purpose is to prepare goods for placement in the shop. The input is the goods on trucks from the warehouse. The process involves off-loading the goods from the trucks. The output is the goods in the storage area.   .

. Packing goods is a sub-system whose purpose. is to prepare goods for sale. The input is the goods in the storage area. The process involves unpacking the goods and placing them on shelves and display racks. The output is the goods ready for sale.

. Selling goods is a sub-system whose purpose is to exchange the goods for cash or credit. The input is the goods ready for sale on the shelves. The process involves customers buying the goods at the counter. The output is the goods sold.

Here the refinement of the shop has involved three sub-systems all linked together so that the output from one sub-system is the input into another sub-system. This is just one way of explaining the shop as a system.

Systems are refined they are broken down into sub-systems, giving one level. If these sub-systems are broken down into smaller sub-systems, another level can be seen. For example, the refinement of the shop contains a sub-system for selling goods at the counter. This sub-system could be broken down into selling goods by cash and selling goods by credit. Each of these parts is a sub-system of the subsystem, and they provide another level for viewing the system of the shop.

1. Copy and complete the following sentences.

a A…………………..is a small system which is part of a larger system.

b Systems can be viewed at different……………

c Combining sub-systems to form a larger system is called……………….

d A……………….is a group of elements which work together to achieve a purpose.

e An…………………is something put into the system.

f Breaking down large systems into smaller sub-systems is called……………

g The…………………….is an example of a system occurring in nature.

h A shop is an example of a system designed by……………….

i An output is something taken……………….the system.

j The……………...involves the actions carried out by the system.

2. What is a sub-system?

3. Explain the difference between, refinement and synthesis.

4. 'Systems can be viewed at different levels.' Explain this statement.

5. Refine your system for planting a tree bought from the nursery into sub-systems. List these sub-systems.

Câu 3: A system as a black box

Many people; do not understand how a system works, yet they know that if the system is given a certain input it will produce a certain output. For example, in a recorded music system when a CD is placed in the CD player and the play button is pressed, the music will be heard. Most people are not concerned with how the CD player works. A system such as this can be called a *'black box'* because the internal components of the system are not fully understood by most people. Their main concern is that the system accomplishes its task.

ENVIRONMENT

Systems work under certain physical conditions or surrounding influences which are called their *environment*. For 'example:

. the environment of coffee making consists of the shop where the coffee and milk were bought, the water board which supplies the water and the electricity commission which supplies the electricity

. the environment of the water cycle consists of our solar system

. the environment of the shop consists of the cost of the goods from the wholesaler, the transport system used by the trucks, or the amount of money the consumers have to spend.

All these factors are not controlled by the system; they are outside the system but have some influence on it.

BOUNDARY

The limit of a system is called its *boundary.* It is determined by the observer who decides which parts it takes up the system and where the boundary is drawn.

For example:

. the boundary of coffee making might consist of the walls of the kitchen where the coffee is made

. the boundary of the water cycle might consist of the earth and its atmosphere .

. the boundary of the shop might consist of the property where the shop is situated.

1. For each of the following statements, select a matching phrase from the list below.

a. A system whose internal components are not fully understood.

b. A small system which is part of a larger system.

c. Separates the system and its environment.

d .The breakdown of a large system into smaller sub-systems.

e. The physical conditions within which the system operates.

f. Something taken from the system.

g. A group of elements which work together to achieve a purpose.

h. A series of actions or changes carried out by the system.

i. Something put into the system.   '

j .The combination of sub-systems into a larger system,

     system process input sub-system

black box   refinement   output

synthesis boundary environment

2. What does the term 'black box' mean?

3. 'The boundaries of a particular system will vary.' Explain this statement.

4. Does the environment contain factors outside the system? Explain your answer.

5.Why are computer systems black boxes to most people?

6. List four systems which are black boxes to you.

Câu 4: PROCEDURES

Procedures are the set of instructions which specify what processing is to be performed, or what course of action is to take place. For example, the procedures in making coffee consist of:

. placing a teaspoon of coffee in the cup

. pouring the hot water into the cup

. pouring the right quantity of milk into the cup

. stirring..   .

The procedures need to take into account the order of the processes, such as whether the milk is poured into the cup before or after the hot water.

PROCESSOR AND RESOURCES

The processor and the resources are closely linked. The processor is whatever carries out or executes the procedures. The person making the cup of coffee is the processor since she or he performs all the above procedures.

The resources are used by the processor to perform the task. They include, anything which supports or assists the execution of the procedures, but do not include the inputs. The teaspoon used in making the cup of coffee is a resource.

1 . The vowels have been omitted from these words. Write out the completed words.

a. pr _c_ss_r   f. r _s _rc_s

b. _nv_r _nm__nt   g. pr _c_d_r_s

c. sys_m   h. b_ _nd_ry

d. _np_t   i .synth_s_s

e. s_b-syst_m   j . _ _tp_t

2. Why is the system defined in terms of procedures, processor and resources?

3. What is the meaning of the following terms?

   a procedures

   b processor

   c resources

4. Why do procedures need to take into account the order of the processes?

5 .Making a piece of buttered toast is a system. What are its procedures, processor and resources?

6 . Planting a tree bought at the nursery is a system. What are its procedures, processor and resources?

Câu 5: Hierarchy charts

Just as we can refine a system into sub-systems, we can also refine a process into *sub-processes,* -also called *modules.* Each of these modules contains only one process.

We can illustrate the different levels of the process using a *hierarchy chart.* The major module is shown as the top level and it can be refined into lower level modules as more detail is required. Control passes from the top level down to the next lower module or first refinement, then to the next lower module or second refinement, and' so on. As well as containing only one process, each module should contain a single entry and a single exit.

1 Write down whether the following statements are true or false.

a. Modules are also called sub-processes.

b. Each module in a hierarchy chart can have more than one entry and exit.

c. Hierarchy charts are never changed.

d. If more detail is required in a hierarchy chart, a further refinement is necessary.

e. Hierarchy charts only illustrate the structl1re of the processes.

f .The top level of the hierarchy chart contains the major module.

g. Processors are the set of instructions which specify what processing is to be performed.

h. Resources are whatever carry out or execute the procedures. i The environment is the limit of the system.

j. A black box is a system whose internal components are not fully understood.

2 What is the purpose of a hierarchy chart?

3 Hierarchy charts use a top-down method. Explain the meaning of this.

4 What is a module in a hierarchy chart?   .

5 The first level in a hierarchy chart is called the top level. What is the next lower level called?

6 Making a piece of buttered toast 'is a system. Draw a hierarchy chart to illustrate the process for toasting the bread.

7 The recorded music system involves using a record, cassette or compact disc to listen to music. Draw a hierarchy chart to illustrate the process of selecting music

Câu 6: IPO charts

An input-process-output (IPO) chart is another method of describing a system. It specifies the inputs put into the system, the processing to be carried out by the system and the outputs taken from the system. It consists of three columns with the headings input, process and output. IPO charts can also be drawn for any sub-system. For example, IPO charts could be drawn for the evaporation, transpiration and precipitation sub-systems of the water cycle. IPO charts provide a quick and efficient way of describing a system.

1. Complete the following sentences

a. ………… charts are a way of describing a system by specifying inputs, processes and outputs.

b. Hierarchy charts are used to show the levels of refinement of a …………..

c. Procedures are the set of…………… which specify what processing is to be performed.

d. Resources are used by the ………………………..to perform its task.

e. IPO charts can be drawn for any……………………….

f .Processes are broken down into smaller components called………………..

g. A………………is whatever carries out or executes the procedures.

h. A hierarchy chart passes control from the………………………..level down to the first refinement.

i . A………………is a system whose internal components are not fully understood.

j. The………………..is the physical conditions or surrounding influences within which the system operates.

2. Describe an IPO chart.

3. Why are IPO charts a good way to describe a system?

4. Making a piece of buttered toast is a system. Draw an IPO chart to describe this system.

5. Planting a tree bought at the nursery is a system. Draw an IPO chart to describe this system.

6. The recorded music system involves using a record, cassette or compact disc to listen to music. Draw an IPO chart to describe this system.

Câu 7: Specifying procedures

Procedures are the set of instructions which specify what processing is to be performed. These procedures are essential if the system is going to achieve its purpose and are stated in the form of an *algorithm*. An algorithm is a series of steps which, when performed correctly, will solve a problem in a finite time. Algorithms can be used to solve all kinds of problems. Even simple actions such as making a phone call, catching a train or running a shower can be represented as algorithms.

The algorithm to make a phone call might be:

1. Pick up the phone receiver.

2. Dial the correct phone number

3. Deliver the message

4. Hang up the phone receiver. ,

The algorithm presents a solution in a finite number of steps. The algorithm to catch a train takes five steps. For the algorithm to work in all situations, the steps must be performed in a particular order and the algorithm must describe every possibility that may occur.

Before the algorithm can be written, the problem must be fully understood. After the algorithm has been written it needs to be tested. If the results are unsatisfactory it is modified or discarded. There is usually more than one correct algorithm to any problem and the best algorithm is a matter of personal choice.

1 Write down whether the following statements are true or false.

a. Algorithms contain an infinite number of steps.

b. Algorithms always need to be tested.

c. A problem may be solved by more than one correct algorithm.

d. Procedures are not stated in the form of algorithms.

e. We use algorithms all the time.

f. Unsatisfactory algorithms are always discarded.

g. The steps in an algorithm are sometimes repeated.

h. Algorithms do not allow for decisions to be made.

2. What is an algorithm?

3. Explain the difference between procedures and an algorithm.

4. What needs to be done if an algorithm is unsatisfactory?

Câu 8: Algorithms

Algorithms are used to enable computers to 'solve particular problems and perform a variety of tasks. This involves a number of stages: first, the problem is analysed to determine its essential features. Secondly, the algorithm is written to solve the problem. Thirdly, the algorithm is changed into a *programming language* which can be understood by the computer. .

In order for the algorithm to be easily changed into a programming language, it needs to be written in a particular form. Algorithms can be expressed in a number of forms including *English prose pseudocode* and *flowcharts.*

ENGLISH PROSE

English prose is a description of the steps required to solve the problem in plain English without a structure. English prose is the simplest method of algorithm description, but since there are no formal rules it is difficult to apply it to complex problems.

PSEUDOCODE

Pseudocode is a limited form of English which relies on indenting lines and using keywords to highlight the structure of the algorithm.

It is written in text form which allows it to be easily modified with a word processor.

Different standards of psuedocode have been established for different applications. The basic keywords are grouped together in pairs. The most common keywords are shown in the table on the following page.

Structured English is another method of describing algorithms which is very similar to pseudocode. It does not use any keywords, but consists of short statements with indentation to show the structure.

FLOWCHARTS

Flowcharts are a way of describing algorithms in pictorial form. They are often favoured since it is easier to follow the structure in a picture than in words; however, it is very easy to draw a flowchart which is complex and difficult to change into programming language.

The basic elements of a flowchart are a set of symbols (containing messages) and interconnecting lines with arrows: A set of standards for flowcharts has been established for a number of different. applications. The four most commonly used symbols are shown in the following table.

1. For each of the following statements, select a matching phrase from the list below.

a. Lines and arrows used in flowcharts.

b. An algorithm which uses a limited form of 'English and relies on indentation and keywords.

c. A symbol used in flowcharts to indicate a selection.

d. An algorithm in pictorial form which uses a set of symbols and flowlines.

e. An algorithm which uses an English description of the steps required to solve the problem.

f. A symbol used in 'flowcharts to indicate the beginning or the end.

g. Used to show the structure in pseudocode.

h. Algorithms are converted into this language so that they can be understood by the computer.

i. A series of steps which, when performed correctly; will solve a problem in a finite time. flowlines terminal indentation

algorithm   flowchart   programming

pseudocode   decision   English prose

2. Briefly describe the following methods of algorithm description:

a. English prose

b. flowcharts

c. pseudocode.

3 .Why are flowcharts often favoured as a method of describing algorithms?

4. When is it necessary for flowlines to have arrows?

5.Write down two advantages pseudocode has over flowcharts.

6 .Why are keywords high lighted in pseudocode?

7. What is the purpose of indenting lines in structured English and pseudocode?

8. Write algorithms in English prose, pseudocode and as a flowchart for the following:

a making a cheese sandwich

b making corn flakes for breakfast.

Câu 9: Control Structures

Control structures are used in an algorithm to control the flow of logic; that is, they indicate the order in which the statements are carried out. Algorithms are composed of three basic control structures: *sequence/ selection* and *loop.*

SEQUENCE

Sequence is where the steps are executed' one after another. Each statement is performed only once and is then fol1owed by the next statement in order.

Example: Washing your hands
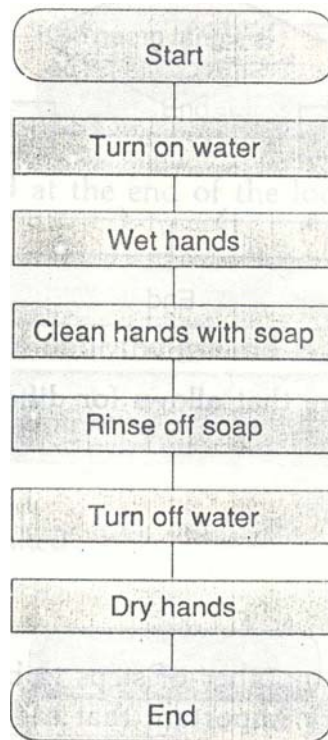
SELECTION

Selection allows for different steps to be carried out in different conditions. There are many situations when the normal sequence of one step: followed by the next is not appropriate. Using selection, a condition such as a question can be given and, depending on the answer, different steps can be followed.

Example: Approaching a set of traffic lights

English prose

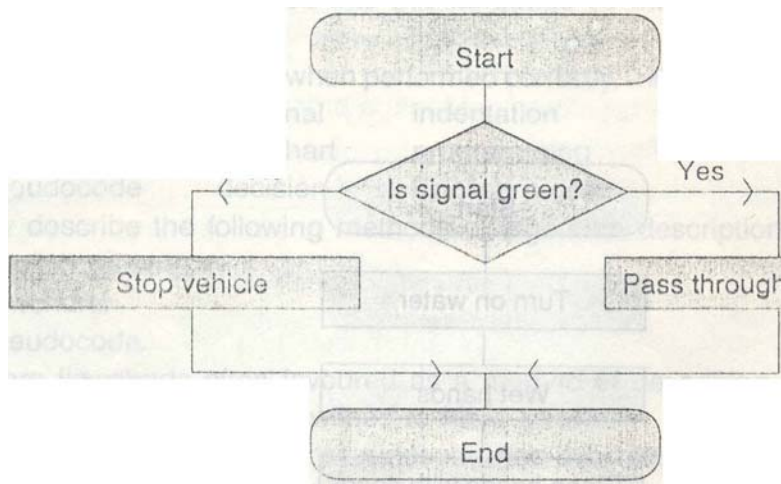If the signal is green, pass through the traffic lights; otherwise stop the vehicle.

Pseudocode

Begin

if signal is green

then pass through, traffic lights

else stop the vehicle

end if

LOOP

A loop or repetition allows a number of steps to be repeated until some condition is satisfied. It is very important that each loop includes a condition that will stop the loop going on forever.

If the condition is checked at the beginning of the loop, it is called a pre-test loop or guarded loop.

Example: Safety procedure for traveling in a car

English prose

Keep seat belts on while you are' traveling in the car.

Pseudocode

Begin

While car is traveling

Seat belts on

End while

End

If the condition is checked at the end of the loop, it is called a post-test loop or unguarded, loop.

Example: Watering plants

English prose

Keep watering the plants until the ground is soaked.

Pseudocode

Begin

Repeat

. Water plants

Until ground is soaked

End

1) *The vowels have been omitted from these words. Write out the completed words*

a. s_q _ _ nc _   b. fl _ wch _ rt   c. s _ l _ ct _ _ n

d. r _ p _ t _ t _ _ n   e. g _ _ rd _ d l _ _ p   f. ps _ _ d _ c _ d _

g. c _ ntr _ l str _ ct _ r _ s   h. _ ngl _ sh pr _ s _   i. _ ng _ _ rd _ d l _ _ p

j. fl _ wl _ n _ s

2. What are control structures used for?

3. Explain the difference between the following control structures:

sequence, selection and loop

Câu 10: Review Exercise 1

1. Copy and complete the following sentences.

a. A ……………………. is a system whose internal components are not fully understood.

b. The boundary is the - of a system.

c. Procedures are a set of ……… which specify what processing is to be performed.

d. …………….. charts are used to show the levels of refinement of a process.

e. A system is a group of elements which work together to achieve a

f. Refinement breaks down……………. systems into smaller sub-systems.

g. Output is something taken ……………….. the system.

h. The ……………. is the physical conditions or surrounding influences within which the   system operates.

i. …… charts are a way of describing a system by specifying inputs, processes and outputs.

j. Resources are used by the …………….. to perform its task.

k. A …………… is a small system which is part' of a larger system.

l. A process is a series of ……………….. carried out by the system.

m. Control structures indicate the ....in which the statements   are executed.

n …… is a control structure that allows for different steps to be carried out in different conditions.

o. A flowchart describes an algorithm in ……….. and flowlines.

p. An algorithm is a series of…………………which, when performed correctly, will solve a problem in a finite time.   .

q…………………….describes the steps in an algorithm using plain English.

r. A loop is a control structure that allows a number of steps to be   until   some condition is   satisfied.

s. Pseudocode describes an algorithm using a limited form of English. It relies on indentation and the use of

t . ………….is a control structure in which the steps are executed one after another.

2. Turning on the TV and watching your favourite TV show can be considered as a

system.

a Construct an IPO chart for this system.

b List any procedures, resources and processors used in the process.

c What is the system's boundary and environment?

3. Why do systems undergo refinement?

4. What is the difference between the boundary of a system and its environment?

5. How are the procedures, processor and resources related in a system?

6. Explain the difference between hierarchy charts and IPO charts.

7. Why are algorithms written?

8. List three methods of describing an algorithm.

9. Describe the three basic control structures.

Câu 11: A computer system

A computer can be considered as a system made up of *hardware* and *software,* which work together, processing *data* to achieve a purpose. Computer hardware refers to the parts of the computer system that you can see and hold, such as the keyboard, monitor, disk drive or printer. Computer software refers to the computer programs or instructions which direct the hardware to perform particular tasks.

Computer systems can be viewed as five co-operating sub-systems. Input - entering data into the system for processing.

Output - presenting data/information which can be used outside the system

Processing - changing data to produce information

Storage - retaining data for later use by the system.

Control - coordinating the operations of the input, processing, output and storage sub-systems.

These sub-systems work together. Data is entered using an input device.

It is then changed in some way to produce information, which is presented on an output device. If necessary, the data/information can be retained on a storage device for later use. To process the data the hardware needs dear instructions, or software, which tell it what to do.

1. Copy and complete the following sentences.

a. Output involves………….. the data/information.

b. Computers can process information at very ………. speed.

c. Processing involves   …………. data to produce information.

d. Storage involves……………. data for later use.

e. The instructions given to a computer so that it can perform a particular task are called its ………………..

f. ……………. involves co-ordinating the operations of the input, processing, output and storage sub-systems.

g. Parts of the computer system that you can see and touch are called its…………..

h. A computer system is made up of hardware and software which 'work together, processing data to achieve a……………

i.   involves entering data into the system for processing.

j. The computer software refers to the computer program or   which direct the hardware to perform particular tasks.

2. What is a computer?

3. What is the purpose of a computer system?

Câu 12: Input

Input involves entering data into the system for processing. The data is taken from the environment and changed into a suitable form to be processed. There are many types of input devices used for different purposes.

The two most common input devices are the *keyboard* and the mouse.

THE KEYBOARD

A computer keyboard looks similar to a typewriter, with a number of extra keys for special purposes. Data is entered when one or more keys are pressed to represent a character or special function. If a key representing a character is pressed, the character appears where the blinking rectangle, or *cursor,* is on the screen. The cursor indicates the user's current position on the screen.

The keyboard is the main device that you use to communicate with your computer.

Some of the special keys include:

Enter or Return- used to inform the computer to act on an instruction

(command) or to move the cursor to a new line.

- allows you to stop the execution of a command.

- used in combination with other keys to perform

special tasks.

- used in a similar way to the control key (not found

on all keyboards).

THE MOUSE

A mouse is a pointing device that can be used to point the cursor at the desired position on the screen. It enables the -user to move the cursor to different parts of the screen very quickly. A button on the mouse allows the user to select a character or command from the screen display.

Other common input devices include the light pen, joystick, scanner, touch screen and trackball.

1. Write down whether the following statements are true or false..

a. The mouse does not allow the user to move the cursor quickly.

b. Input devices take data from the computer system.

c. The cursor indicates the user's current position on the screen.

d. Data can be entered into the computer using a keyboard.

e. The mouse is part of the computer's software.

f .Computers do not have any intelligence.

g. The software follows instructions contained in a computer's hardware which command it to perform a particular task.

h. The Escape key allows you to stop the execution of a command.

i .The Enter or Return key is used in combination with another key to perform a special task.

j. The Backspace key deletes the character immediately to the left of the cursor.

2 .Make a drawing of the keyboard used on the computers at school. Mark the standard typewriter keys and the special computer keys. Try pressing the various keys to learn what they do.   .

3 .What is the long key across the bottom used for?

Câu 13: Output

Output involves presenting data/information which can be used outside the system. Computers present data to users as text (letters and numbers) or graphics (pictures), or in the form of computer-generated speech called voice synthesis. Many kinds of output devices can be used to present data.The two most common output devices are the *monitor* and the *printer.*

The monitor

The monitor is the most popular output device. It is similar to a television screen, but superior in clarity. The monitor is known by several names which include the screen, CRT (cathode ray tube) or VDU (visual display unit). There are many types of monitors and they can be either monochrome or colour. Monochrome refers to black on white or, in some cases, amber or green on black.

Many laptop computers and portable computers use a liquid crystal display (LCD), the same type of display as on digital watches and calculators. This type of display is very light and requires less power than a CRT, allowing it to be run on batteries.

The printer

A allows data to be presented on paper as a 'hard copy' or printout. There are many different types of printers, the main types being dot-matrix, ink-jet and laser. The dot-matrix printer is the cheapest and most popular. A printer must have power, be connected to the computer and have the paper inserted correctly. The computer's software must be instructed about the type of printer being used.

1. For each of the following statements, select a matching word or phrase from the list below.

a. Devices used to enter data into a computer system for processing.

b. Screen used by many laptop computers.

c. A type of monitor that comes in black and white, black and amber or black and green.

d. Devices used to present data.

e. An input device which consists of a series of keys which produce characters when pressed.

f. The physical components of a computer system.

g. The most popular type of printer.

h. A key on a keyboard used to inform the computer to act on an instruction.

i .A key on a keyboard that allows you to stop the execution of a command.

dot matrix   output   LCD

Enter   monochrome   input

keyboard   hardware   Escape

2. Why are LCD screens used on laptop computers instead of CRT monitors?

3. What is the main difference between a computer monitor and a television set in presentation of data?

4. In what forms do computers present data to users?

5. What would you check if a printer was not working correctly?

Câu 14: Processing

Processing changes data to produce information. Data are the raw facts put into the computer system by an input device. When this data is processed or ordered and given some meaning, it is called information. This information is then presented for use outside the system by an output device.

The processing in a computer is carried out by the *central processing unit* or *CPU*. It is made up of millions of electrical components and is the control centre of the entire computer system. The electrical components are located on a thin silicon wafer called a *silicon chip* or *integrated circuit.* The CPU in a microcomputer is referred to as a *microprocessor* and is contained on one silicon chip.

1. Vowels have been omitted from these words. Write out the completed words.

a. s-l-c-n

ch-p   f. –nt-gr–t-d c-rc- -t

b. m-cr -_pr-c-ss-r   g. l-pt-p

c. m- n- t - r   h. d-t-

d. -nf - rm-t- -n   i. d-v-c-s

e. pr-c-ss   j. – nstr - ct- -n

2. What does the central processing unit do?

3. How is data changed into information?

4. Microprocessors are being used in many different ways. Write down five pieces of equipment. in which a microprocessor is used.

5. If possible, under teacher supervision, examine the internal parts of the school's computer. Find the CPU.

Câu 15: Storage

Storage involves retaining data for later output or processing by the system. Data can be stored for later processing in *primary storage* or stored for later use.

Primary storage, or main memory, is the computer's internal data storage area. It is directly linked to the CPU and stores data before and after it is processed. The unit of measurement of storage is the *byte* and it represents a single character, such as a letter, a number, a punctuation

mark or a space. Primary storage can be measured in billions of bytes *(gigabytes)*, millions of bytes *(megabytes)* or thousands of bytes *(kilobytes)*, depending on the capabilities of the computer.

Since primary storage is generally limited in size and is often too small to contain all the necessary data, most computers use secondary storage.

A common form of secondary storage device is the magnetic disk. Data can be stored on and recalled from either a *hard disk* or a *floppy disk.*

Disks

Hard disks and floppy disks are magnetic disks whose surface has been coated with a thin layer of iron oxide. They are housed in protective jackets or containers, since a fingerprint, spot of dust, or smoke particle can prevent access to the data on the disk.

Floppy disks are cheap and vary in size from 9-20 cm; the most popular standard sizes are the 3.5 inch (9 cm) and the 5.25 inch (13 cm). The 5.25 inch disks are 'floppy', as their name suggests, but the 3.5 inch disks are housed in a hard plastic jacket. To be used, a floppy disk must be inserted into the right sized *disk drive.* The floppy disk drive is either built in to the computer or is an external unit connected to it by a cable. The disk drive spins the disk at a constant speed and data is read from or written to 'tracks' located on the surface of the disk.   .

With proper care and handling floppy disks are usable for many years, with no loss of data. To insure against data loss, the disk must be protected from damage, contamination and exposure to magnetic fields. It only takes a tiny particle to affect data transfer and cause errors. In order to protect your floppy disks, follow these safety precautions.

. Keep floppy disks in a protective envelope when not in use.

. When transporting or posting disks, always use a protective box.

. Never expose disks to temperatures above 50 °C or below 10°C. Temperatures inside a car can exceed 50 °C on a hot day.

. Magnetic fields destroy data on your disk. Magnetic influence can be caused by any magnet, monitor, disk drive or electronic appliance that generates a magnetic field. Always store your disks in storage boxes at least 10 cm from all electrical appliances or computer components. A hard disk works on the same principles as a floppy disk except that it is rigid and much thicker, and spins much faster. It is usually housed in a special casing inside the computer and is not removed like a floppy disk. Hard disks hold much more data than floppy disks.

1. Write down whether the following statements are true or false.

a. Secondary storage is limited in size and is often too small to contain all the necessary data.

b. Floppy disks should be kept in their. protective envelope when not in use.

c .Hard disks hold less data than floppy disks.

d. Magnetic fields do not destroy data on floppy disks.

e. Data is stored for later processing in primary storage.

f .Magnetic disks should not be kept near any device that generates a magnetic field .

2. What is the difference between primary storage and secondary storage?

3. How is information stored on a disk?

4 .What should a floppy disk be stored in when it is not in the disk drive?

5 .What is the difference between a hard disk and a floppy disk.

6. Why is it important not to leave your floppy disks on the monitor or the disk drive?

Câu 16: Control

The control system co-ordinates the operations of the input, processing, output and storage systems. The control in a computer system is performed by the *control unit* within the central processing unit. The control unit doesn't process data itself, but selects, interprets and oversees the execution of the program's instructions. It controls all the parts of the computer system, just as the central nervous system controls the muscles and other parts of the human body.

The control unit communicates with input devices in order to begin the transfer of data or instructions into storage; it communicates with output devices in order to begin the transfer of results from storage. The control unit uses a system clock to synchronise all these tasks by sending out electrical pulses. The number of these electrical pulses per second indicates the speed of the processor.

1. From the list below, write down the word that best fits each empty. space in the following passage. There are more words in the list than you need.

quickly computer microcomputer

microprocessor calculating   tiny

supervisor   supercomputer storage

The CPU in a **a…………..**is called a microprocessor; micro means

b………….... The CPU or **c ………..**has two different sections.

One section is the control unit. The control unit acts like a **d…………**in an office.

It controls the other parts of the **e**………..system and regulates the work they do.

2. What is the purpose of control?

3. Where is the control unit located in a computer system?

4 .How is the speed of the processor measured?

Câu 17: Perspective-Security

The security of a computer system and its data is a major concern to many organisations. Computer security does not only concern the physical security of the computer itself, but also concerns restricting access to the computer system and its data.

Security involves a system of safeguards designed to protect a computer system and its data from deliberate or accidental damage and access by unauthorised persons. This, means safeguarding the system against such threats as burglary, vandalism, fire, natural disasters, and theft of data for ransom or industrial espionage. It is possible for a person to gain illegal access to the computer systems of business and government organisations using a microcomputer. These people are referred to as hackers.

If security fails, the problems faced by organisations fall into three categories: hardware,

software, and data. The loss of hardware is not a major problem in itself, since the loss will probably be covered by insurance and the equipment can be replaced. Lost productivity can be a problem, however, while the equipment is being replaced. The loss of software should not be a problem if the organisation has used common sense and kept backup copies. The loss of data is the major security concern with large computer systems. The cost of replacing huge numbers of records which change rapidly can be enormous.

The following are some steps to prevent theft or alteration of data.

. Waste must be secured since discarded printouts, printer ribbons and the like can be sources of information to unauthorised persons. This kind of waste can be destroyed using shredders. Passwords are secret words or numbers that must be typed on the keyboard to gain access to the system. Good data protection systems change passwords often so that only authorised persons can have access to certain data.

. Internal controls are controls that are planned as part of the computer system. For example, the computer system could keep a list of every time someone has gained or attempted to gain access to certain data.

. Data sent over communication lines can be encoded (cryptography). The code can only be decoded by the person who is to receive the data.

. The weakest link in the security of any. computer system is the people in it. Employees need to be screened carefully. Dishonest job applicants should not be employed. There are a number of ways to restrict data to authorised persons. These include using a key, badge, plastic card, password, identification number, personal signature, and devices which recognise individual body characteristics such as fingerprints and voice.

Some systems use a combination of the above techniques. For example, access to an automatic teller machine requires both a plastic card and a personal identification number.

1. Copy and complete the following sentences.

a. A …………….. is a person who gains illegal access to a computer system from her or his personal computer.

b .Secret words or numbers to gain access to a computer system are referred to as…………

c. The process of decoding and encoding data is called………………..

d. …………… involves a system of safeguards designed to protect a computer system   and its data.

e. The loss of ………..is the major concern in the security of a computer system.

f. The weakest link in the security of any computer system is the……….. in it.

g. Security of data could include internal controls where a list is kept of every time someone has gained ……….   to certain data.

h. Loss of software is not a problem if ……………… copies of software have been kept.

i . Shredders are used to destroy ………………..

2. Why is the loss of data a more serious problem than the loss of hardware or software?

3. What measures are used to protect data in large computer systems?

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4. How can access to a computer system be restricted to authorised persons?

5 .Why would people want to steal data?

6. List any measures that could be used to protect data when using microcomputers.

Câu 18: REVIEW EXERCISE 2

1. Copy and complete the following sentences.

a. The monitor is the most popular form of………device.

b. To obtain a hard copy output a…………is needed.

c. The physical equipment that makes up the computer system is referred to as………………

d .The…………is generally a rectangle the size of a capital letter which appears (sometimes flashing) on the screen of a monitor to indicate the current display position.

e.Devices used to present data are called ------ devices

f. A common form of secondary storage device is a ………….

g. The processing in a computer is carried out by the………..

h. A type of computer screen that is similar to a television set is called a ……

i Devices used to enter data are called ………. devices.

j Monitors tare available in…………. or colour.

2. What are the five co-operating sub-systems or components of a computer system?

3. Describe a floppy disk and list two reasons why it is frequently used with microcomputers.

4. Explain the purpose of the following computer devices:

   a. monitor

   b. mouse

   c. keyboard

   d. disk drive.

5. Why do the majority of computers use secondary storage devices?

6. What is the clock speed of a computer?

Câu 19: Hardware configurations

Computers can be divided into a number of types, or configurations, according to their size, power and capabilities. These include supercomputers/ mainframe computers, micomputers/ microcomputers and microprocessor-controlled devices. With advances in technology, today's microcomputers have many of the characteristics and capabilities that were only available on larger, more expensive machines a few years ago.

SUPERCOMPUTERS

A supercomputer is the fastest, most powerful and most expensive type of computer available. One of the most powerful supercomputers today is the Cray-2. It is less than the height of an adult and small enough to fit onto a large business desk. A supercomputer generates so much internal heat that it requires an air-conditioned room and its own internal cooling system.

The primary storage of the supercomputer contains many gigabytes, or billions of bytes of data. It can calculate at rates of over 200 million instructions per second or *MIPS,* and these speeds are expected to increase in the future. Supercomputers can take input from over 10 000 individual *workstations,* or *terminals.* Their prices start at about $4 million.

There are several hundred supercomputers in use around the world today, mainly in scientific applications such as aerodynamics design and simulation, and processing geological, genetic and weather data.

MAINFRAME COMPUTERS

A mainframe computer is a high-level computer which is slower, less powerful and less expensive than a supercomputer. It is generally found in a special computer room where environmental factors such as temperature, humidity and dust can be closely monitored.

The primary storage of a mainframe computer is measured in megabytes, although it can be expanded. It can calculate at rates from 100 to 200 MIPS, and accommodate input from 1000 remote workstations. Mainframe systems can be rented from the manufacturer, leased through leasing companies, or purchased for amounts ranging from several hundred thousand dollars to several million dollars.

Governments, universities, large banks and hospitals, and commercial and industrial companies often need mainframe capabilities. Mainframes typically co-ordinate and manage vast amounts of data. Mainframes use a technique called *time-sharing* that allows many people at different terminals to access the same computer at one time. In a time-sharing environment the CPU gives its attention to one user at a time, for a short period, and then switches to the next user. It switches so quickly between users that it seems as if the CPU is devoted to only one user's task. Some companies offer to sell time-sharing services to others outside their organisation.

MINICOMPUTERS

Minicomputers are powerful, general purpose computers, without the size and prohibitive expense of mainframe systems. The minicomputer's size prevents it from being portable, but it can be moved more easily than a mainframe. Although some are still kept in special computer rooms with dust and humidity controls, most minicomputers are also free of the elaborate environmental constraints of the larger systems.

Primary storage in minicomputers consists of several megabytes, or millions of bytes of data. They can calculate at rates from 5 to 50 MIPS. Their prices begin at several thousand dollars, and can range into the hundreds of thousands of dollars.

Minicomputers are well suited to tasks such as accounting, word processing, database management and specific industry applications. Because of their affordability, they were the first type of computer to be widely used outside scientific and engineering organisations, spreading into the business world.

MICROCOMPUTERS

A microcomputer is a self-contained computer that uses a microprocessor (a single silicon chip) as its central processing unit. It has smaller memory and less power, is physically smaller" and permits fewer *peripherals* or external devices than the minicomputer or mainframe. Microcomputers have also been called *personal computers,* as they have brought computing into people's homes and have been used for an increasing number of applications.

Microcomputers range in price from a few hundred dollars to several thousand dollars for the powerful systems with all the peripheral equipment and software. There are millions of personal computers in use throughout the world, since they are useful, inexpensive, easy to use and offer something for almost everyone. Their primary storage can range from several kilobytes to megabytes.

MICROPROCESSOR-CONTROLLED DEVICES

When the central processing unit is contained on one silicon chip it is called a microprocessor. The microprocessor performs a variety of operations according to the instructions it is given. Microprocessors are used not only in computers, but also in devices such as video recorders, televisions, microwave ovens, washing machines and cars. These, devices can also be considered to contain a computer since they involve input, output, storage, processing and control. For example, the video recorder has a series of small buttons for input, it has a digital display for output and, since it allows you to program it to record even when you are not there, it must have storage. The processing and control is performed by the microprocessor.

1. Copy and complete the following sentences.

a. Supercomputers are mainly used in……………………………. applications.

b. Pre-packaged……………………………….. is available, so that microcomputers are easy to use.

c. Mainframe computers can accommodate input from…………workstations or terminals.

d. A billion bytes of data is referred to as a..............

e. A………………is a general purpose computer that calculates at rates from   5   to   50   MIPS.

f. A technique that allows many people to access the same computer at the one

time is called ……………

g. A ……… is a central processing unit contained on one silicon chip.

h. ………………. is the set of physical objects that make up a computer or any device working with the computer.

2. Why are microcomputers often called personal computers?

3. Construct a table to illustrate the different computer types or configurations and their relative costs and processing speeds.

4. What environmental constraints are there for the larger computer systems?

5. Where are supercomputers mainly used?

6. Explain the meaning of time-sharing.

7 .What type of computer does your school use? Find out their cost and processing speed.

Câu 20: Classifying hardware devices

All the different types of computers have devices or physical equipment associated with the five co-operating sub-systems. These hardware devices are divided into peripheral devices and central processor devices.

Peripheral devices are pieces of computer equipment other than the central processing unit. They usually have to be attached to the computer and include input devices, output devices and secondary storage. For example the keyboard, mouse, monitor, printer and disk drive are ali peripheral devices.

Central processor devices are associated with processing, control and primary storage. They are usually located on the computer's *motherboard* and include the *arithmetic logic unit, control unit, registers,* read-only memory *(ROM)* and random access memory *(RAM).* The motherboard consists of a flat printed circuit board containing microprocessing chips. Additional circuit boards known as *interface cards* can be mounted vertically on to the motherboard to connect additional equipment to the computer. These are sometimes referred to as *daughter boards.*

1. Vowels have been omitted from these words. Write out the completed words.

a. h-rdw - r -

f. p_r __ph_r_l

b. m--nfr -m-

g. s_p_rc_mp_t_r

c. d_v_c_s

h. m_cr _c_mp_t_r

d. m_cr _pr__c_ss__r

i. m_n_c_mp_t_r

e. M_PS

j. c_nf_g_r_t_ _n

2. What is a peripheral device?

3. What is a central processor device?

4. Where are central processor devices usually located?

5. List any peripheral devices attached to your school's microcomputer system.

Câu 21: Input devices

Input devices are used to enter data into the system for processing. They are an *interface* between the system and its environment; that is, data is taken from the environment and changed into a suitable form by the input device so that it can be processed by the system. Input is considered a sub-system of the computer system and can be represented by the following system diagram.

A *barcode wand* is an input device that allows the computer to read the barcodes found on nearly all packaged products. It usually looks like a thick pen and is rubbed lightly over the barcode. Barcode readers used in the supermarkets are set into the surface of the checkout counters. They read the barcode and enter the name and price of that item on the cash register. They are quicker than keying in every price on the cash register and eliminate operator error.

The *keyboard* is the most commonly used input device; almost every personal computer uses one. There are two alternative keyboard layouts: the QWERTY and Dvorak. The QWERTY keyboard was named after its first row of letters and was actually designed to slow typists down. Its nineteenth century inventor, Christopher Sholes, originally laid out the keys of the typewriter in alphabetical order. He soon found that the primitive wooden type bars, which were slow to fall into place, jammed as typists of the day became more proficient. Sholes then scrambled the keyboard, moving the most commonly typed letters, E, T, A, O, N and I, to positions further from a typist index fingers. Adopted by later keyboard manufacturers, this purposely inefficient layout has been mastered by generations of touch typists and has remained virtually unchanged to the present day.

Modern computers do not suffer from the same mechanical problems, but the QWERTY keyboard is still used throughout the world. To change this world standard would require a lot of retraining, and many users would be reluctant to change, regardless of the benefits.

The Dvorak keyboard was developed in the 1930s by Dr A. Dvorak; it places the most commonly used letters, E, T, A, O, N and I, on the middle row. It is more efficient than the QWERTY keyboard, but has not become popular.

The *mouse* is another popular input device. It is a pointing device that can be used to point the cursor at the desired position on the screen. It enables to user to move the cursor to different parts of the screen very quickly. With graphics or drawing software, the mouse can be used to draw shapes.

All types of mouse have at least one button. If the button on the mouse is pressed, or 'clicked', it allows the user to select a character or command from the screen display. It is also possible to press the button twice very quickly to select a different command. This is called a 'double click'.

Joysticks are mainly used for computer games. The user moves the joystick in order to move the cursor or other object on the screen. They can be used instead of a mouse to make menu selections and to move graphics across the screen, but it is very difficult to draw using a joystick.

A *graphics tablet* consists of a special electronic pad and a pen called a stylus, which is connected to a computer. The stylus is connected to the pad and can be used for drawing, similar to a pen and paper.

A *light pen* is an input device that can change your pictures or drawings into electronic signals. It is wired to the computer and can be used like an ordinary pen. You simply use the light pen to draw on the screen in the same way as drawing on paper.

Touch screens detect the touch of the human finger. Infrared light beams shine horizontally and vertically across the face of the screen. The pointing finger interrupts both horizontal and vertical beams, indicating the location of the finger. They are useful for menu selections, and providing information, such as in large department stores.   .

A *document reader* is an input device that is able to read text. Many multiple choice tests require answers to be marked onto specially printed answer sheets using a pencil. The answer sheets are corrected using a computer which receives its information from a document reader. This input device consists of a series of lights and photoelectric cells which can read the lead from the pencil.

Optical character readers are used in shops to keep track of sales. They are hand-held devices that can read specially printed numbers from a label attach to an item. They are usually attached to a terminal at the shop counter, which turn is connected to a computer.

Scanners are used to convert text and graphics into patterns which can be read by the computer. The scanner shines a strip of light onto the page and then measures the reflected light using light sensors. Scanned images or text are displayed by the computer as shapes made up of tiny dots. Scanned graphics can be modified using appropriate graphics software. Scanned text must first be converted into proper characters using optical character recognition software.

A *disk drive* is a secondary storage device which is used to store data on a de' floppy or hard disk. Since this data can then be entered or returned into the computer system using the disk drive,

it is also an input device.

1. Copy and complete the following sentences.

a. The……………keyboard was purposely designed to slow typists down.

b. A…………………is used to convert text and graphics into bit patterns which can   be read by the computer.

c. The…………..keyboard places the most commonly used letters on the middle row.

d. A device that allows the computer to read the barcodes found on many product is called a…………….

e. The……………is the most commonly used input device on a computer.

f. A…………is an input device used for drawing.

g. A document reader can………….. information from specially printed answer sheets.

h. A…………….detects the touch of the human finger.

i. An input device mainly used for computer games is called a …………

2. Why did Christopher Shoies scramble the most commonly typed letters on the QWERTY keyboard?

3. Explain why the QWERTY keyboard is more widely used than the Dvorak keyboard

4 .Name three keys that are used on a keyboard but not found on a normal typewriter.

5. A high-speed card reader can read 2400 cards per minute, each card containing 80 characters.

a. How many characters per minute is this?

b. How many characters per second is this?

c. How many cards can be read in one second?

6. List any advantages of using optical character recognition in a large shop.

7. What is a light pen?

Câu 22: Output devices

Output presents data/information which can be used outside the system. An output device is an interface between the system and its environment; that is, data is taken from the system and changed into a suitable form by the output device so that it can be understood outside the system. Output is considered a sub-system of the computer system and can be represented by the following systems diagram.

A *monitor* is the most common computer output device and is used to view what you are doing. The cathode ray tube (CRT) monitor looks like a television screen and works in a similar manner but has greater clarity. The monitor is also referred to as the screen.

A *plotter* is a specialised printer that is used in the architectural an engineering design areas. It uses special pens which are moved across the paper to create the desired drawing. The plotter operates with commands from' the computer and can draw an amazing array of shapes and figures.(visual display unit) or CRT. Monitors may be monochrome or colour. Monochrome monitors are available in black and white, black and green or black and amber. The monitor may not be a separate unit to the computer. In portable computers, such as laptops, the monitor is a flat screen which uses a liquid crystal display (LCD) or plasma. These use very low power and are flat

and very light.

A printer is used by the computer system to represent data on paper. There are a number of different types of printers.

A *dot matrix printer* is probably the most common printer because it is fast, reliable and cheap. This printer prints characters as a series of dots, very much like the characters formed on the visual display unit. Each single dot is formed by the impact between a pin, a printer ribbon and the paper.

Ink-jet printers produce characters by spraying very fine jets of ink on to the paper. They are quiet, light and reasonably priced, but, require non-absorbent paper to produce good results.

A *laser printer* uses a laser beam to create an image on a specially sensitised drum. The drum then picks up toner which creates the image on the paper in much the same way as a photocopier. Laser printers obtain high-quality output, their speed is fast, and they can produce graphics as well as text at varying sizes and styles. Laser printers tend to be more expensive than other printers.

Bubble-jet printers are a new type of printer which is becoming popular. They can produce higher quality.

A *disk drive* is a secondary device which is used to store data on to a magnetic disk. In this sense, the disk drive is also an output device.

1. For each of the following statements select a matching word or phrase from the list below.

a. A printer which forms characters as a series of dots.

b. The flat screen used in laptop computers.

c. A printer that uses a laser beam to create an image on a specially sensitised drum.

d. An output device that uses special pens which are moved around to create the desired drawing.

e. A high-quality printer which is portable. Battery-driven and reasonably priced.

f. Monitors with one colour.

g. A printer which produces characters by spraying very fine ink jets on to the paper.

h. The highest quality dot-matrix printer.

i .A monitor which works like a television screen.

j .The lowest quality dot-matrix printer.

| laser printer | 24-pin matrix | CRT |
| LCD, | plotter | pin matrix |

| ink-jet printer | monochrome | dot-matrix printer |

2. What is meant by the term 'dot-matrix'?

3. What is a plotter?

4. Which type of printer would be best suited to the following computer applications?

a. an engineering firm (for drawing plans)

      b. a publishing company

      c. a solicitor's office

      d. a school (for general use)

5. In what applications can a plotter be used?

6. Explain how a laser printer works.

7. What is the difference in producing characters between an ink-jet printer and a dot-matrix printer?

8 .Will printers ever operate at speeds greater than the computer? Explain your answer

9. Make a list of the output devices used in your school.

Câu 23: Primary storage

Storage retains data for later output or processing by the system. Storage is considered a sub-system of the computer system and can be represented by the following systems diagram located on the computer's motherboard where it is linked directly to the central processing unit (CPU) so that access to data for processing is very fast. Integrate (circuits or silicon chips are used for primary storage.

Primary storage provides both temporary storage, called random access memory (RAM), and permanent storage, called read-only memory (ROM).

RANDOM ACCESS MEMORY

RAM is where data and program instruction are held temporarily so that they can be manipulated or executed. This type of memory allows the user to enter data into memory (write) and to retrieve data (read). RAM depends on a supply of electricity to maintain data storage; when the power to the computer is shut off, everything stored in RAM is lost. In other words, RAM is volatile.

READ-ONLY MEMORY

ROM allows the user to read, but not to write data. ROM may contain information on how to start the computer or even built-in software such as a word processor. The actual contents of ROM are set by the computer manufacturer; they are unchangeable and permanent. The contents of ROM are not lost when the computer is turned off, so ROM is non-volatile.

The amount of primary storage is very important in determining the capabilities of a computer. Computers with more primary storage can store more data. Since many software programs require a specific amount of memory before they can be used, a computer with more primary storage can also use more powerful software. Microcomputers use up to several megabytes of memory, while supercomputers measure their storage capabilities in gigabytes. Many computers have provisions for either adding individual RAM chips to the motherboard or adding interface cards to increase their memory capabilities.

1. Write down whether the following statements are true or false.

a. Primary storage is usually located on the computer's motherboard.

b. ROM is volatile.

c .RAM is where data and program instructions are held temporarily.

d. The contents of ROM are unchangeable and permanent.

e. Microcomputers measure their storage capabilities in gigabytes.

f. Software programs do not depend on the computer's primary storage.

g. Two megabytes equals 2 000 000 000 bytes:

h. RAM chips can be put onto the computer's motherboard to increase its memory capability.

i. Supercomputers measure their storage capabilities in megabytes.

j. Integrated circuits are not used for primary storage.

2. What are the two main types of storage devices?

3. Primary storage is known by four other terms. What are they?

4. Why is access time from the CPU to primary storage very fast?

5. How are the computer's capabilities by the amount of primary storage it has?

6. Write down the number of bytes in

a .512 K   b. 2 MB   c .3 GB.

7. What is primary storage?

8. What does the term 'volatile' mean in relation to a computer's memory?

9. Explain the difference between RAM and ROM.

10. What are the terms used for retrieving data from the computer's memory, and entering data into the computer's memory?

11.Who determines the contents of ROM in a computer?

Câu 24: Secondary storage

Secondary storage is the memory that is stored away from, or external to, the computer's motherboard. It is used on most computers since primary storage is limited in size and is often too small to contain a11 the necessary data. Tape drive and disk drives are two examples of secondary storage devices.

DISK DRIVES

There are many types of disk drives, each having a different speed and capacity. They can 'read' data from or 'write' data to any point on a magnetic disk. This process is similar to playing a record on a turntable, where any track can be played at any time without having to start from the beginning. Accessing data directly in this way is called random access or direct access.

TAPE DRIVES

Tape drives access data which is stored sequentially. The tape drive must read data in the same order as it was stored; it cannot go directly to the required data, Sequential access is a similar process to playing an audio cassette on a cassette player.

STORAGE MEDIA

A secondary storage medium or off-line storage is used to store data permanently away from the computer. There are three main secondary storage media used with all sizes of computers: magnetic tapes, magnetic disks, and optical technology.

1 Write the word that best fits the empty spaces in the sentences of the passage. Below is a list of words you can choose from. There are more words in the list than you will need.

disk drive   floppy disk   CPU   CD-ROM

monitor   primary   tape drive   magnetic tape

computer   RAM   ROM   secondary

The **a** memory of the computer is often found on the motherboard. Primary memory comes in two different sorts. **b** contains instructions which cannot be erased and **c** is where the computer stores things temporarily. Since this memory is relatively small, **d** memory is used to store data away from the computer. A **e** is a device which uses random access to obtain data, while a **f** is a device which reads data sequentially.

2. The vowels have been omitted from these words. Write out the completed words.

a. s_q- _nt- _I   f. v_l_t_l_

b. st_r_g_   g. r_ _d

c. r_nd_m   h. m_m_ry

d. s_c_nd_ry   i .wr _t_

e. byt_s   j. dr –v_

3. Why is secondary storage used on most computers?

4. Explain the difference between random access and sequential access of data.

5. What is secondary storage?

Câu 25: Magnetic tape

Magnetic tape is a very long, thin strip of plastic coated with a thin layer of magnetic material. Data is stored on the tapes in frames; each flame consists of one byte and represents a character. Tapes can store large quantities of data inexpensively and so are often used as a backup medium; that is, for storing information for security purposes and for long-term reference, rather than for data that is in constant use. Magnetic tapes are erasable, reusable, and durable. Magnetic tape is not well suited to data which is used, revised or updated often, since tape's sequential access to data is too slow.

Although mainly associated with large computers, magnetic tapes can be used with all sizes of computers. They are made in reel-to-reel, cassette and cartridge forms. Each form stores data magnetically, but each holds different amounts of data and accesses it at different rates.

A *reel-to-reel tape* is a magnetic tape about 1.2 centimeters wide which is placed on reels about 25 centimeters in diameter. A typical tape can hold about 40 megabytes of data and data can be transferred at speeds ranging from 5000 bytes per second to over one million bytes per second. These tapes are used mainly with large computer systems.

A *cassette tape* resembles the tape used for audio recording. It is relatively inexpensive but cannot hold much data and access to that data is slow. They were popular with personal computers.

A *cartridge tape* uses 0.6 centimeter wide tape and is similar in appearance to a cassette tape, but with a much greater data storage density. It is usually used with smaller personal computer systems for off-line storage or backup.

1. Copy and complete the following sentences.

a. A…………tape looks like a cassette tape but holds more data.

b. External storage of data is usually located away from the computer's motherboard and is called ……………

c. Magnetic tapes can store large quantities of data inexpensively, so are often used as a………..medium.

d……………..were a popular means of data storage with personal computers.

e. Magnetic tapes are not used for data that is used, revised or updated often, since access to data is………...

f. ……………… access cannot go directly to the required data, but must read from the beginning.

g. Internal storage of data is usually located on the computer's motherboard and is

called………………

h. ………..access allows the required data to be read directly.

2. How much data can a typical reel-to-reel tape hold?

3.What are tile two problems in using cassette tapes to store data?

4. How is the data stored on magnetic tapes?

5. List the advantages and disadvantages in using magnetic tapes as a secondary storage medium.

Câu 26: Magnetic disk

A magnetic disk is a circular metal or plastic plate coated on both sides with magnetic material. There are three main advantages magnetic disks have over magnetic tapes; the ability to:

. access data directly (random access)

. hold more data in a smaller space

. attain faster data transfer speeds.

Floppy disks or diskettes are cheap and vary in size from 9-20 centimetres.

The 5.25 inch (13 centimetre) disk and the 8 inch (20 centimetre) disk are covered by a stiff protective jacket. Data can be protected by covering the write-protection notch. The 3.5 inch (9 centimetre) disk has a hard plastic covering and a protective notch that covers the read/write window. This additional protection makes the disk less prone to damage from handling dust or other contaminants.

A floppy disk cannot be used. until it has been formated. Formatting involves dividing the disk into concentric circles called tracks and pie-shaped wedges called sectors. The number of tracks and sectors is usually determined by the computer's operating system (its most basic level of software) during the formatting operation. The operating system labels each sector of each

track with an address so that the computer can go directly to a specific 'area, rather than having to start at the beginning, as with magnetic tape. A floppy disk formatted for use by one operating system cannot be used in a computer with a different operating system.

Floppy disk can be either: .'

- single-sided in which case data is recorded on only one side of the disk, or double-sided, in which case data can be recorded on both sides of the disk.

All floppy disks have two sides, but the difference depends on whether the disk has been checked to be free of errors on one or both sides.

In addition to being single- and double-sided, floppy disks are also available in several densities. The three most common densities for floppy disks are single,

- double, and high (quad) densities. For example, a typical single-sided double density 5.25 inch floppy disk holds 180 kilobytes; a double-sided, double-density 5.25 inch floppy disk holds 360 kilobytes; a1!d a double-sided, high-density 5.25 inch floppy disk holds 1.2 megabytes.

Floppy disks are convenient to use with small computer systems, but are highly inefficient, expensive and inadequate for larger computer systems. A high-density. floppy disk can store 1.2 megabytes of data (about 500 pages of text) which is not' sufficient for most large computer systems. To compensate for the limited space

on the floppy disk another type of disk is used, called the hard disk.

A *hard disk* is a metal disk covered with magnetic material. Its rigid construction allows it to be rotated 10 times faster than a floppy disk which allows quicker access to data. Another advantage in its hard construction is that it permits data to be stored more densely. It is also located in the computer's casing or a sealed unit. his provides a clean environment and allows a higher storage capacity.   .

Hard disks and drives are available for all sizes of computers. The disk may be permanently installed in the drive, a fixed disk, or may be in the form of a cartridge or disk pack, that can be removed from the drive.

A *fixed disk* is enclosed permanently inside a sealed case for protection from the elements. Fixed disk systems contain one or more hard-disks and can be used with a types of computers. Fixed disks in personal' computers have typical storage capacities of between 10 and 70 megabytes. In large computers, the fixed disk system provides storage capacities in the gigabyte range (billions of bytes).

A *removable carlridge* has the same speed and capacity as a hard disk. These cartridges usual1y contain only one or two disks. Many hard disk systems in small computers are designed to use removable cartridges. The advantage of the removable cartridge is that it may be removed at any time and a different cartridge may be inserted. For example, the user can have separate cartridges for different software applications.

A *disk pack* is another removable device in which several hard disks (a common number is eleven) are packed into a single plastic case. The disk pack drives are designed for large systems that require large storage capacities in the hundreds of megabytes.

1. For each of the following statements   select a matching word or phrase from the list below.

a. Pie-shaped wedges on a disk.

b. Contains one or more hard disks permanently enclosed inside a sealed case.

c. When a floppy disk has data recorded on both sides.

d. Consists of one or two hard disks which can be removed at any time.

e. Floppy disks are available in several of these, the most common being single, double and high.

f. Several hard disks in a single case.

g. Concentric circles on a disk.

h. When it is covered, no data can be written on to a 5.25 inch floppy disk.)

removable cartridge   write-protection notch disk-pack   sectors

density double-sided   fixed disk   tracks

2. A magnetic disk drive can 'read' 20 000 bytes (characters) per second. How long would it take to 'read' a 100 page telephone directory consisting of about 15 000 characters per page?

3. Find the storage capacity of the following:

a. a single-sided, double-density 5.25 inch floppy disk

b. a double-sided, double-density 5.25 inch floppy disk

c. a double-sided, high-density 5.25 inch floppy disk

d. a double-sided, double-density 3.5 inch floppy disk.

4. What are the three main advantages magnetic disks have over, magnetic tapes?

5. For a large computer system, what type of magnetic disks would be appropriate?

6. What safety precautions are necessary to protect floppy disks from data loss?

Câu 27: Optical technology

Optical technology involves the use of laser beams; this technology has created new types of secondary storage media for the computer, including optical laser disks, optical cards, and optical tape.

Optical laser disks are hard metal disks ranging in size from 12 centimetres (4.7 inches) to 36 centimetres (14 inches). They were originally developed as compact disks (CDs) for video and audio applications. Most optical disks are read-only storage devices, but some of the more expensive optical disks can be written on and erased.

A common version of the optical disk is the *CD-ROM* (compact-disk read only memory). While not suited to applications where data changes, they are very convenient for storing data that remains constant.

The laser technology used gives these devices tremendous storage capacities. For example, a 20-volume encyclopedia can be stored on a compact disk 12 centimetres in diameter. A typical 36 centimetre disk can store as much as 20 reel-to-reel tapes. Some libraries have started converting their traditional card catalogues and microfilm to CD-ROM systems.

The *optical card,* or laser card, is the size of a credit card and has an optical laser-encoded strip that can store approximately 2 megabytes of data. Optical cards have the potential to store an

individual's entire financial records, adding to or subtracting from appropriate accounts as a person makes, saves or spends money. These cards might also supply a hospital with the holders complete medical history. Some people predict that these cards may one day lead to a cashless society.

Optical tape is similar in appearance to magnetic tape, but data is stored by optical laser techniques. Optical tapes in cassette form can store over 8 gigabytes each, and tape drives can hold 128 cassettes, providing a total storage of about 1 terabyte (1000 gigabytes). Like other optical methods of data storage, optical tape is read-only.

1. The vowels have been omitted from these words. Write out the completed words.

a. m_gn_tic   d_sk   f. c_ss_tt_   t_pe

b. r_m_v_bl-   c_rtr _dg-   g. s_to_s

c. d- _bl-   d_ns_ty   h.l__s_r   d_sk

d. _ptic_1   techn_l_gy   i .tr _cks

e. fl_ppy   d_sk   j. m_g_byt_s

2. What are the advantages and disadvantages of using a laser disk as a secondary storage medium?

3. How much data can optical tapes store if they are in cassette form?

4. List three secondary storage media which involve the use of optical technology.

5. The optical card has the potential to alter our way of life. Explain.

6. Why do libraries started to convert to CD-ROM systems?

7. Describe an optical laser disk.

Câu 28: Processing and control devices

Processing changes data to produce information and is carried out by the processor. The processor is also called the central processing unit *or* CPU. The CPU carries out the processing operations, performs calculations and controls the actions of all the devices attached to the computer.

CENTRAL PROCESSING UNIT

The CPU in a microcomputer is referred to as the microprocessor and is contained on one silicon chip, or integrated circuit. It is located on the main circuit board or *motherboard*. Larger computer systems use a range of silicon chips to perform the CPU function.

ARITHMETIC LOGIC UNIT

The arithmetic logic unit (ALU) is that part of the CPU which carries out all mathematical and logical calculations.

It performs:

. basic mathematical operations, including addition, subtraction, multiplication and division.

. comparison operations, in order to make decisions using relational operators.

. logical operations to combine decisions using the logical operators AND, OR and Not.

REGISTERS

A register is a temporary storage area for very small amounts of data. Groups of data are called words and have their own address so that the computer can find them as needed. Three registers are given specific roles:

. The accumulator holds all the calculation results.

. The storage register holds data coming from or being sent to memory.

. The address register holds information about the location of data in memory.

CONTROL UNIT

The control unit is that part of the CPU which directs the input, processing and output of data. The control unit uses a system clock to synchronise all tasks, by sending out electrical pulses. The number of these electrical pulses per second indicates the speed of a processor. Clock speed is measured in millions of pulses per second, or *megahertz* (MHz). Personal computers have clock speeds between 2 and 40 megahertz.

CPU SPEED

Technology has allowed computers to continually increase their CPU speed. This has been achieved by increasing the clock speed and improving the efficiency of internal operations. The speed of the CPU is measured by the number of instructions completed per second, or millions of instructions per second *(MIPS)*. Supercomputers can execute instructions at over 200 MIPS, mainframe computers between 100 and 200 MIPS, and minicomputers between 5 and 50 MIPS. Some microcomputers can also operate at between 3 and 4 MIPS, but the majority operate at less than one MIPS, and are usually classified only by their clock speed. The speed of a computer goes beyond what we can comprehend. Adding two numbers can be performed by a microcomputer in a few milliseconds (thousandths of a second); this is 2000 times faster than the time taken to blink an eye. A mainframe can do the same calculation in a few microseconds (millionths of a second), while a supercomputer only takes a few nanoseconds (billionths of a second).

1. Copy and complete the following sentences.

a. The……………is the computer's centre of activity.

b. The speed of large computer systems is measured in…………… of instructions per second.

c. Mathematical and logical functions are performed in the………….. which is part of the CPU.

d. The control unit sends out electrical………….. which are measured in megahertz.

e. The CPU is located on the………………

f. A microsecond is a………………… of a second.

g. Mainframe computers can execute instructions at between…………… MIPS.

h. The…………… interprets any instructions it receives from memory, and directs the sequence of events.

i. A nanosecond is a………………… of a second.

2. What is the CPU sometimes called in a microcomputer?

3. If the speed of a CPU is 16 MHz, what does this mean?

4. How fast can a microcomputer execute an instruction?

5. What is a register?

6. Describe three tasks that the ALU performs.

Câu 29: Buses

A *bus* is a pathway of wires and connectors that provides the link between the input, output, process, storage and control devices. That is, the bus allows the CPU to transport data to and from memory, receive input from external devices, and send output to external devices. In addition to the data, a bus also carries the addresses of the source and destination of the data.

1 A hand-held calculator is a simple form of computer. Consider these parts of the calculator liquid crystal display, keys, semi-conductor, wires and memory. Classify these in terms of the components of a computer; that is, CPU, primary storage, input devices, output devices and buses.

2. Write the letters which come before these letters in the alphabet.

   a. cvtft   c. nfnpsz   e. tjrpjdpo

   b. qfsjqifsbm   d. sfhjtufst   f. ibsexbsf

3. Why are buses important in a computer system?

4. What do buses carry besides data.

Câu 30: Perspective-Historical

In order to gajn a broad understanding of computers it is helpful to look at the developments in computer systems' throughout history.

EARLY COMPUTING DEVICES

If computers are defined as machines capable of doing calculations, then the first computer was the abacus, which existed in Egypt as long ago as 5000 BC. In some cultures people still use, an abacus to help them calculate.

John Napier, a Scottish landowner who lived in the late 1500s, invented sets of rods, called Napier's Rods. When two sets of rods were placed side by side they could be used to do difficult multiplication problems. This work was used by the Englishman William Oughtred to invent the slide rule in 1622.

Blaise Pascal is credited as the person who built the first mechanical calculator. In 1642, at the young age of 19, he invented a machine made of gears, wheels and cylinders which could be used to add and subtract. He called it the 'Pascaline'.

Gottfried Leibniz in 1694 developed a device commonly cal1ed Leibniz's Wheel. Like Pascal's machine, it could perform addition and subtraction, but could also multiply, divide and give square roots.

Joseph Jacquard in 1801 invented a punched card device to control the pattern of the weave on a loom. Punched cards are still used in some computer systems today.

Charles Babbage was born in 1791 and is considered to be the father of the modern computer. He designed a machine called the 'Difference Engine' to calculate mathematical tables and print them. It was too advanced for the engineers at the time and was only produced in part at the end of the nineteenth century. Later he designed a machine called the 'Analytical Engine'

which consisted of two basic components. The first was a storage unit which could hold 1000 figures of 50 digits each. The second part was an arithmetic calculator, It used punched cards to set the sequence of operations.

Almost everything that was ever needed for a computer was thought of by Mr Babbage; that is, input unit, output unit, arithmetic unit, and storage system. Unfortunately only part of this machine was ever completed, and the Fikhon involved in driving the mechanical gears never The integrated circuit, or silicon chip, was the next major development allowed the engine to rate. I was not until his writings were re-discovered in 1937 that his great genius was appreciated.

Augusta Ada Byron, or Countess Love was one of the great ladies of computing. She lived from 1816 to 1852 and was the only legitimate daughter the poet Lord Byron. Her notes on Babbage's works were accepted for publication in Taylor's Scientific Memoirs and she helped Babbage in adjusting and correcting some of the problems in his work. It was also her idea to repeat a set of instructions over and over again, which today is called a loop.

Herman Hollerith worked for the United States census bureau and in 1886 he developed a mechanical machine that collected and tabulated data using 50 column punched cards. His invention was first used in the 1890 census.

Howard Aiken worked with IBM and in 1939 he constructed a fully automatic calculator called the Aark 1. It was an electromechanical machine and could perform four basic operations. Input was entered on punched cards and output recorded on an electric typewriter. It could perform 3 calculations per second and could store up to 72 numbers.

EARLY ELECTRONIC COMPUTERS

The first electronic computer was ENIAC (Electronic Numerical Integrator and Calculator), completed in 1946 by J. Presper Eckert and John Mauchly. It filled a room and contained 18 000 vacuum tubes. (A vacuum tube is a glass tube inside which is an empty space or vacuum, with an electric current flowing through the vacuum.) ENIAC was a great success for its day and was used by the military for calculations relating to rockets. An interesting feature of ENIAC was that it used a base 10 number system, not the base 2 system computers use today, and it was able to perform over 5000 operations per second. It also had many problems. The vacuum tubes created enormous amounts of heat and burned continuously. To change a program required rewiring the machine.

Another great pioneer of computing was John von Neumann who, in 1946, led the development of EDVAC. EDVAC was capable of storing both instructions and data in its computer. memory. Von Neumann then went on to find new (applications for computers and he helped scientists such as Robert Oppenheimer and Edward Teller at Los Alamos apply them to atomic bomb research.

In 1951 UNIVAC, designed by Eckert and Mauchly, was delivered to the American Bureau of the Census. It was the first commercially available electronic computer.

William Shockly perfected the first transistor and in 1958 it was used in a computer. This development greatly increased the computers' processing speed to 10 000 operations per second and reduced their size.

It consisted of hundreds of electronic components, such as transistors, resistors and capacitors, packed on to a small piece of silicon wafer. Computers made after 1966 which used

this technology were smaller, more reliable, cheaper and able to work at high speed 100 million calculations per second.

The first popular personal computer was the Altair, which was advertised in Popular Electronics in 1975 at the price of US$397. The machine had no memory, no keyboard, no display and no printer. Input was via a bank of switches on the front panel and output was via a row of light-emitting diodes (LEOs). The first personal computer to grab the public's imagination was the Apple. This was put together by Steve Wozniak and Steve Jobs in a garage to show to members of their computer club. It was made at home, but unlike any other personal computer at that time it contained everything in the one package, Enthusiasts queued to buy the Apple I**,** which was very shortly followed by the Apple It the first personal computer that almost anyone could use.

In 1981 the First high-powered personal computer was released by IBM. Since then it has undergone many technological improvements and been the basis for. countless copies, or 'clones'.

GENERATIONS OF COMPUTERS

Development of the electronic computer has been divided into a number of distinct stages or generations. The word generation is used, since each new computer development is dependent on the earlier computers.

The first generation of computers used vacuum tubes to operate. These computers were produced from 1951 to 1959 and included such computers as ENIAC, EDVAC and UNIVAC. The second generation of computers existed from 1959 to 1966 and used transistors instead of vacuum tubes. The third generation of computers used the integrated circuit and existed from 1966 to 1975. Computer being used and developed today are' part of the fourth generation. They consist of far more advanced integrated circuits which use large-scale integration (LSI) and very large-scale integration (VLSI). Scale refers to the number of rniniaturise elements on a single chip.

1. Copy and complete the following sentences.

a. The first tool used for computation was the……………..

b. Joseph Jacquard invented the………………

c. A Frenchman named……………..invented the first mechanical calculating device.

d. The essential features of today's computers were thought of by………………

e. Herman Hollerith developed a machine for the……………….

f. Third generation computers used the………………. instead of vacuum tubes.

g. Charles Babbage developed a machine called the………………..

h. John Napier invented a computation tool using sets of rods which are called…………

2. Briefly list the contribution of the following people in the development of calculating devices.   .

a Pascal

b Leibniz

c Babbage

d Hollerith

e Aiken

3. How many calculations could the Mark 1 perform in one minute?

4. Compare the storage capacity of the Mark 1 with today's personal computer.

5. What is the importance of the following computers.

a ENIAC

b EDVAC

c UNIVAC

6. Name two advantages the second generation of computers had over the firs tgeneration.

7. What effect did the invention of the silicon chip have on computers?

8. What was the importance of the development of the Altair computer?

9. Why was the 1890 US census so much easier to tabulate than the 1880 census?

10. Why are integrated circuits faster than transistors?

Câu 31:

Software refers to the computer programs (instructions) which direct the hardware to perform a particular task. It controls the processing and movement of data within the computer system. A computer needs software to tell it what to do and it needs hardware to actually carry out the work. Software is written by people called computer programmers.

Software is encoded using a programming language and stored on a medium in primary or secondary storage. Software which is in the computer's ROM, such. as programs supplied by the manufacturer, routines and language translators, is called *firmware.* For example, many microcomputers come with ROM chips that! contain the language BASIC. Firmware cannot generally be modified or removed by the user. There are two main kinds of software: system software and applications software.

System software

System software manages and controls the hardware so that the application software (such as a word processor) can perform the required task.

All computers have system software; it is usually supplied with the computer and includes language translators, resident monitor programs and operating systems.

LANGUAGE TRANSLATORS

Software written by computer programmers needs to be converted into *machine language* or machine code. (strings of binary numbers), so that it can be understood by the computer. *Language translators* change programs into machine language. There are three groups of language translators: assemblers, compilers and interpreters. These are explained later in this chapter.

RESIDENT MONITOR PROGRAMS

Resident monitor programs are groups of instructions sometimes called routines, which are used by the computer's operating system. A program to start up the computer system or a program that tells the computer how to accept input data from the keyboard are example of resident monitor programs. There are many disk operating systems including Unix, Zenix, PC-DOS, 5-005, OS/2, Windows, Apple Macintosh operating systems, ProDOS, Amiga DOS. All of these disk operating systems went written for a particular of microcomputer and are not compatible with each other. This means disks

OPERATING SYSTEMS

The *operating system* uses the resident monitor programs to actually manage and control the computer's hardware resources, such as memory, CPU time, disk space and peripheral devices. It is the link or interface between the hardware and the application software (such as a .word processor). The computer's hardware is dependent on its operating system. A system of hardware and operating system is called the *extended machine*. It can be represented by the following system diagram.

The operating system can be *single-tasking* or *multi-tasking*. Single-tasking allows only one task to be performed at one time, such as entering text using a word processor. Multi-tasking allows multiple programs to be working at the same tip1e so you could switch from a word processor to a drawing program and back again instantaneously. It can also allow the computer's CPU to be shared with other computers. Multi-tasking requires computers with more power and speed than single-tasking.

Disk operating systems (DOS) are programs which manage and control the computer's disk drive. They perform many tasks including

- formatting a disk.

- listing the names of the files on a disk.

- loading a file from the disk into RAM.

- saving a file from RAM onto a disk.

- deleting a file from the disk. changing the name of a file on the disk.

- copying a file or disk from one disk to another disk.

These tasks can be completed using a command, a sequence of actions often within an application program. If required, utility programs can be purchased to simplify these procedures which are formatted using MS-DOS on an IBM-PC will not work on an Apple acintosh computer which uses an Apple Macintosh operating system.

When the computer is turned on, the disk operating system is placed into RAM from a hard disk or floppy disk{s) or, in some computers, from ROM. The process of loading the disk operating system into RAM is called *booting* the system or booting DOS.

1. Copy and complete the following sentences.

a. Software are the……………for controlling the computer's hardware.

b. MS-DOS is a disk…………………system.

c. Software needs to be converted into………………..language so that it can be

understood by the computer.

d. ………………. monitor programs are used by the computer's operating system.

e. ……………. software manages and controls the hardware.

f. ………………. is short for disk operating system.

g. When a computer only allows you to perform one task at a time it is called………..-tasking.

h. Software is written by people called……………….

i. Operating systems are the……………….. between the hardware and the application

software.

2. What does the term 'booting DOS' mean?

3. Name the two main kinds of software.

4. Why are language translators essential?

5. Write down an example of a resident monitor program.

6. Explain the difference between single-tasking and multi-tasking.

7. What does a computer programmer do?

8. Name three types of language translators.

9. What disk operating system does your school computer system use?

10. Copy and complete the following table for your disk operating system.

Function	Command or action
Formatting a disk	
Listing files on a disk	
Deleting files	
Renaming files	
Copying files	'

11. Boot DOS and complete the following tasks using your data disk.' It may be necessary to use a utility program to carry out some of these tasks.

a. List the files on your data disk.

b. Copy anyone file on 'your disk, calling the new file DEM01.

c. Rename the file called DEM01 to DEM02.

d. List the files on your data disk to check that you have the file DEM02.

e. Delete the file DEM02.

f. List the files on your disk to check that you have deleted DEM02.

Câu 32: Application software

Application software is the second type of software. These programs allow users to achieve a wide variety of tasks on their computer. For example, if you need to do some writing using a computer, you purchase a word processing software package. A word processor is an example of application software.

We know a computer system is made up of hardware and software working together processing data to achieve a purpose. This view of the system can now be refined to include the extended machine and the application software.

The extended machine consists of the computer's hardware and operating system. This view is represented by the following system diagram.

There are two main ways application software can be purchased. The first method involves buying commercial software packages. A word processor or database purchased from a software shop are examples of software packages. This is the cheapest and most common way to buy software, but may not meet the exact requirements of the problem. The second method is to have a program designed and written to fit the requirements of the problem. This type of application software is caned custom-made software; it is labour-intensive and very expensive.

DOCUMENTATION

Documentation is written to explain a piece of software. The computer programmer writes documentation in the computer language of the software so that other programmers can understand the structure of the program. Most application software has documentation or manuals to explain how it can be used. This may include a list of hardware requirements, detailed instructions and a tutorial package to teach the user.

1. The vowels have been omitted from these words. Write out the completed words,

   a. pr _gr _m   f .s_ngl_-t_sk_ng

   b. tr _nsl_ter   g. pr _gr_ming syst_m

   c. _pplicat_ _n   h. s_ftw_r_   p_ck_g_

   d. c_st_m-m_d_ s_ftw _r -   i. m_lt_-t_sk_ng

   e. D_S j. b_ _t

2. What is custom-made software?

3. Why do people prefer to buy software packages rather than custom-made software

4. What is meant by 'labour-intensive'?

5. Why do most software packages have documentation?

6. Examine as many software packages as possible. Write an advertisement for the piece of software that you like best.

7.Without referring to the documentation, use a software package. Write some documentation to explain the software in your own words.

8. Search through a software catalogue and make a request to your teacher to purchase software package. The request should outline the reasons for the purchase and it should be written using a word processor.

Câu 33: Programming languages

Software is written using *programming languages.* Programming languages can be divided into two groups: low-level languages and high-level languages.

LOW-LEVEL LANGUAGES

Low-level languages are dependent on the hardware of the computer system. *Machine language* or machine code is a low-level language which consists of 0s and 1s binary code. This is an example of machine code.

00000010 00000000 10000100 00010001 11001111

00111001 10000111 00000000 00000010 10100001

Although machine language is the only language a computer can actually understand, it is not easy for programmers to work with. It was used in the early days of computing, but today other types of programming languages are used.

Assembly language or assembly code is a low-level language that uses letters of the alphabet, often called mnemonics, for every instruction. This is an example of assembly code.

MOV X, 2000

SUB X, 1000

MOV 1000, X

Programming in assembly language is faster than programming in machine language, particularly when the programmer becomes familiar with the mnemonics. However, a program, written in assembly language ultimately needs to be changed into machine language for the computer to understand its instructions. A language translator called an *assembler* is part of the system software which will change any program written in assembly language into machine language. Although assembly language is easier than machine language for people to understand, it still may require thousands of lines of code for it to do something useful. This amount of detail makes programming time-consuming repetitive and error-prone.

High-level languages are closer to the English language and are not dependent on the hardware of the computer system. This allows programs which are written in one high-level language to be used on different computer systems. Since high level languages are closer to English, programs are also easier to write and often shorter in length than programs in low-level languages.

HIGH-LEVEL LANGUAGES

Most computer programmers use a high-level language. There are many high level languages available, each designed for a particular purpose; they include BASIC, Pascal, C, COBOL, FORTRAN, and Logo. High-level languages are changed into machine code by either a *compiler* or an *interpreter*. A compiler is a language translator which changes the entire high-level program into machine code. An interpreter is a language translator which changes one instruction at a time into machine code and then executes the instruction. A compiled program is produced faster, but editing is more difficult than with a program which has been translated using an interpreter. Compilers and interpreters are not always part of the system software and often need to be loaded into primary storage.

1. For each of the following statements, select a matching word or phrase from the list below.

a. A low-level language that uses mnemonics.

b. A language translator which changes the entire high-level program into machine code.

c. A low-level language that uses binary code.

d. A language translator which changes instructions in high-level code into machine code one at a time.

e. A programming language that is dependent on the hardware of the computer system

f. A high-level language used in education.

g. A language translator which changes assembly code into machine code.

h. A programming language that uses English words for instructions.

machine language   assembly language   interpreter Logo assemble

compiler high-level language   low-level language

2. Why do computers only understand the binary number system?

3. What are the advantages and disadvantages in using a compiler instead of an interpreter to translate high-level code into machine code?

4. What level of programming language do most programmers use?

5. List three disadvantages in using assembly language.

6. What do the following language translators do?

a. assembler

b. compiler

c. interpreter.

7. Explain the difference between low-level language and high-level language.

8. What level of code would an assembler be written in?

Câu 34: Logo - A high-level language

Logo is a high-level language developed by Seymour Papert for' education. It teaches students about mathematics and programming. Students enter Logo commands *to* make a 'turtle' move around the screen and draw pictures.

It is a very powerful tool and today there are many different versions of Logo.

Logo, like all high-level languages, contains about one hundred different instructions, sometimes called primitives. The turtle responds to these instructions.

Command	*Example*	Action
SHOWTURTLE	ST	Puts the turtle on the screen
HIDETURTLE	HT	Removes the turtle from the screen
PENUP	PU	Turtle moves without drawing
PENDOWN	PD	Turtle draws a line as it moves
FORWARD x	FD 50	Moves the turtle forward
BACK x	BK 50	Moves the turtle backwards
RIGHT x	RT 90	Turns the turtle x degrees to the right
LEFT x	LT 90	Turns the turtle x degrees to the left
CLEARSCREEN	CS	Clears the screen
HOME	HOME	1urtIe returns to the centre of the screen

The turtle's starting position, *or* home position, is in the centre of the screen facing upward and with the pen down.

Look carefully at the following program and what it produces.

Perspective-Copyright and viruses

COPYRIGHT

Like books, magazines, photographs and illustrations, software is protected by copyright. Copyright is a a law which gives the creator of a work the sole right to make copies of the work and sell them. No one else is allowed to makes copies of the work without the permission of the copyright-holder. Just as authors of books are protected by copyright and receive returns for their time and effort in writing, authors of software programs also deserve returns for their efforts. Without this kind of protection software authors would be reluctant to spend time developing good software.

Unfortunately it is relatively easy for anyone with a computer to make copies of commercial software which is not their own. This is known as software *piracy,* and it is illegal. The copyright act imposes penalties for persons infringing the copyright of computer programs. It is a crime if a person:

. knows, or ought to know, that the copy will be infringing copyright

. publishes an advertisement to supply a copy of a computer program.

VIRUSES

A *virus* is a program which 'infects' your computer by inserting itself into your data. Once inside your computer system, some viruses can corrupt computer data, including the system software that the computer needs to function. Viruses have become a major problem for many computer users; it is often very costly to repair the damage they cause, and it may be impossible to replace the data. They received their name because they are similar to biological viruses in that they can duplicate and spread. Viruses are spread between computer systems when data is copied on to a floppy disk and loaderon to another system. Creating and introducing destructive viruses is a form of vandalism.

Viruses are often spread by students when they exchange disks which carry illegal copies of popular computer games. In many cases students are not aware that they are breaking the law or that they may be transmitting a computer virus. In order to prevent infection by a virus, programs have been invented which can scan a computer system or floppy disk and detect viruses before they nl do any damage. Because new viruses are always appearing, anti-virus program must constantly be updated.

1. How are computer viruses spread?

2. What would occur if the copyright laws didn't protect software authors?

3. What is a computer virus?

4. Why are computer viruses written?

5. List two ways that the' copyright of computer programs could be infringed.

Câu 35:

Any people think of data and information as the same' thing, but there is an important difference between them. *Data* are the raw facts put into the computer system by an input device. These facts are represented by symbols, such as letters and numbers.

This data is then processed by the computer until it becomes *information* and is sent to an output device. Data becomes information when it is ordered and given some meaning. This information can then be used by people to make decisions. For example, data might be measurements, observations, a document, or a reading from a gauge. Taken by themselves these data would not mean much; however, when the data is assembled in an appropriate way it can provide information which is meaningful.

Data can be represented as *digital* or *analog* in form. Digital data is data which is represented by a series of actual values. For example, a digital clock or watch shows the time as a certain number of hours and minutes. The time changes in a series of jumps. Analog data is data which is continuously variable. For example, an analog clock or watch shows a second hand continually sweeping around the clock face, measuring infinitely small units of time.

Digital representation

Even though a computer is made up of many electronic circuits and can perform many complex tasks it is only a 'two-state' device. This means that at its very simplest level the computer's electronic circuits can be considered to be either 'on' or 'off'. The *binary number system* is used to represent these two states; the digit 1 represents 'on', or an electronic current, and the digit a represents 'off', or no electric current. When data is represented in the form of digits it is called digital representation. Virtually all computers in common use are digital computers, which rely on digital representation of data.

Binary code, in the form of a series of 1s and 0s, is the only language that computers 'understand'. So, for us to understand how computers work, we need to have a general working knowledge of the binary number system.

BINARY NUMBER SYSTEM

Our number system is to the base ten and is called a decimal system. It uses It digits - 0, 1, 2, 3, 4, 5, 6, 7, 8 and? - and the position of the digit or place value determines the worth of the digit. The decimal number system uses powers off ten for its place value.

In order to change any binary number into a decimal number, or vice versa, it is only necessary to know the place values of the binary number system.

In a computer each digit (0 or 1) is called a *bit* (short for binary digit). A bit is the smallest unit for storing data in a computer system and can only represent a 0 or a 1.

1. For each of the following statements select a matching phrase from the list below.

a. A number system to the base two.

b. Data which has been ordered and given some meaning.

c. The smallest unit for storing data in a computer system.

d. Data which is represented in the form of digits.

e. A number system to the base ten.

f. Raw facts put into the computer system.

Data, decimal system, binary system , information, bit, digital data

2. Explain the difference between data and information.

3. Name the two ways data can be represented.

4 What is the name of the number system used by digital computers?

Câu 36: Digital interpretation

If a digital computer is a two-state device that uses the binary number system, how does it understand all the data and Instructions given to it? In this section you will learn how data is grouped and changed into binary code.

BYTES AND WORDS

Bits (1s and 0s) are grouped together to form *bytes.* A byte consists of 8 bits an represents a single character of data, such as an alphabetical letter or a symbol. The byte is also used as the unit of measurement for memory. A kilobyte (KB or K) is not exactly 1000 bytes, but actually 1024, or 210, since the binary number system is to the base two. Similarly a megabyte (MB) is not exactly 1 000 000.

Each byte is then grouped together to form *words* which are then processed in a single operation by the computer. This is not a word as we know it, but a group of 1, 2, 4 or 8 bytes, or 8, 16, 32 or 64 bits. The number of bits or bytes in a word is called its word length or word size. When a computer moves bits from one place to another it takes one word at a time. The more powerful the computer, the larger the word length it can handle and the faster it will operate. f0icrocomputers are available in 8-, 16- or 32- bit word sizes, while larger computer systems would use 32- or 64- bit word sizes.

HEXADECIMAL

Although they are ideal for computers, binary numbers are very difficult for people to work with as they are repetitive strings of 1s and 0s. To make life a little easier many computer systems represent binary numbers in *hexadecimal.*

The hexadecimal number system, or hex, is to ,the base sixteen and consists of sixteen digits - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E and F. The numbers are often preceded by the $ (dollar) sign to indicate that they are in hexadecimal code. The hexadecimal number system is used since sixteen is 24, "making it very easy to convert binary to hexadecimal and vice versa.

Hexadecimal code provides an easy method to represent a byte. The 8 bits in a byte are divided nto two-bit groups called *nibbles.* Instead of using eight binary digits to represent a byte it is only necessary to use two hexadecimal digits. For example, the binary number 101101011, is divided into two 4-bit nibble 1011 and 01011.

When computer programmers are correcting errors they often require a complete printout or 'dump' of the computer's memory. A dump in binary code would consist of thousands of 0s and 1s, whereas a dump in hexadecimal reduces the size of the printout, making it easy for programmers to detect any errors. The computer contains a program which converts the binary numbers into hexadecimal.

ASCII

In order for a computer to use data it needs to be converted into a binary number, All letters, numbers, characters and instructions are represented in the same way; they are first given a decimal number which is then changed into binary code. The most commonly used method for converting characters into binary code is called ASCII (pronounced 'ass-key') which stands for the American Standard Code for Information Interchange.

Each computer system works with a fixed number of characters, including uppercase, or capital, letters (26); lowercase, or- small, letters (26); digits (10); punctuation symbols (8); control symbols (20); and special symbols (20).

This amounts to at least 120 different symbols. To represent these in binary would require at least 7 bits (111111h = 128io); this is known as 7-bit ASCII. h 8-bit ASCII allows for 256 different characters (28). A 7-bit ASCII is often expanded to an '8-bit ASCII with the extra bit being used to check for any error! in transmission.

For example, the uppercase letter Q is converted to the decimal number 81 using the ASCII code; this number is' then converted into the binary number1010001 which can be stored by the computer.

1. Copy and. complete the following sentences.

a. A……….consists of 8 bits and represents a character.

b …………..code is used by programmer to detect errors in their program

c. A word consists of the number of………that a particular computer canprocess in one operation.

d The ASCII code for the uppercase letter K is …………..

e……….refers to the number of bits or bytes in a word..

f. Bytes are divided into two 4-bit groups called ……………

g. A printout of the computer's memory is called a ……………..

2. Why is the .hexadecimal number system important for programmers?

3. Explain the meaning of the following terms.

a. bit

b. byte

c. nibble

d .word.

4. Write down the numbers from a to 63 in hexadecimal code.

Câu 37: Analog representation

Analog ,data represents data using continuously variable physical quantities such as voltages.

In most cars the speedometer is an analog device since it shows variable speed using a pointer. The odometer (distance meter) is a digital device since it shows the distance travelled using digits. The analog device allows people to look at it quickly and get an approximation without having to worry about exact numbers. However, when it comes to communicating data such as the speed you have to convert the analog representation on the speedometer into digital representation that someone else will understand (for example, 60km/hour).

ANALOG COMPUTERS

An analog computer uses mainly analog representation of data. It is designed to perform arithmetic functions upon numbers which are represented by some physical quantity, such as voltage, rather than as digits. These computers are used in situations where data can be accepted

directly from a measuring instrument without having to convert it into numbers first. They can then collect and process this data at high speeds making them suitable for work in oil refineries, steelworks, weapon systems and similar operations. Analog computers do not require any storage capability. because they can measure and compare quantities in one operation. Output from an analog computer is usually in the form of dials (like the car speedometer) or charts on a monitor.

1. For each of the following statements, select a matching word from the list below.

a. Representation of data that uses continuously variable physical quantities.

b. A code used to represent all letters, 'numbers and characters.

c. A number system used by programmers for correcting errors.

d. Representation of data in the form of digits.

e. The number of bits that can be processed in one operation.

f. A number system used by computers.

g. Consists of 8 bits and represents a character.

h. Smallest ynit for storing data

   word binary   hexadecimal   byte

   ASCII   analog bit   digital

2. Why is digital representation used in the majority of computers in the world?

3. What is the advantage of analog representation over digital representation?

4. Explain the difference between an analog device and a digital device.

5. What is an analog computer?

6. Name three applications in which an analog computer may be used.

7. What form does the output from an analog computer usually take?

Câu 38: Data transfer

Data transfer involves exchanging data between two devices or components via; communication link. For example, data may be sent to an output device, such a!1 printer, via a cable, or to another computer some distance away, via the telephone line. There are two ways data can be transmitted: by *serial transfer* or by *parallel transfer.* Serial transfer transmits the data one bit at a time through a single channel or wire. Parallel transfer transmits the data one byte (or 'eight bits) at time through eight separate channels. Obviously parallel transfer is a lot quicker than serial transfer and it is commonly used to send information to a printer. When transferring data over a telephone line, however, parallel transfer cannot be used.

A telephone line cannot support eight separate channels; it only allows data in analog form to be transmitted along a single channel. Before data can be transferred using a telephone line it must be changed to serial form and then converted into analog signals. A device called a universal asynchronous transmitter, or *UART,* is used to change parallel signals to serial and serial signals to parallel. Once the data is in serial form it must pass through an *interface card* to a *modem.* An interface is a connection between two parts of a computer system. A modem is a device that allows computers to transfer data over the telephone lines. The modern consists of a modulator, which converts digital signals into analog signals that can be carried over the telephone lines, and a demodulator to convert analog signals back into digital signals.

RATES OF TRANSMISSION

The speed at which data is transferred by a modern is measured either by its *baud rate* or the number of *bits per second* (bps). The baud rate is a measure of the maximum number of data symbols or electrical signals that can be sent per second over the telephone line. Bits per second measures the maximum number of bits. Since an electrical signal may contain more than one bit of data a 1200 bps modern might operate at 600 baud. Common speeds are 300, 1200, 2400 and 9600 bps.

1. Write down whether the following statements are true or false.

a. There are three ways data can be transferred.

b. A modem consists of a modulator and a demodulator.

c. Most computers use serial transfer for sending data via telephone lines.

d. The baud rate is the same as the number of bits per second.

e. ParalIel transfer transmits data one byte at a time.

f. An interface card is a connection between two parts of a computer system.

g. Data can be transmitted in digital form along the telephone lines.

h. Parallel transfer is a lot quicker than serial transfer.

i. A data transfer speed of 1600 bps is common.

j. Serial transfer transmits data one bit at a time.

2. How is the speed of data transfer measured?

3. What is the purpose of a universal asynchronous transmitter?

4. Why is parallel transfer faster than serial transfer?

5. What is a modem?

6. Why is serial transfer more common than parallel transfer?

Câu 39: Intefaces and protocols

Interfaces and protocols are an important part of data transfer.

INTERFACES

An *interface* is a connection between two parts of a system or a link between system and its environment. It is like a bridge that allows data to be exchange between two devices which work in different ways or at different speeds. It adjust for slightly different transmission rates and other factors, so that the devices can communicate with each other.

There are two main types of interfaces: a serial interface for serial transfer and a parallel interface for para11el transfer. A serial interface is commonly used for modems, printers, light pens and plotters, while a parallel interface is common used for disk drives, robots, printers and joysticks.

PROTOCOLS

Protocols are sets of rules for transferring data through an interface. Computer systems must follow certain protocols when sending and receiving data. For example, it would be very difficult for one person who could only spell and understand English to communicate with a person who could only speak and understand French. Similarly, computer systems must have a

common 'language' or protocol in which to transfer data. Protocols are controlled by the computer's software and include its baud rare (word length, the number of bits separating the bytes or characters, and the paril (an error-checking procedure). When two systems are compatible or have the same protocols it is known as *hand-shaking,* and data can be transferred.

1 For each of the following statements select a matching word or phrase from the list below

a. Transmits data one bit at a time.

b. A connection between two parts of a system.

c. Speed of data transfer.

d. Transmits data eight bits at a time.

e. A set of rules for transferring data.

f. When two systems are compatible and ready for data transfer.

g. Represents data continuously using variable physical quantities.

h. Represents data in the form of digits.

i The smallest unit for storing data.

i Represents a single character of data.

hand-shaking   parallel   transfer   byte

bit   baund rate   digital

interface   serial transfer   analog

2. Why are interfaces essential for data transfer?

3. list at least three devices which might require a

a. serial interface

b. parallel interface.

4. What is a protocol?

5. List four characteristics which require protocols so that two systems can hand-shake.

6. Determine how many interface cards are attached to your school computer system.

Are these interfaces serial or parallel?

Câu 40: Media

The *media* are the physical materials on which data is stored or presented. The medium for storing data may be optical, electrical, magnetic or paper.

OPTICAL

Optical media include optical disks (also known as compact disks or CDs), optical cards and optical tapes. Data is recorded by directing a laser beam onto the surface of the medium. This light energy causes a small indentation in the surface of the medium referred to as a pit. The data can be read using a light sensor to determine the intensity of the light reflected from the pit.

ELECTRICAL

Data can be represented electrically on a monitor or a cathode ray tube (CRT). Images are produced by a beam of electrons of different intensities moving back and forth across a phosphor-

coated screen. Each beam is directed to a spot called a *pixel* which is illuminated in proportion to the voltage applied.

MAGNETIC

Magnetic media include magnetic disks (such as hard and floppy disks) and magnetic tapes. The surface of the medium consists of a thin layer: of iron oxide or chromium dioxide so that when data is recorded it appears as magnetic spots. This data can be accessed an indefinite number of times and removed by recording new data on the surface.

PAPER

A printer is used by a computer system to represent data on paper. Printers can be classified as impact and non-impact. Impact printers make an image on the paper by striking the paper with a metal print head. Non-impact printers make an image using some other method. A laser printer is a non-impact printer that uses a laser beam to create an image on a specially sensitised drum. The drum then picks up the toner which creates the image on the paper in much the same way as a photocopier.

1. Copy and complete the following sentences.

   a. With media a laser beam is directed onto the surface of the medium

   b. A beam of   is directed onto the phosphor-coated screen of a monitor

   c.   are the physical materials on which data is stored or presented

   d.   media have a thin layer of iron oxide or chromium dioxide on
their surface.

   e. A printer is used by a computer system to represent data on

   f. A   is a small indentation in the surface of the optical medium.

   g. Each beam of electrons in a CRT is directed to a spot called a

2. How is a laser beam used to represent data in an optical medium?

3. Explain the difference between impact printers and non-impact printers.

4. How is data represented in a monitor?

5. What types of media can be used to store data?

6. How is data removed from a magnetic medium?

Câu 41: Perspective-Privacy

Businesses and government departments collect a huge amount of data about individuals. Data about our personal details, educational achievements, attitude towards various issues, lifestyle and other aspects of our lives is often require on forms we have to fill in for all sorts of purposes. The government carries 0 a census every four yea.r:s to gather personal data about all Australian resident. While most of the data collected is used responsibly for our benefit, it may accessible to the wrong people and has the potential to be misused. Increasing people are becoming concerned about the issue of privacy.

Computer systems have affected the individual's right to privacy because they have enabled people to invade privacy with greater ease and frequency than ever before. That is, computer technology has:

- enabled the user to store and organise a lot of data

- allowed other users quick access to everything that is stored.

Invasion of privacy is dangerous since it means people can use our preferences, weaknesses and habits to their advantage. For example, data on what we buy, how we pay for it, what we read, what we watch on television, what our sicknesses are, and how much we earn is valuable data for those who want to sell us things.

While we understand that doctors must have access to our complete medical history to cure us, and banks need proof of our credit record to provide a loan, we do not want this information to be available to other people for other purposes. It needs to remain confidential.

Society is concerned about whether the data collected is accurate – inaccurate, data can be caused by mistakes in gathering the data or in data entry by a mismatch of the data and the person; or by out-of-date information, data is secure from illegal access and use - although security systems are in place to protect data, computer-related crime and theft has increased in the last few years, data is being combined, sold and exchanged, data is serving any useful purpose.

If inaccurate data is ordered and given some meaning by people the decisions made can be hazardous.

1. The vowels have been omitted from these words. Write out the completed words.

a. d_g_tal   f. s_cur_ty

b. bin_ry   g. s_r__l

c. byt_   h. h_x_d_c_m_l

d. _n_l_g   i. w_rd l_ngth

e. pr_tic_l   j. pr_v_cy

2. What is meant by privacy in relation to data kept on computer systems?

3. What factors can cause data collected by an organisation to be inaccurate?

4. How does computer technology increase the danger of individual privacy being invaded?

5. What kinds of personal data are collected and stored about individuals?

6. Which organisation stores the largest amount of personal data in Australia?

7. Who owns the data stored on a computer system?

8. Do you think the data should be made available in the following situations?

Explain your answer.

a. Before accepting a particular patient, a doctor might like access to data listing all patients who have been involved in malpractice suits (suing their doctors in court).

b. Before accepting a tenant, the owner of a block of units might want access to data listing tenants who have previously sued landlords.

Câu 42:

1. Write down whether the following statements are true or false.

a. All mainframes are also supercomputers.

b. A CRT is a type of monitor.

c. Microcomputers are only used in businesses.

d. A mouse is a device for data output.

e. Charles Babbage worked on the second generation of computers.

f. Joseph Jacquard invented a punch card system.

g. Computers never get bored.

h. Input can be done by a keyboard.

i. A dot matrix character is of better quality than a laser printed character.

j. Computers rarely make mistakes.

2. Vowels have been omitted from these words. Write out the completed words.

a d_t   m_tr_x   f s_p_rc_mp_t_r

b pl_tt_r'   g m_n_t_r

c d_c_m_nt   r-_d_r   h v_c-_m   t_b_s

d _b_c_s;   i m_-_nfr_m

e m_g_byt-   j m_n_c_mp_t_r

3. What is the difference between the second generation of computers and the third generation?   .

4. What does LSI stand for?

5. What is a peripheral?

6. Find out about some input/output devices other than those described in this chapter. What do they allow the user to do?

7. What does the arithmetic logic unit (ALU) do?

8. How can a computer's primary storage capability be increased?

9. Why are floppy disks popular with personal computers?

10. What part of the computer carries out the processing operations, performs calculations and controls the actions of all the devices attached to the computer?

11. List three forms of magnetic tape.

12. Describe a magnetic disk.

13. Which is faster - sequential access or random access? Explain.

14. What is a disk pack storage system?

15. What purposes are served by the write-protection notch on a floppy disk?

16. Databases process a large amount of data. Which type of secondary storage device would be appropriate for a database? Explain your answer.

17. Write a short story on a word processor mentioning as many pieces of computer hardware as possible.

ASSIGNMENT

Each student will be allocated a topic relating to a prominent person in computing history or an important computer development. Some suggested topics are listed below.

1. Abacus   14.   UNIVAC

2. John Napier   15. William Shockly

3 .William Oughtred   16. Integrated circuits

4. Blaise Pascal   17.   LSI

5. Gottfried Leibniz   18.   Steve Wozniak and Steve Jobs

6. Joseph Jacquard   19. Laptop computers,

7. Charles Babbage .   20. Microcomputers

8. Ada Augusta Byron 21. MajQframe computers

9. Herman Hollerith   22. Minicomputers

10. Howard Aiken   23. Supercomputers

11. J. Presper Eckert and John Mauchly 24. Macintosh computers

12. Vacuum tubes   25. IBM computers

13. John von Neumann

CHALLENGE

Select the most appropriate answer for each question.

1. The man who built the first mechanical calculator was:

a. Howard Aiken

b. Blaise Pascal

c. Joseph Jacquard

d. Gottfried Leibniz.

2. The first generation of computers 'used:

a. LSI

b. transistors

c vacuum tubes

d. integrated circuits.

3.The equipment of a computer system is called its:

a. software

b input devices

c. CPU

d. hardware.

4. A computer used in the home is most likely to be a:

a. microcomputer

b. supercomputer

c. mainframe

d. minicomputer.

5.The most efficient keyboard layout is the:

a. QWERTY

b. mouse

c. Dvorak

d. CPU. '

6. The type of monitor used on laptop computers would be a: a cathode ray tube

b. liquid crystal display

c.visual display unit

d. screen.   ,

7 .The highest quality printout can be achieved with a:

a. laser printer

b. dot matrix printer

c. letter quality printer

d. ink-jet printer.

8. The person responsible for developing a loop was:

a. Charles Babbage

b. John von Neumann

c. Augusta Ada Byron

d. Williall Shockly.

9. A billion bytes is called a:

a. megabyte

b. gigabyte

c. kilobyte

d. microbyte.

10.A peripheral device which, can draw an amazing array of shapes and figures is called a:

a .light pen

b. dot matrix printer

c. monitor

d. plotter.

Câu 43:

1. Copy and complete the following sentences.

a…………software is written to allow the user to carry out a particular task or solve a particular problem.

b.Software………… purchased from a shop is an example of a software   .

c…………..are programs which manage and control the computer's disk drive.

d. A low-level language uses the……………number system.

e. An………………changes assembly code into machine code.

f .Software is protected by………………laws.

g………..software manages and controls the hardware of a computer system.

h. Programs designed to fit the exact requirements of a problem are called………..software.

i. A   is a program which corrupts ,or destroys computer data.

j. A……………..changes the entire high-level program into machine code,

2. Name the two broad types of software.

3. What are people who write software called?

4. List two examples of a software package, .

5. Explain the difference between a compiler and an interpreter.

6. What was Logo designed to do?   I

7. Describe the difference between system software and application software.

8. List two examples of:

a a low-level language

b a high-level language.

9.List four tasks which are performed by a disk operating system.

10. Name the low-level language that consists of Os and 1s.

11. What happens when a system has been booted?

12. List two things that might be included in the documentation for a software package.

ASSIGNMENT

The class is divided into six groups and each group is allocated one software packal Each group will write approximately one page using a word processor evaluating the;software, then provide a computer demonstration of the software to the class. The software evaluation could include:

- the name of the software

- the topic/subject of the software

- the brand of microcomputer that the software is designed to run on

- the type of software (drill and practice, tutorial, simulation, problem-solving, game)

- its ease of use

- its ability to maintain interest

- its use of graphics, animation, colour and sound

- any problems in using the software package

- comments on the documentation

- ways the software package could be improved

- a rating of the software package on a scale from 1 to 10.

Câu 44:

1 Copy and complete the following sentences.

a………….transfer transmits data eight bits at a time.

b. Digital representation of data is in the form of………….

c. A……….represents a single character of data.

d. Protocols are sets of rules for transferring data through an……………

e. The speed of data transfer is measured in………………….

f. A car speedometer is an example of an……………..

g. The ASCII code for the uppercase letter M is………………

h. A binary number is to the base…………….

i…………….are the physical materials on which data is stored or presented.

j There are………………bits in every byte.

2. What is the difference between data and information?

3. Change the following decimal numbers .into binary numbers using eight bits.

                   a. 26   b.   140   c. 254

4. How is the hexadecimal number system used?

5. Change the following hexadecimal numbers into decimal numbers.

               a. 19   b. 3A   c. 2F   .

    6. Using the ASCII code, convert the following characters into binary code which can be stored by the computer.

               a. 4   b. P   c. Space

7. Explain the difference between digital representation of data and analog representation

8. What are the two ways data can be transferred?

9. Why are interfaces and protocols important to a computer system?

Câu 45:

People are involved in every aspect of a computing system; computer systems are designed by people for use by people, and their use affects people. In this chapter we will look more closely at how people are involved with computer systems.

Design and construction

People who design and construct computer systems may be involved in planning and developing a new system, or modifying an old system. They include systems analysts, programmers and engineers.

SYSTEMS ANALYSTS

A *systems analyst* is a person who develops a system to solve a particular problem. This may involve investigating the current system and modifying it, or developing a new system. A systems analyst could be involved in planning, implementation and maintaining the computer system. As well as technical computing skills, the systems analyst must have good management and personal skills to be able to interview users of the system, determine their hardware and software requirements and develop plans and schedules.

PROGRAMMERS

Computer programmers write programs (software) that direct the hardware to perform a particular task. The programmer depends on the systems analyst to provide a detailed description of the program required. This is referred to as the specifications of the program. There are two types of programmers:

The system programmer and the application programmer. A system programmer writes the instructions for the computer's operating system, whereas the application programmer writes the instructions that tell the computer to perform a particular task.

Generally programmers need to complete a computer course at a tertiary institution. They are required to know several different programming languages and types of hardware. Computer programmers are often required to work in teams, each person writing a separate part of a large program.

COMPUTER ENGINEERS

Computer engineers design and invent the hardware of the computer system. Today's engineers are developing computers which are smaller, faster and have more memory than computers in the past engineers need to have university degrees and a, high level of technical knowledge and experience with computers.

1. Copy and complete the following sentences.

a……………..design and invent the hardware of the computer system.

b. A systems analyst is a person who develops a………..to solve a particular problem.

c. A…………… programmer writes the instructions for the computer's operating system.

d. Computer programmers are often required to work in……………. each writing separate parts of a large program.

e. Engineers are developing computers which are………….and faster than computers in the past.

f. Computer programmers write…………… that directs the hardware to perform a particular task.

2. What are the specifications of a program?

3. List the qualifications required to be a

a. systems analyst

b. computer programmer

c. computer engineer.

4. How are people involved in a computer system?

5. Describe the role of a systems analyst.

6. Explain the difference between a system programmer and an application programmer.

7. Why do engineers need a high level of technical knowledge?

8. Using the employment section of a newspaper, find the average salary of a

a. systems analyst   .

b. computer programmer

c. computer engineer.

Câu 46: Operations and maintenance

People involved in the operation and maintenance of a computer system keep the system working efficiently so that it achieves its purpose. They include managers, computer operators,

data entry operators, computer consultants, training specialists, technical support staff and computer technicians.

MANAGERS

Managers are needed to oversee the computer operation and ensure that personnel and machines are working efficiently. They have a variety of titles with slightly different roles, such as information systems manager, data processing manager, programming manager and operations manager:

The information systems manager plans and oversees all the information resources in the organisation. She or he must have leadership skills as well as

technical knowledge about systems development, so a degree in business and information systems is generally required.

COMPUTER OPERATORS

As the name suggests, *computer operators* operate or run large computer systems such as mainframes. Their tasks involve switching the computer on/off, loading disks; or tapes, supplying printers with paper, and making sure the computer system is working correctly. If the computer system breaks down they attempt to identify the problem and, if necessary, liaise with technicians to fix the problem.

Many computer operators receive their training on the job, although tertiary qualifications are becoming increasingly necessary. They need to be logically minded people who can work under pressure.

DATA ENTRY OPERATORS

Data entry *operators* are people who enter data into large computer systems. They need to be able to enter data accurately and quickly. Data entry operators are trained on the job, although good typing skills are required. Smaller companies might employ a secretary whose job would include data entry.

COMPUTER CONSULTANTS

Computer consultants are employed on a contract basis to analyse a problem and then give advice on a computer system that will solve the problem. In order to better understand the working environment, consultants usually specialise in a particular area, such as education, retailing or engineering.

TRAINING SPECIALISTS

Training specialists teach users how to operate their computer system. Training is needed when a new computer system is installed to ensure that's the computer is being used efficiently. Users may also need regular retraining to keep up with the latest developments in hardware and software.

TECHNICAL SUPPORT STAFF

Technical support staff are people who assist users of a computer system by answering their questions on hardware or software. This service is usually provided over the phone. Technical support staff need to be completely familiar with their products and are trained by their company. They may work for companies which make and sell computer hardware and software, or on a 'help desk' in a large organisation that uses a lot of computers.

COMPUTER TECHNICIANS

Computer technicians install, maintain and repair the hardware of a computer system. To prevent the computer from breaking down, they perform routine checks and services. This may involve checking for loose connections, cleaning any moving parts, and running test programs to check that everything is working correctly. Computer technicians must have a high degree of technical knowledge, so tertiary qualifications are necessary.

1. The vowels have been omitted from these words. Write out the completed words.

a. _p_r _t_rs   f. sp_c_f_cati _ns

b. syst_m   pr _gr _mm r   g. _ng_n__rs

c. d_t- _ntry   _p_rat_rs   h. __pplic_t- _n   pr _gr _mm_r

d. m_n_g_rs   i. syst_ms   _n_lysts

e. c_ns_lt_nt   j. t_chn_c__n

2. Describe the role of a computer operator.

3. How do technical support staff usually assist users?

4. When would a business employ a training specialist?

5. Describe a computer consultant's job.

6. What skills are necessary to become a data entry operator?

7. 'Computer operators require more knowledge about computers than data entry operators.' Do you agree with this statement? Explain your answer.

8. How are managers involved in the computer system?

9. What personal qualities are necessary to become a computer operator?

10. Describe a computer technician's job.

11. List the steps taken by a computer operator if a computer breaks down.

Câu 47: Users

Users are people who are affected by computer systems. Our modern society could not exist in its present form without computers and their associated technology. People living in this society are affected by computer systems, as *direct users, indirect users* or *intermediary users.*

DIRECT USERS

Direct users interact with or are in control of a computer system. They understand how the computer system operates and can use a computer to perform a particular task. People involved in designing, constructing and maintaining a computer system are all direct users.

INDIRECT USERS

Indirect users don't use a computer system, but the use of computers by other people affects them. Although they cannot use a computer system, they take advantage of its many products.

In many cases indirect users may not be aware that a computer has been involved. For example:

. Supermarkets store data relating to the ordering, transferring and selling of goods. Information on the shopper's receipt is obtained from a computer.

. Bank accounts and financial records are stored on a computer and bank statements are produced using a computer.

. Libraries keep track of books and loans by using a computerised system. Governments store huge amounts, of data about taxation, social security, health and housing on computers.

Computers are used in medical research and even in surgery. Manufacturing industries produce a range of goods using computers and robots.

It would be impossible to live in our modern society and not be an indirect user of computers.

INTERMEDIARY USERS

Intermediary users interact with a computer system to provide a link for indirect users. For example, since all banking accounts are stored on a computer system, the bank teller is the link between the customer' and the computer system.

The bank teller is an intermediary user and the customer is an indirect user

THE USER INTERFACE

The user interface is the interaction between users and a computer system. In most systems you interact by typing in a command, selecting something from a menu, or clicking on something with a mouse. The characteristics of the hardware and the software determine the interface which affects the way users perceive and interact with a computer system.

1. For each of the following statements, select a matching word or phrase from the list below.

a. Install, maintain and repair the hardware of a computer system.

b. Develops........... system to solve a particular problem.

c. Oversee the computer operation.

d. Write the software that directs the hardware to perform a particular task.

e. Run large' computer systems. .

f. Design and invent the hardware of the computer system.

g. Enter data into large computer systems.

   systems analystprogrammers

   data entry operators   computer operators

computer technicians engineers

2. What is meant by the term 'user.

3. Explain the types of people who are:

a. direct users of computer systems

b. intermediary users of computer systems

c. indirect users of computer systems.

4. Do you think it's possible in our society for a person not to be affected by computer systems? Give reasons for your answer.

5. What type of user is a computer programmer?

6. List two ways computer systems may affect you.

7. Explain the term 'user interface'.

Câu 48: Perspective-Ergonomics and safety

In order to gain a broad understanding of computers we need to examine how the use of computers affects individuals and society. In this section we will examine the effects of computers on a person's health and safety.

The term *ergonomics* refers to the relationship between people and their work environment. Most environments in which people do the same kind of work every day are potentially harmful to people's health, even when the work involves sitting in an office for long periods. Health problems such as eye strain headaches, backaches, fatigue, muscle pain and repetitive strain injuries (RSI) can result from working in certain conditions. In order to reduce these health problems, Australian standards have been set for the work environment. One of these standards deals with ergonomics and personal computers.

All organisations should endeavour to meet these standards.

Let's briefly examine some of the standards set to reduce health problems, improve efficiency and make the user more comfortable.

SCREEN

Looking at a computer screen all day may cause eye strain and headaches. To avoid these problems the screen needs to provide a clear, sharp and steady image. The monitor should allow for minor adjustments of angle, brightness contrast to cater for individual differences. If should then be positioned between 0° and 30° below the horizontal of the eye so that the user is looking down attnt screen, not up. The surface of the screen should also be adjusted so that it is alright-angles to the line of sight; this means it should be tilted slightly upwards, Filters can be placed in front of the screen to reduce the amount of glare from natural or artificial light. A break should be taken every hour when using a computer.

KEYBOARD

The keyboard can place strain on the fingers, wrists and shoulders. The keyboard layout should contain a numeric keypad if large amounts of numeric data are to be entered. The keyboard should be detainable and be positioned so that the forearms are parallel to the floor. The keys need to be 'dished' to accommodate the fingers and should require a minimum of pressure.

FURNITURE

Incorrect furniture can cause problems for the back, neck, shoulders, arms and legs. The desk should be between 720 mm and 740 mm in height, so that the top of the desk is at the same level as the user's forearms when typing. The depth of the desk should be adequate to accommodate the monitor and cables and allow for variable positioning of the keyboard.

The chair is also an important furniture consideration as it affects the posture of the individual. Its height should be adjustable between 380 mm and 480 mm from the floor, allowing a clearance of 200 mm between it and the desk.

The backrest should be adjustable to fit snugly into the small of the back, giving support to the lower back.

LIGHTING

Poor lighting can cause eye strain and headaches. Room lighting should be at a level of brightness similar to the brightness of the screen. All parts of the work environment should have non-reflective surfaces to minimise glare, and natural light sources should not be excessive.

TEMPERATURE

The temperature of the work environment should be in the range of 20°-26° that it is comfortable for users. Computer equipment can generate heat and raise the temperature of the working environment so air-conditioning is required.

NOISE

Excessive noise in the work environment can be a significant distraction to users. Keyboards cause very little noise and are quieter in operation than a typical typewriter, but some printers can be noisy. Noisy equipment should be masked with acoustic covers, kept in a sound-proof box or isolated in a different room.

WORK PRACTICES

The 'design' and workload of a job are important to the health of the computer user. If possible, the job should be designed so that users perform a variety of tasks frequently, rather than operating computer equipment continuously. When the workload of users involves extended periods of computer use, a break should be taken away from the computer every hour.

1. Copy and complete the following sentences

a. If data entry consists of numbers, the keyboard layout should contain a……………

b. They need to be…………….. to accommodate the fingers.

c. The keyboard should be positioned to that the forearms are to………. the floor

d. Noisy equipment should be masked with…………. covers.

e. All parts of the work environment should have…………. surfaces to minimise glare.

f. Backrests should be……………to fit snugly into the small of the back.

g. A…………..is a piece of furniture which affects the posture of the individual.

h. Room lighting should be at the level of brightness of the…………..refers to the relationship between people and their work environment.

j .The surface of the screen should be at………………..angles to the line of sight.

k. A break should be taken every…………………..during extended computer use.

2. What does the term RSI stand for?

3. At what angle should the screen be positioned below the horizontal of the eye?

4. Why was an Australian standard set to deal with ergonomics and personal computers?

5. When should the keyboard layout contain a numeric keypad?

6. What is the recommended height for a desk?

7. When would it be necessary to place a filter in front of the screen?

8. Suppose the room lighting was darker than the lighting of the screen. How would this affect the user? What if it was brighter?

9. Why is it important to take breaks when working at a computer?

Câu 49:

1. Write down whether the following statements are true or false.

a. Engineers write software that directs the hardware to perform a particular task.

b. Data entry operators run large computer systems.

c. Direct users interact and are in control of a computer system.

d. A monitor should allow for minor adjustments of angle, brightness and contrast to cater for individual differences.

e. A systems analyst installs and repairs the hardware of a computer system.

f. Computer technicians are indirect users of computer systems.

g. Computer operators oversee the computer operation.   '

h. Keyboards produce more noise than a typical typewriter.

i. A chair should allow a clearance of 200 mm between it and the desk.

J. Computer consultants are people who assist users of a computer system by answering their questions on hardware or software, usually over the phone.

k. Keyboards should require only a minimum of pressure to reduce strain on the fingers.

2. What is ergonomics?

3. List and describe three jobs involved in the design and construction of a computer system.

4. What is the recommended height for a chair?

5. Explain the meaning of the term 'user'.

6. List and describe seven jobs involved in the operation and maintenance of a computer system.

7. What is the recommended temperature for the work environment?

8. Why is air-conditioning usually required in a room containing computer equipment?

9. What ergonomic considerations need to be taken into account when designing a job for a computer user?

Câu 50:

Although a computer can be a very useful tool it is not the solution to all our problems. There are certain problems which computers do well and other problems which people do well. Computers are very good at processing data quickly and accurately, storing and retrieving large quantities of data, and following instructions. People are better at recognising patterns, setting goals, identifying issues, solving problems, and dealing with special cases.

A *computer solution* involves using a computer system to solve a problem.

It is needed when a task is too difficult, dangerous or time-consuming for people. For example, the task of sorting names could take hours for a person, but can be done in seconds by a

computer. Our modern society is continually finding new ways of using computer systems and their application appears boundless.

Designing computer solutions is a creative process. It is simply not possible to look at a complex problem and immediately use the computer to solve that problem,. It requires people with good problem-solving skills. In this chapter we will be outlining how computer solutions are developed to solve problems.

Stages in developing a computer solution

There are six stages in developing a computer solution to solve a problem. They are:

. defining the problem

. planning a solution

. designing a solution

. implementing the solution

. testing the solution

. reporting the solution.

DEFINING THE PROBLEM

The first step is to understand the problem and determine what is needed to solve that problem and whether it can be solved by a computer. This may involve rewording the problem and identifying the important elements in the problem.

PLANNING A SOLUTION

Before a solution is designed it has to be carefully planned. This requires: determining the input, processing and output which needs to take place.

The problem may have to be refined into smaller problems and a solution for each smaller problem. Hierarchy charts and IPO charts provide useful took Solutions to similar problems need to be investigated, resources identified and test data written. The test data will be used to test the solution and needs to cove the range of values in the problem.

DESIGNING A SOLUTION

There is no point in repeating someone else's work, so the first step in designing a solution involves investigating existing solutions. If an appropriate software package is not available, and an existing program cannot be modified to solve the problem, a new solution must be developed. Algorithms such as English prose, pseudocode, and flowcharts can be used to develop new solutions.

IMPLEMENTING THE SOLUTION

Implementing a solution involves using the solution to solve the problem. If a software package, such as a word processor, has been chosen, implementing the solution will mean applying the software to the problem. If a new solution is being developed the algorithm needs to be converted into a programming language and is called a program. the program can then be executed to solve the problem.

TESTING THE SOLUTION

Testing the solution involves checking the results of the solution and making sure it solves all aspects of the problem. If the solution is unsatisfactory anothesolution has to be planned. Testing the solution should be carried out throughout all the stages.

REPORTING THE SOLUTION

Reporting the solution means producing a statement of the solution and the method of solution, in either written or verbal form.

1 For each of the following statements, select the appropriate stage in developing a computer solution.

a. Checking the results.

b. Understanding the problem and determining what is needed to solve the problem.

c. Investigating known solutions.

d. Producing a statement of the solution and the method of solution.

e. Using the solution to solve the problem.

f. Determining the input, processing and output which needs to take place.

2. What are the problem-solving strengths of:

a. a computer?

b. people?

3. State whether a computer or a person would best solve these problems.

a. calculating interest on a bank account

b. looking after a dog

c. driving a car

d. storing recipes.

4. When is a computer solution needed?

5. List the six stages in developing a computer solution.

6. What is a program?

7. A letter can be written using a pen, a typewriter or a word processor. Do you think the computer is an efficient tool to use for this task? Why?

8. A telephone directory of students in your class can be constructed by hand or using a database. Do you think the computer is an efficient tool to use for this task? Why?

Câu 51: Documentation

Documentation is a written description to explain the development and operation of a computer solution. It could describe a software package and the tasks it can perform or explain the logic of a program and its statements. Although documentation should be developed at the same time as the computer solution, it is often neglected and left until last. This results in inadequate documentation, making the computer solution difficult to understand or modify.

There are different standards of documentation depending on the problem; however all documentation should include:

. problem statement

. method of solution

. test methods

. results obtained

. user manual.

Problem statement is a listing of the problem so that the reader understands the purpose of the solution.

Method of solution outlines how the solution was determined. The reader must clearly understand what the solution does, and how it goes about doing it.

If IPQ charts, hierarchy charts, or algorithms were used to determine the solution they could be included here.

Results obtained lists the test results and the advantages and disadvantages of the solution. Was the solution successful? What needs to be avoided when implementing the solution?

User manuals are the instructions for any person using the solution. Unfortunately, many manuals are easier to read *after,* rather than before, the solution has been implemented.

1. Copy and complete the following statements.

a. Documentation is a written description to........................ the development and operation of a system or a program.

b..................manuals are the instructions for any person using the solution

c.....................the solution involves using the solution to solve the problem.   .

d.....................a solution first involves investigating known solutions.

e. In defining the problem it is necessary to   the problem

f...................the solution involves producing a statement of the solution and the method of solution.

g......................a solution involves determining the input, processing and output which needs to take place.

h...................the solution involves checking the results.

2. What is the purpose of documentation?

3. Why is it necessary to explain the logic of a program?

4. What should all documentation contain?

5 Why is documentation often inadequate?

Câu 52: Programming

Programming creates a computer solution by designing, writing and testing

a computer program. It is a creative process which involves its own problem solving. The six stages in developing a computer solution are modified into nine stages for programming. The typical stages are:

- define the problem
- decide on a structure for the data

- develop a sequence of actions or processes

- refine the processes using structured programming

- develop an algorithm

- code the program in a programming language

- test and debug the program

- prepare documentation

- publish the solution

Defining the problem determines what is needed to solve the problem. What is the program going to achieve?

The *structure of the data* for input and output needs to be decided. Is the data *numeric* (numbers only) or *alphanumeric* (letters and numbers)? What is the data's format and range? Where does the input data come from? How is the output data going to be presented? What data can be used to test the solution? Test data needs to cover the range of values that are possible in the problem.

Processes need to be designed which will change the input into output.

What formulas and rules do the processes require? The processes are dependent on the input and output, so IPQ charts are a useful tool at this stage.

Relining the process means breaking the problem down into smaller problems called modules. This is referred to as structured programming or top-down programming. It produces programs 'which have a definite form and are therefore more easily understood and more likely to be correct. Hierarchy charts are used at this stage to break the larger problem into smaller problems.

Coding the algorithm into a programming language is a straightforward task if the above stages have been complet.ed. Each programming language has its own set of rules, called *syntax,* which must be strictly followed. A compiler or interpreter then translates the program into machine code so the computer can implement the solution.

Testing and debugging the program involves finding and correcting any errors, or 'bugs', that have been made in the program. There are two types of errors: syntax errors and logic errors. *Syntax errors* are made when the programmer has failed to follow the rules of the programming language. When the program is compiled or interpreted, an error message will appear if the program contains any syntax errors. Correcting any syntax errors, or debugging the program, is usually a simple task. *Logic errors* result from an incorrect. An *algorithm* is a series of steps which will solve the problem correctly in a finite time. English pros, flowcharts and pseudocode are three forms of algorithms which are used in programming. Algorithms produce a structured program if they are written using only the three basic control structures of sequence, selection and loop. The control structures for pseudocode closely relate to many programming languages, so an algorithm written in pseudocode can easily be translated into a programming language.

It is often very time-consuming to find and correct logic errors. For this reason, testing should be carried out at all stages to reduce the number of logic errors.

The *documentation* required in a program consists of three main categories: intrinsic, internal and external. *Intrinsic documentation* involves writing the program so that it can be easily read. This means using correct programming techniques and meaningful variable names, such as 'height'

instead of 'X'.

Internal documentation is any comments or remarks within the program code to describe its purpose. *External documentation* includes any written, support material. This may include the problem statement, input data, output data, processes, algorithm, test data and a listing of the program.

Publishing the solution means producing a statement of the solution and the method of solution, in either written or verbal form.

ESSENTIALS OF A GOOD PROGRAM

1. Write down whether the following statements are true or false.

a A compiler or interpreter translates the algorithm into a program.

b Syntax errors result from an incorrect series of steps in the algorithm.

c There is always only one correct solution to a problem.

d The control structures in flowcharts closely relate to many programming languages.

e A structured program will be more easily understood.

f Intrinsic documentation is any comments or remarks contained within the program code.

g. Each programming language has its own set of rules.

h Internal documentation involves writing the program so that it can be easily understood.

i. A structured program uses only two control structures.

j. Logic errors are often time-consuming to debug.

2. What are the benefits of using structured programming?

3. Programming involves three main categories of documentation. Describe them.

4. Explain the difference between syntax errors and logic errors.

5. What is the purpose of a compiler?

6. Why does test data need to cover the range of values that are possible in the problem?

7. What is a 'bug' in a computer program?

8 List the three control structures that a structured program uses?

Câu 53: Programming languages

A program is a series of instructions or statements written in a form acceptable to the computer. These instructions can be written in a high-level programming language. The most commonly used high-level languages are Logo, BASIC, Pascal, COBOL, C and FORTRAN.

Logo was developed in 1968 by Seymour Papert, for educational use. It teaches students about mathematics and programming. Students enter Logo commands to make a 'turtle' move around the screen and draw pictures.

BASIC stands for Beginner's All-purpose Symbolic Instruction Code. It was developed at Dartmouth College in 1964 by John Kemeny and Thomas Kurtz. It is a simple programming language and is useful in teaching programming concepts.

Pascal was named after Blaise Pascal, a seventeenth century French mathematician. It was developed in Switzerland in the early 1970s by Niklaus Wirth. Pascal was designed for structured

programming and is also useful in teaching programming concepts.

COBOL stand for Common Business-Oriented Language. It was developed for business between 1959 and 1961. It is a very popular language that makes wide use of English language statements. It has undergone many modifications.

C was created at Bell Laboratories in the USA by Dennis Ritchie in 1972. It was designed for structured programming and is associated with the UNIX operating system. C contains commands which are similar to assembly language, making it very efficient. It is difficult for beginners to learn.

FORTRAN stands for FORmula TRANslation. It was developed by Jim Backus of IBM in 1954. It resembles the symbolism used in mathematics and has undergone continued development. It is heavily used in science and engineering.

PROGRAMMING LANGUAGE CONCEPTS

There are a number of concepts which are common to all programming language. These concepts include constants, variables, operators, assignment statements, input/output statements, subprograms and control structures.

Constants are items of data which do not change; they are fixed values. They can either be numeric (numbers) or alphanumeric (numbers and letters).

Variables are items of data which may change. A variable name is used to store data in a location of memory.

Operators are used to indicate actions to change the data.

Assignment statements change or assign a value to a variable.

Input/output statements allow data to be received from an input device or sent to an output device.

Subprograms are program modules that perform a particular task, also callef subroutines. They can be used more than once to reduce the amount of programming.

Control structures include sequence, selection and loop.

1.The vowels have been omitted from these words. Write out the completed words.

a. L_g-   f. P _sc_1

b. Pr _gr _mm_n   g. C_B,_L

c. L_g_c _rr _rs   h. d_b_g

d. B_S_C   i. d_c_m_nt_t__n

e. F _RTR_N   j. Synt_x   _rr _rs

2. For each of the following statements, select the correct programming language from the list below.

a. Contains commands similar to assembly language.

b. Resembles the symbolism used in mathematics.

c. Common business-oriented language.

d. Beginner's all-purpose symbolic instruction code.

e. Developed by Seymour Papert for education.

f. Developed by Niklaus Wirth to teach programming.

Logo BASIC Pascal   COBOL C FORTRAN

3. What is a program?   ,

4. Name two programming languages that were designed for structured programming.

5. Explain the difference between constants and variables.

6. Why are subprograms useful?

7. In a programming language how is data received from an input device and sent to an output device?

Câu 54: BASIC and Pascal

BASIC and Pascal, like all other programming languages, both contain a vocabulary of about a hundred or so words and symbols and a well-defined strict 'grammar' which governs how they are used. Both languages were originally designed for teaching computing and both are good choices for ginners, though in different ways. BASIC is much easier to get started with, due to its language design and partly due to the very interactive way it is usually implemented.

Pascal, on the other hand, is a bit slower to get into. It requires more knowledge both the language and the computer itself. The Pascal program to add 230 and 420 and print the answer is four lines long.

BASIC is a superior language in terms of the ease of getting started, for small programs, and for trial-and-error editing. However, BASIC becomes hard to read and follow as the program grows in size and complexity. Pascal programmers are several times faster at making changes and corrections to larger programs than are programmers using unstructured languages such as BASIC.

Pascal is a relatively new programming language and benefits from a lot of thinking that went on among computer scientists in the 1960s. It is a model of modern thinking about programming languages and structured programming.

Since this is a small problem the program code in BASIC provides a quick an£ easy solution. When comparing BASIC and Pascal, consider the following simple rule. If the program is small enough to fit on the screen then use BASIC; if it's bigger or is going to get bigger then use Pascal.

1. Copy and complete the following statements.

a. All programming languages contain about a hundred or so………….and symbols.

b……………is an unstructured language.

c. Pascal is………… at making changes and corrections than BASIC.

d. All programming languages have a well-defined and strict……………

e…………are items of data which may change.

f. Operators are used to indicate actions to change the………………

g…………are items of data which do not change.

h. Program modules are called……………

i.A sequence is an example of a………………structure.

2. A guarded loop is used as a control structure in the name problem. List the commands

used for this structure in:

   a. the Pascal solution

   b. the BASIC solution.

   3. Which algorithm form resembles the Pascal programming language?

   4. List the variables used in the Pascal solution of the name problem.

   5. What are the input statements used in:

   a. the Pascal solution?

   b. the BASIC solution?

   6. Why is BASIC a good language to teach programming?

   7. Why is Pascal a good language to teach programming?

Câu 55: Perspective-Employment

The use of computers has affected every aspect of our modern society including employment. The unemployment rate has been increasing in the last two decades. It is evident that the country is producing goods and services efficiently and meeting its needs, without fully employing all available workers. This is partly due to increased computerisation.

Computers have replaced people in many unskilled jobs. For example, some manufacturing processes' are now being carried out by robots, making the unskilled factory workers redundant. The number of clerical jobs is being reduced as word processors, allow typists to work more quickly and accurately. In some areas, computers are also allowing jobs to be done by workers with less skills. For example, watches are no longer made by highly skilled watchmakers, but are mass-produced in factories employing semi-skilled workers.

However, computers have also created jobs. There are now many jobs available in the computer industry. Opportunities are available in the design, construction, operation and maintenance of computer systems. Jobs include systems analysts, programmers, engineers, managers, operators, data entry operators, consultants and technicians. Unfortunately, it is not always possible for those who work in unskilled jobs to be retrained to acquire the computer skills necessary for such jobs.

Education and training are essential if our society is going to address this problem and help people to keep pace with an increasingly computerised work.

Young people will be required to complete tertiary courses and obtain higher level skills to improve their employment prospects. They will also have to accept that they are going to be retrained and have their skills updated throughout their working lives.

1 Write down whether the following statements are true or false.

a. Unemployment is not related to computer technology.

b. Computers replace unskilled jobs.

c. Today's society requires people with higher skills than in the past.

d. Some people are correct in blaming the computer for being retrenched.

e. There are employment opportunities in the computer industry.

f .The use of computers has had little affect on our employment.

g. You will never have to update your skills throughout your working life.

h The problem of unemployment would disappear' if computers were taken away

2. How have computers affected employment?

3. List any jobs which have been created through the use of computers.

4. What types of jobs do computers replace? Give an example.

5. How can education assist in solving the unemployment problem?

6. What are tile effects of unemployment on our society?

7. Do you think our society can maintain an unemployment rate of between 1 and 2 per cent as was the case in the 1960s. Why?

Câu 56: REVIEW EXERCISE

1 Copy and complete the following statements.

a……………the solution involves using the solution to solve. the problem.

b. The first stage in developing a computer solution is called…………the program.

c.   ……………is a written description to explain the development and operation of a computer solution.

d……………..   error results from an incorrect series of steps in the algorithm.

e. Programming creates a computer solution by designing, writing and testing a computer………….

f…………..errors result when the rules of the programming language   have   not   been followed correctly. '

g. A programming language that contains commands similar to assembly language is called……..   .

h.   ………….statements change or assign a value to a variable.

i. Constants are items of……………..which do not change.

j. ………….are program modules which can be used more than once.

k. Pascal was designed for…………..programming.

l. Correcting any errors in a program is called…………………..   .

2. List the, six stages in developing a computer solution.

3. Why is documentation important in a computer solution?

4. What is structured programming?

5. Name three programming languages that could be used to teach programming.

6. List seven concepts which are common to all programming languages.

7. What are the advantages and disadvantages of BASIC and Pascal as programming languages?

8. When is a computer solution needed?

Câu 57:

Data from an input device is processed by a computer system until it becomes information and is sent to an output device. Input is an important part of an irlformation system, since the data needs to be structured, prepared and entered effectively into the system. Output is also important, as the main objective of an information system is accurate and up-to-date information.

Information systems can be viewed as five sub-systems: hardware, software, data, applications and people.

Hardware

Computers have been used as information systems for many years. Herman Hollerith worked for the US census bureau in Washington in the 1880s.

He developed a mechanical machine that collected and tabulated data using 80-column punch cards. Using this census tabulator, Hollerith was able to complete the 1890 census count in only two years. The success of this machine led to further research and development into information systems. The company he fonned has since undergone several mergers and name changes and is now known as International Business Iv1achines Corporation or IBM.

PERIPHERAL DEVICES

Information systems are characterised by large amounts of data. Peripheral devices are responsible for reading this data from an input medium and inverting it into a form that the computer can understand and process.

At the other end of the system, they are responsible for converting computer data into information. Peripheral devices are important in any information system the faster and more efficiently we can enter input data into the computer and obtain output data from the computer, the more effective the information stems will be, Input devices commonly used in information systems include e keyboard, mouse, document reader, modern and scanner. Output devices used include printers, monitors and communication devices such as modems. Some information systems allow time-sharing, whereby many people at different terminals can access a large computer system virtually at the one time. A standard terminal consists of a keyboard and monitor. Any information system which uses this time-sharing environment contains multiple inputs and multiple outputs.

STORAGE

Storage is an important part of any information system. The large amount of data that is processed by information systems needs to be recorded and stored somewhere. Paper storage used in the past is not adequate for our needs today. Disk drives and tape drives are storage devices used to provide fast access to data and large storage capabilities. Magnetic tapes such as reel-to-reel tape and cartridge tape, and disks, such as fixed disks, removable cartridges and disk packs, are all used to store large quantities of data/Optical technology is now providing a medium to store even larger quantities of data. Optical laser disks, such as CD-ROM, and optical tape are being used to store vast amounts of data which remains constant.

PROCESSING

The processor in an information system needs to be powerful and fast, so that data can be searched rapidly. Supercomputers can calculate at rates of over MIPS and are: mainly usd to

process data in scientific applications. Mainframe can calculate at rates from 100 to 200 MIPS, and are used by large organisation such as governments, banks, hospitals, and businesses to manage their vast amounts of data. Although minicomputers and microcomputers have less computing power, they are also used as information systems. They are often used for spreadsheet, word processing and database management applications.

1. Copy and complete the following statements.

a. Information systems are systems which provide……….. to users

b. The main objective of an information system is to provide………….and up-to-date information.

c. The………………. needs to be powerful and fast, so that data can be searched rapidly.

d. Herman Hollerith developed an information system to complete the 1890 US………

e. A ……………environment allows the information system to have multiple inputs

f. …………………devices need to provide fast access to data and large storage capabilities.

g. Organisations need relevant, accurate information in order to make wise……………

2. Why is today's society refer to as the 'Age of 'Information'?

3. How can a microcomputer be used in an information system?

4. Why are peripheral devices important in any information system?

5. What organisations might use a mainframe as part of an information system?

6. Why is optical technology being used for data storage in information systems?

7. List the input devices which are commonly used by information systems.

8. How has information in our society changed the. way we live?

9. Why is a computer system an information system?

10. List the output devices which are commonly used by information systems.

Câu 58: Software

Information systems need software which is able to receive, store and process data, and then give back information which is appropriate and useful. There are three common types of software used in information systems: word processor spreadsheets and database management systems.

WORD PROCESSORS

word processor is a software paekage whose purpose is to allow you to write. e user is able to write letters, reports, assignments, articles or books, and do quickly and efficiently. It forms part of an information system since data can retrieved, altered and printed out in a variety of ways to meet the user's requirements. Word processors are tools which manipulate data as text to provide information to users.

There are three advantages word processors have over other methods of writing. They are:

Ease of editing text-mistakes can be corrected before printing; text can be moved and copied.

Variety of print including normal, italics, enlarged, boldface,   underline,   superscript, subscript and specialised fonts.

Ease of storage text can be stored on a disk and retrieved as required, transmitted to other word processors or used, to create mailing lists.

SPREADSHEETS

Spreadsheets allow data requiring mathematical calculations to be organised and stored in a row and column format. They let you plan a budget, calculate loan repayments, keep track of income and expenses, and perform countless other activities dealing with numbers. A spreadsheet forms part of an information system since data is stored, and then processed and organised as information to the user.

There are five advantages of using an electronic rather than a manual spreadsheet. They are:

. Calculations - performed quickly and accurately.

. Editing data - allows mistakes to be corrected before printing; data can also be moved and copied.

. Recalculation - if data such as a number is changed, then all other numbers which depend on that number are recalculated. This allows the user to make predictions   and   helps   decision making.   ,

. Storage - data can be easily stored on disk or tape, and retrieved when required.

. Reports - data Gm be presented, often graphically, in many different ways using all or part of the spreadsheet.

DATABASE MANAGEMENT SYSTEMS

Databases are a way of organising and storing data and have been used for hundreds of years. They form part of an information system since data is stored, and then processed and organised as information to the user. In recent years computerised databases have been developed. Their three main advantages over manual systems are:

. Speed - computers are ideal tools for searching a large amount of data quickly and accurately. A computerised database allows cross-referencing, a feature which is very complicated on paper databases.

. Revising data - computer databases can be updated without having to retype all the information. A huge amount of information can be stored on disks,   revised and arranged when appropriate.

. Flexibility - a database can divide the data into sections for particular applications.

Databases can be classified into two broad categories: closed databases and empty databases.

Prepared or *closed databases* are databases which contain information about specific subject. The information can be accessed and read, but cannot be altered Since computers can search for large amounts of data quickly and accurately, information is placed into a database instead of a book.

Empty or *flexible databases* are databases which allow data to be entered or altered and are usually referred to as *database management systems* (DBMS). That is, the user decides on the topic and the type of information to be stored.

1 Write down whether the following statements are true or false.

a. Databases allow data requiring mathematical calculations to be organised and stored in a row and column format.

b. Word processors allow mistakes to be corrected before printing.

c. Recalculations on spreadsheets allow the user to make informed decisions.

d. Cross-referencing does not allow databases to search for data quickly and accurately.

e. A software package whose purpose is to allow you to write is called a spreadsheet.

f .Database management systems allow data to be entered or altered.

g .Spreadsheets can be used to keep track of income and expenses.

h. Information systems in the microcomputer environment are often considered to insist of word processing, spreadsheets and database packages.

2. a.Start up a word processing program.

b. Type in the following text.

The amount of information now being produced is so great that it has been called an 'information explosion'. Many businesses and governments have problems coping with the quantity of information they produce. For example, the printed output from a typical mainframe in business is about 1000 kilometres of paper per year.

c. Create a new paragraph after the first sentence.

d. Move the second paragraph up to become the first paragraph.

e. Find and replace these words.

'quantity' with 'amount'

'great' with 'vast'

f. Save this document with the filename of INFOMAT.

3. Create a spreadsheet of music sales using the following table.

Câu 59: Data

Data is the raw, facts put into the information system. It can be in the form of text graphics and sound. In order for data to be useful, it must be organised in some way. Methods for organising data are referred to as data structures.

STRUCTURED DATA

Arrays are commonly used as a means to store and process data. An array is an arrangement of items of the data which can be found using a key or subscript.

The data is retrieved using its co-ordinates or subscript. For example, the character 'e' has the co-ordinates (2, 5), reading the row first and the column second.

Files/ records and *fields* are used to structure data in a database. A file is the entire body of data that is related to a specific purpose. A record is that portion, of the file that contains data about one specific entry. Fields are divisions of eacn, record and contain the actual data. For example, a telephone book could be thought of as a file, each person as a record and the family name, address and phone number as the fields. The hierarchy chart below is an example of a data structure consisting of a file containing four records and eight fields.

Files can be organised as a sequential file or as a direct access file.

Sequential files arrange their records in ascending or descenc;ling order according to a key field. To fiIld a particular record, it is necessary to start at the beginning of the file and examine each record until the desired record is found. Sequential access is a similar process to playing an audio cassette on a cassette player. Sequential files are used on magnetic tapes.

Direct access files or random access files give .each record a particular address so that the record can be found directly. Direct access is similar to playing a record on a turntable, where any track can be played at any time without having to start from the beginning. Direct access files are used on magnetic disks.

DATA PREPARATION, VALIDATION AND VERIFICATION

Data preparation, validation and verification are carried out to ensure that data is entered correctly. Data preparation involves collecting data from its place of origin, organising it into written form and entering it into the computer. Data entry operators are people who enter data into large computer systems. If their terminals are connected to the computer system, it is called on-line entry. If they are required to save their data to a disk which is later transferred to a computer system, it is an example of off-line entry.

Data validation and verification involves checking that the data is correct.

It needs to be done at all stages of data preparation. In some applications the data is entered twice, and compared electronically to ensure there are no typing errors. Data validation can be built into the software. For example, when the data is entered in the format 23/03/93 the program can ensure that the first two digits are in the range of 1 to 31, and the second two digits are in the range of 1 to 12.

DATA MANIPULATION

Data manipulation is the process which data undergoes to become information. It includes techniques such as searching and sorting. Searching is used to find data requested by the user. A search to find one item, such as a character, word or phrase, is called a linear search. If a search is carried out to find a combination of two items, or either one item or another item, it is called a binary search. Sorting involves arranging the data in a meaningful way. For example, the sort may be alphabetical (from A to Z or Z to A), ntlmerical (from 0 to 9 or 9 to 0) or chronological (in order of date and time).

1. For each of the following statements select a matching word or phrase from the list below.

a. A portion of a file that contains data about one specific entry

b. Files that give each record a particular address so that the record can be found directly,

c. Used to find data requested the user.

d. Arrangement of items of data which can e found using a key or subscript.

e. The entire body of data that is related to a specific purpose

f. Files whose records are arranged in ascending or descending order.

g. Arranging data in a meaningful way.

h. Divisions of each record that contain the actual data.

i. Processes which data undergoes to become information.

j. Carried but to ensure data is entered correctly.

direct access   data manipulation   file

  sort   data preparation   record

  sequential"   search field

2. What is the purpose of arrays?   .

3. What type of storage medium is commonly used for sequential mes?

4. Explain the difference between on-line and off-line data entry.

5. List three ways data can be sorted.

6. Which is the faster way to retrieve data - from a sequential file or from a direct access file?

7. What is the purpose of a subscript in an array?

8. Why is data entered twice in some applications?

Câu 60: Applications

Whenever a problem involves collecting data and processing this data to provide information to users, an information system is used. Information systems are used in the government, in many businesses and by individuals.

MAINTAINING AN ORGANISATION'S DATA

Maintaining data involves up-dating the data so that it is current, correcting an errors in the data, and altering the data by adding new features. Personnel and, payroll are two examples of applications which require data to be maintained.

Personnel records of employees are kept in every organisation and need regular maintenance. Employee records contain personal data such as name, address, family, previous employment details, and so on, as well as data relative to job performance and professional development.

The *payroll* of the organisation's employees' is another application which needs maintenance. Payroll refers to the amount of wages that each employee has earned. A payroll system would contain records of the employee's name, hours worked, rate of pay, taxation and other relevant data.

USING A DATABASE SYSTEM

Database systems are used in many different ways and in many different situations. In business, two common applications are for orders and invoicing and for inventory management.

Orders and *invoices* are used to keep track of the accounts in a business. When goods are needed by a business an order is placed with another business, organisation or individual. It includes the amount of money that will be paid.

An invoice is the opposite. It is given to customers who owe the business money for goods or services provided. The processing of these orders and invoices is essential if the business is going to make a profit. A database system is used for this task. Firstly, it stores records of every order, itemising its cost, who placed the order and when it was sent. Secondly, it stores records on

customers, item what was purchased, for how much, and by whom. At any time the business can use the database to determine how much money it is making and how much money it is spending.

Inventory management involves keeping a record of each item in the business. The item inventory might contain an item number, item description, data purchased, cost and number in stock. When a particular item is sold, the inventory must be changed and, if necessary, an order placed for its replacement.

ONLINE DATABASE SYSTEMS

On-line database systems are applications in which the terminal is connected directly to the computer system and its central processing unit. Two common applications are electronic funds transfer ,systems, or EFTS, and airline bookings.

Electronic funds transfer systems, or EFTS, are a way of paying for goods and services by transferring funds directly from your bank account. The point-of-sale terminal is on-line to the database system of the bank, which contains your bad records. Instead of paying cash, you can present a special card, type in a person identification ,number (PIN) and the amount of your purchase is subtracted from your bank account. This process is very fast and requires no paperwork.

If you use an automatic teller machine (ATM) to transfer money between different accounts you are using electronic funds transfer.

Airline bookings can be made at any travel agent to book seats on an aero plane. The travel agents have a terminal which is on-line to the airline's database system It contains records of seats available on particular flights. The data is always current, as any seat booked by the travel agent automatically changes the database.

COMPUTER RETRIEVAL SYSTEMS

Computer retrieval systems provide. information to organisations and enable them to operate effectively. Credit ratings and medicine databases are two examples.

Credit ratings are records of how much financial credit people have. It keeps track of how much money people pay to credit organisations and whether or if they make the repayments on time. Organisations then use this data to determine if a person is a good credit risk.

Medicine databases store medical knowledge obtained from leading doctors throughout the world. This data can then be used to help diagnose a patient's illness. The doctor enters the patient's symptoms and the computer gives a list the possible causes. The doctor can also retrieve the latest information about a particular condition.

1. Vowels have been omitted from these words. Write out the completed words.

  a. m- ant_rnac-   f. _n-l_ne

  b. f_ _ld   g. r - tr --val

  c. - rr - y   h. f_le

  d. s_q- _ntial   i. r _c_rd

  e. m_n_pul_ti _n   j. d_r _ct_cc_ss

2. What are the advantages of a computerised airline booking system?

3. List the type of data stored in an information system for

a. personnel

b. payroll.

4. How do point-at-sale terminals transfer funds electronically?

5. Explain how a database system is used to keep track of accounts?

6. What is the purpose of keeping an item inventory?

7. What does data maintenance involve?

8. Do you think that a computer's diagnosis of an illness will be more accurate than a doctor's?

9. Do you think we will become a 'paperless' society because of the use of information technology?

Câu 61: People

People are involved in every aspect of an information system. They are providers and users of the information service, but unfortunately are also sometimes responsible for abusing it.

PROVIDERS OF INFORMATION SERVICES

People who are concerned with the design, construction, maintenance, and operation of an information system are the providers of the information service. They include systems analysts, system managers, programmers, operators and data entry pernonnel.

A *systems analyst* is a person who develops the information system to solve a particular problem. This may involve investigating the current information system and modifying it, or developing a new system.

System managers are the people responsible for the development of the information system. They oversee and co-orqinate the analysis, design and implementation of the information system.

Programmers write the software that directs the hardware to perform a particular task. The programmer depends on the systems analyst to provide a detailed description of the program required.

Operators .run large computer systems required for many information services. This person will load disks or tapes, supply printers with paper, attempt to rectify any problems and generally ensure that the system is working correctly.

Data *entry personnel* are the people who enter data into information systems. Data needs to be entered quickly and accurately, and is usually entered using a keyboard.

USERS OF INFORMATION

Users are people who are affected by the information system. If people are going to survive in to day's society they must be users of information. Users can be classified as direct users and indirect users.

Direct users of information systems are people who interact with and are in control of the system. All of the providers of the information services are direct users.

Indirect users of an information system never use the system, but its use by other people affects them. For example, supermarkets use an information system to complete an inventory of

goods. When we buy our groceries we are not usint the information system, but its use has affected the service we are receiving.

Intermediary users interact with the information system to provide a link foil' indirect users. For example, banks use information systems to keep records of their customers' accounts. Bank tellers are intermediate users as they provide the link between the customer (indirect user) and the information system.

Managers of all organisations make use of information to guide their decision making. In fact, managers are dependent on information. For example, the manager of a bank needs to be aware of a' customer's credit rating in order to approve a loan.

ABUSE OF INFORMATION SYSTEMS

Information systems collect and store huge amounts of data. This data can be abused or misused if the data is inaccurate, if illegal access is obtained, or if data is combined, sold and exchanged. Although information systems have improved our quality of life they have also affected our privacy. People are forever abusing the system, and it is important that safeguards and security systems put into place to protect our personal data.

1. Write down whether the following statements are true or false.

a. People living in today's society are all users of information systems.

b. Data entry personnel enter data into information systems.

c. Systems analysts run large computer systems required for many information services.

d. Information systems have not affected our privacy.

e. Programmers write software that directs hardware to perform a particular task.

f. Direct users never use the information system.

g. People do not abuse information systems.

h.Managers are dependent on information.

2. List the people who are involved in providing information services.

3. How can data be abused or misused?

4. Who would be an indirect user of an information system?

5. Do you think people without access to information systems will become 'second class citizens'? Explain your answers.

Câu 62: REVIEW EXERCISE

1. Copy and complete the following statements.

a.................systems are systems which provide information to users.

b. Peripheral devices need to provide............. access to data, when part of an information system.

c. A....................is a software package which allows data to be organlsed and stored.

d. A word processor is a software package whose purpose is to allow you to ....

e. Spreadsheets allow data requiring mathematical..................... to be organised and stored.

f. A...........is the entire body of data that is related to a specific purpose.

g. A search is used to.......................data requested by the user.

h. A................file contains records arranged in ascending or descending

i. A..................is a portion of a file that contains data about one specific.

j. Maintellance of data involves.....................the data so that it is current.

k...........................database systems are applications in which the terminal is connected   to the computer system and its central processing unit.

l.......................are involved in every aspect of an information system.

m. Abuse of information systems has affected our...........................

2. What characteristics do peripheral devices need in an information system?

3. Explain the purpose of the following software

a. word processor

b. spreadsheet

c. database management system.

4. Why does a processor in an information system have to be powerful and fast?

5. Explain the difference between sequential files and direct access files.

6. Why is storage an important aspect of any information system?

7. Why is data preparation, validation and verification carried out?

8. What is the difference between searching and sorting data?

9. Describe an application of an information system.

10. Research the employment section of a 'newspaper and determine which provider of information services is in the most demand.

Câu 63:

Communication systems can be viewed as five sub-systems: hardware, software, data, applications and people.

Hardware

All communication systems involve transferring data and this requires a link between the sender and the receiver. This link is very important in a communication system, and can involve a number of different types of hardware.

LINKS

A link is the connection between computer devices, Although we are often not aware of the link when using communication systems it is very important. The physical medium used in the link can be. a telephone line, coaxial cable, fibre optic cable or a non-cable link such as a microwave.

A *telephone line* uses a twisted pair of insulated copper wires. Since telephone lines exist throughout the world, data can be transmitted anywhere on this   medium inexpensively. Telephone lines have a disadvantage in that they do allow noise to interfere with the transmission.

A coaxial *cable* has a single copper wire surrounded by insulation and mesh covered in a plastic sheath. This shielding allows data to be transmitted with Iii distortion and means that

hundreds of cables can be combined into a larger cable. These larger cables have been -laid across the ocean floors to provide communication between continents. Coaxial cables are also used in computer networks and to connect television antennas to televisions.

A fibre *optic* cable uses a laser of light to carry data in small glass fibres and the diameter of a human hair. Fibre optic cables are replacing the convention copper wires. They are free from electromagnetic and radio interference, provide absolute security, and can transmit data at high speeds without errors. However fibre optics is a new technology and is more expensive.

A *microwave* is a non-cable medium that consists of high-frequency radio signals which are sent through space in a straight line from one antenna to another. Antennas are placed on tall buildings or mountain tops approximately kilometres apart. Microwave transmission is faster than telephone lines and coaxial cables. Although it is reasonably error-free, weather conditions or something obstructing the signal can affect the transmission.

Packet switch systems on telephone lines provide an efficient way to transfer data and link two devices. Data is divided into 'packets' with each packet consisting of the destination, source, data up to 1024 bits, and an error checking code. The packets of data can come from different sources and share the same link, they are simply sorted at the destination. The packet switch system allows data to travel at speeds of 48 000 bits per second and keeps all links open whether or not data is being transmitted.

Satellites are a special form of microwave transmission. A satellite is a microwave antenna that has been suspended above the earth in a geostationary orbit. A signal is sent from one ground station to the satellite which receives and retransmits the signal to another ground station. Each ground station uses a satellite dish to send and receive the signals.

Satellites can transmit large amounts of data over long distances and at great speeds. However, the data is not secure, it is more expensive than other link and signals are affected by weather and solar activity.

Buses provide a link between the input, output, process, storage and control devices. A bus consists of a group of wires along which electrical signals travel. Data is sent and received along a bus between the computer's central processing unit and its peripheral devices.

INPUT/OUTPUT DEVICES

Communication systems use a variety of devices to enter and present data. It includes modems, acoustic couplers, facsimiles, point-of-sale terminals (POST) automatic teller machines (ATM), scanners, light pens, barcode readers, credit cards, debit cards, teletext keypads and videotext decoders.

A *modem* is a device that enables the transmission of data from one computer to another using the telephone lines. The word modem stands for Modulator / DEModulator. A modem converts, or modulates, digital signals sent from a computer into analog sounds suitable for the telephone line. When the signal is received by another modem it reverses the process by converting, or demodulating, the analog sounds into digital signals suitable for the computer. A direct-connect modem is the most common type of modem; it is connected directly to a telephone line and to a computer.

An *acoustic coupler* is a modem that connects to a telephone handset rather than directly to a telephone line. This type of modem has a cradle that can hold a telephone handset. They are not commonly used, as signals are easily disrupted by sounds.

Facsimile, or fax machines are used to send and receive data in the form of documents over a telephone line. The fax machine scans a document into digital signals, then acts as a modem and converts these signals into analog sounds suitable for .the telephone line. The fax machine at the destination receives the analog sounds and reverses the process to print out a copy of the document.

Recently a 'fax card' has been developed. This is an interface card which will allow a microcomputer to also function as fax machine, sending and receiving faxes without the need for a paper printout.

1. For each of the following statements, select a matching word or phrase from the

list below. .

a. A non-cable link that consists of high-frequency radio signals.

b. Used on telephone lines, to provide an efficient way to transfer data and link two devices.

c. A device that enables the transmission of data from one computer to another using the, telephone lines.

d. A link consisting of a single copper wire surrounded by insulation, mesh and a plastic sheath. .

e. The link between the computer's central processing unit and its peripheral devices.

f. A device used to send and receive data in the form of documents over a telephone line.

g. A link that uses a laser of light to carry data in small glass fibres about the size of a human hair.

h. A special form of microwave transmission involving an antenna suspended above the earth in a geostationary orbit.

i. A device that enables the transmission of data from one computer to another using the telephone handset, rather than directly to a telephone line.

j A link that uses a twisted pair of insulated copper wires.

microwave	bus	acoustic coupler
telephone line	fibre optic cable	modem
coaxial cable	packet switch system	facsimile machine satellite

2. What is a communication system?

3. List four media used to link computing devices.

4. Why do packet switch systems provide an efficient way to use a link?

5. Why are fibre optic cables replacing conventional copper wires?

6. What is the, difference between a direct-connect modem and an acoustic couple

7. List the advantages of using satellites as part of a link.

8. What are benefits of shielding copper wires?

Câu 64: Networks

A *computer network* is a number of computers and their peripheral devices connected over a distance. The simplest form of a network is when one computer is connected directly to another computer using a cable. However, a network can also consist of hundreds of computers connected together. Networks can be classified according to the distances they cover and include local area network and wide area networks.

LOCAL AREA NETWORKS

Local area networks (LANs) connect computers or terminals within a building or group of buildings on one site. Since LANs are in a limited geographical and the computers or workstations are linked together using cables. The network often contains a central computer called the *Fileserver* or *network server.* Files are transferred between the server's hard disk and the workstations.

There are three advantages in using a LAN. Firstly, they allow limited hardware resources, such as printers, hard disks, and modems to be shared. Secondly, application software, including word processing, database, spreadsheet and graphics programs, can also be shared. Finally, since messages can be sent, they improve communication among users on the network. They are commonly found in offices, hospitals, schools and tertiary institutions.

The method of arranging the cables in a LAN is referred to as its *topology.* There are three common topologies used in local area networks: the bus network, the star network, and the ring network.

Bus networks do not have a central computer and all workstations are connected by a common cable called a bus. As data travels along the cable, workstations check the cable, and retrieve their messages. Only one workstation can transmit data at a time.

Star networks have a central computer to which each workstation is directly connected. This requires extra cabling as each workstation needs a cable to the central computer; however, if *one* workstation or cable is broken the network can still operate. It is the most common topology for a mainframe computer and terminals.

Ring networks do not have a central computer. All workstations are connected by a common cable in a closed loop or circle. Data in most ring networks travels in one direction, moving from workstation to workstation until it arrives at its destination.

WIDE AREA NETWORKS

Wide area net-works or WANs connect computers or terminals over large distances. They use telephone lines or microwaves to transmit data, and normally consist of a central computer system, such as a mainframe, and a number of terminals. The mainframe computer is called the remote host, while the terminals are either dumb, smart or intelligent. Dumb terminals do no processing; smart terminals can do some low-level processing, such as text editing; intelligent terminals have both memory and processing capabilities. Most microcomputers would be classified as intelligent terminals. Since WANs are not connected directly and rely on links such as telephone lines, they are slower than LANs at transferring data.

DISTRIBUTED PROCESSING

Distributed processing offers an alternative to having one central computer processing all the data. It consists of two or more computers, called distributed processors, which are located at different sites and share the processing. If one computer fails, the other(s) can still provide the necessary services.

1. Copy and complete the following statements.

a. …………….…… networks connect computers or terminals within a building or group of buildings on one site.

b. Star networks have a …….………….….…… computer to which workstation is directly connected. .

c…………..processing consists of two or more computers located at sites to share the processing.

d…………………networks connect computers or terminals over large distances.

e. Ring networks are connected by a common cable in a closed…………. or circle.

f. A computer network is when a number of computers and their………..devices are connected over a distance.

g. Bus networks do not have a central computer and all…………. are connected by a common cable called a bus.

h. The system of interconnecting cables is referred to as the……………… the network.

i. A network often contains a central computer called the…………

j. The remote host is often a…………computer in a wide area network.

2. What is the simplest form of a network?

3. How are local area networks linked?

4. Explain the difference between bus networks, star networks and ring networks.

5. What is a computer network?

6. Where are local area networks commonly found?

7. List any advantages in using a local area network.

8. Why are WANs slower at transferring data than LANs?

9. What is the benefit of distributed processing?

Câu 65: Software

Communication systems need software to be able to transfer data/information from one location to another location. There are three common pieces of software used in communication systems: word processors, communication software and network software.

WORD PROCESSORS

A word processor is a writing tool that can be used to create text to be communicated. The text can be written or read while the computers are not connected and can then be transferred from one computer to another as a prepared file. There are a number of reasons for doing this.

. Writing text when the computers are connected is generally slower than sending a prepared file.

. Often only limited editing features are available when the computers are connected.

. If the text is written first on the word processor it reduces the amount of time the computers are connected and this reduces the cost.

. If the text is written on the word processor first you automatically have a copy of the text.

COMMUNICATION SOFTWARE

Communication software packages are the programs that allow the transfer of data/information from one location to another location. They allow computers to send and receive data at the right time, and ensure that the computers are using the same protocols. Protocols are the set of rules for transferring data and include the speed of transmission, the number of bits per character and the parity. These will be discussed in the next section. If computers are using different protocols then the data being transferred will contain errors. Some communication software provides services to its users, such as Videotex, electronic mail and bulletin boards.

Videotex is a computer-based information retrieval service which uses a central computer, telephone lines and modified television sets. It provides up-to-date information on such topics as news, weather, sport, travel and holiday facilities. Interactive activities are also available with which the user can make travel reservations, shop, send and receive messages, carry out banking and money transactions and play computer games.

Electronic mail or E-Mail is a communications service that allows users to transmit mail such as letters, documents and messages from one terminal or computer to another. Every user has storage space on a remote computer called their mailbox, and mail is sent to a mailbox from other users. Electronic mail' very fast and relatively cheap, and it allows mail to be sent to more than one in many different locations. However, it is necessary for the users to check their mailboxes regularly, and junk mail can be sent through the service. Telecom runs a large electronic mail service called Keylink. Subscribers or users are given a user name and a password and a 'list of subscribers to whom mail can be sent *Bulletin boards* provide a means by which users can exchange messages. A bulletin board is created by users with a common interest. Messages placed this 'board' will only be viewed by users who have this interest. Bulletin board also allow users to send (upload) or retrieve (download) public domain software providing easy distribution. Public domain software refers to programs which are freely available for copying and distribution.

NETWORK SOFTWARE AND OPERATING SYSTEM

A major advantage of a local area network is its ability to share application software, such as word processing, spreadsheets, database management system and so on. In many instances this software needs to be modified so that it can operate correctly through the network. Software that has been modified for a network called *network software.*

A local area network cannot operate without a network operating system,

just as your disk drive cannot operate without a disk operating system. Its purpose is to manage the network and allow the workstations and fileserver communicate. The network operating system is usually stored on the fileserver although all workstations need special files to be able to use the network.

1. Write down whether the following statements are true or false. ,

a .Electronic mail ensures that the computers are using the same protocols.

b. Software that has been modified for a network is called network software.

c. If text to be communicated is written on a word processor first, it reduces the cost.

d. Videotex is an information retrieval service which uses a central computer, telephone lines and modified television sets.

e. Protocols am the set of rules for transferring data.

f. A word processor cannot be used with electronic mail.

g. Bulletin boards provide a means by which users can exchange messages.

h. Network software and a network operating system are used LANs.

i. Mailboxes are storage spaces on a terminal.

2. How can a word processor be used in a communication system?

3. What is the purpose of communication software?

4. List some of the services Videotex provides.

5. What are the advantages in using electronic mail?

6. Explain the purpose of a network operating system.

7. Why do people use bulletin boards?   .

8 .a. Start up a word processing program.

b. Type in and complete the following text to be communicated.

   'Hello, my name is   and I am a student at

   High School. I am interested in

c .Save this text as MESSAGE 1.

9. Assemble and disassemble a communication system involving a microcomputer, modem and telephone line.

10. a. Start up a communication program.

b. Access or log onto a remote computer which has electronic mail or bulletin   board services.

c. Send the file MESSAGE 1 to a mailbox or upload it to a bulletin board.

d. Download (receive) any file from the remote host and save it to your data disk.

e. Log out of the remote host.

f. View this file on a word processing program.

Câu 66: Data

Data are the raw facts which are transferred from one location to another location in a communication system. If communication is going to be successful, the sender and the receiver must agree upon a standard for transferring data.

STANDARDS

Standards are needed when data is being transferred within a computer, between a computer and its peripheral devices, and along communication links. Standards are required for data transfer,' transmission modes and transmission rates.

Data transfer can either be serial transfer or parallel transfer. *Serial transfer* transmits the data one bit at a time through a single channel or wire. *Parallel transfer* transmits the data one

byte (eight bits) at a time through eight separate channels. Obviously parallel transfer is a lot quicker than serial transfer since it can send eight bits at a time. However, parallel transfer is only used for distances of less than a few metres, otherwise errors occur in transmitting the data and the cabling is too expensive., It is used for data buses within the computer and for connecting peripheral devices such as printers and disk drives. Serial transfer is used to connect peripheral devices such as modems and printers,' and is used over longer distances through telephone ,lines, coaxial cables, fibre optic cables or microwaves.

Serial transmission can be classified as either synchronous or asynchronous, *Asynchronous transmission* sends data by identifying each byte with special start and stop bits; it has become the standard used with microcomputers. *Synchronous transmission* requires, all the data to be sent at the same rate; it is faster and more efficient than asynchronous transmission, and is used on large computer systems.

Transmission mode is the direction of data flow and is either simplex, half.

duplex or full duplex. *Simplex* mode sends data in one direction only, from the sender to the receiver. *Half-duplex mode* allows data to be transmitted in both directions, but only in one direction at a time. This means the sender and the receiver take turns. *Full-duplex mode* allows data to be transmitted in both directions at the same time.

Transmission rates measure the speed of data transfer either by its baud rate or by the number of bits per second (bps). The baud rate is a measure of the maximum number of data symbols or electrical signals that can be sent per second over the communication link, while bits per second only measures the maximum number of bits. Since a data symbol may contain more than one bit data a 1200 bps device might operate at 600 baud. Common transmission speeds are 300, 1200, 2400 and 9600 bps. .

Protocols are the set of rules for transferring data; they include the number of bits per character, the type of serial transmission, the transmission mode, the rate of transmission, and the parity. When two computers are compatible, or have the same protocols, it is known as *handshaking* and data can be transferred successfully. If they are using different protocols then the data being transferred wm contain errors.

BINARY INFORMATION

At the simplest level a digital computer uses the binary number system to represent data. A standard method is then required to convert all characters into binary numbers. Microcomputers commonly use ASCII, which stands for American Standard Code for Information Interchange. ASCII assigns each character a numeric code which is represented by a 7-bit binary number.

Many mainframe computers use another method called EBCDIC which stands for Extended Binary Code Digital Interchange Code. EBCDIC assigns each character an 8-bit binary number. Both these methods represent characters as binary numbers, which are made up of bits. These bits can then be transferred as digital signals in the form of distinct pulses.

A modem converts, or modulates, the digital signals into analog signals which are used to transfer data over longer distances. The analog signals are pulses in the form of waves and, depending on the medium used, can be electrical pulses or light pulses. A modern at the receiving end reverses this process and converts, or demodulates, the analog signals back into digital signals for the computer to understand.

ERROR DETECTION AND CORRECTION

Errors can sometimes occur in data transmission, caused by the source, the receiver, or by interference on the link. The error must first be detected and then corrected.

Parity checking is one method used to detect errors. ASCII codes use a 7-bit binary number leaving the eighth bit as the check bit or parity bit. If an odd parity is chosen, the number of ones in the eight bits must be odd. This means that if the number of ones in the first seven bits is even, then the parity bit must be a one to make it odd. If the number of ones in the first seven bits is odd, then the parity bit must be a zero to keep it odd. The sender and receiver can also decide to send an even parity, in which case the number of ones in the eight bits must be even. If an error has occurred in a single bit then the parity will be different and an error in transmission has occurred. If errors have been detected in the transmission the simplest method of correction is to transmit the data again.

1 For each of the following statements select a matching word or phrase from the list below.

a. Serial transmission which requires all the data to be sent at the same rate.

b. Transmission mode that allows data to be transmitted in both directions but only in one direction at a time.

c. Data transfer by which data is transmitted one bit at a time through a single channel or wire.

d. A set of rules for transferring data.

e. Transmission mode that sends data in one direction only.

f. Serial transmission which sends data one byte at a time with special start and stop bits

g. Data transfer by which data is transmitted one byte (eight bits) at a time through eight separate channels.

h. Transmission mode that allows data to be transmitted in both directions at the same time.

i. Used to measure the rate of transmission.

j. Used to detect errors in transmission.

   protocol   synchronous   bits per second

   serial   parallel simplex

parity asynchronous full-duplex

2. When are standards required?

3. Explain the difference between the three transmission modes: simplex, half-duplex and full-duplex.

4. Where can errors occur in the transmission of data?

5. What is 'hand-shaking' between two computers?

6. List two methods used to convert characters into binary numbers.

7. Why is serial transfer Used to transfer data over longer distances?

8. Which transmission mode is commonly used by microcomputers?

9. What protocols were used to send the file MESSAGE 1 in the last exercise?

Câu 67: Applications

Whenever a problem involves transferring data/information from one location another, a communication system is used. The advancements in computing *and* communication technology ale changing our way of life in many different areas We have already discussed some specific applications including Videotex, electronic mail, electronic funds transfer systems and airline bookings. In this section we will study commercial and domestic applications.

COMMERCIAL

There are many ways communication .systems are. used in business, industry and trade. Videoconferencing and telecommuting are two ways some organisations are using this new technology.

Videoconferencing allows groups of people in different locations to see and hear each other, so that a conference or meeting can take place. This technology involves a telephone link for the voice transmission and a satellite link for the video transmission. Organisations can save money on airfares, hotel rooms, meals and time, even though a videoconference requires specialised equipment, camera crews, satellite time, consultants and conference rooms.

Telecommuting allows people to work at home instead of at an office. They work on a terminal or microcomputer at home and send their work through a communication link to the computer system in the office. There are savings in transportation, clothing, food and time; however, people who telecommute can experience loneliness and isolation. People who are physically impaired or who look after small children may benefit from this type of work.

DOMESTIC

Communication systems are also used in the home for a variety of purposes. Computer shopping and accessing large databases to obtain information are two ways the new technology is being used.

Shopping can be done on your microcomputer using a modem and a telephone line. Comp-U-Store is a system in the USA that provides a 24-hour shopping service. Products can be selected using your computer and purchased using a credit card. The cost of running a shop is not included in the prices of products which are bought using a computer.

Using a microcomputer information can be obtained from databases on large mainframe computers. Compuserve is a popular database in the USA which provides extensive information for users around the world. In Australia, Telecom's Discovery service provides information on business-related topics, such as the share market.

1. Vowels have been omitted from these words. Write out the completed words.

a. tr_nsm_ss- -n   f. V _d_- t-x

b. LLc_mm_t_ng   g. c_mm_n_c_t- -nl_nks

c. m_d_m   h. p_r _ty

d. v_d- _c_nf_r _nc-   i .asynchr _n__s

e. s_mpl_x   j. pr _t_c__ls

2. List an advantage and a disadvantage of videoconferencing.

3. What type of people would benefit the most from telecommuting?

4. How can individuals obtain greater access to information?

5. Do you think communication systems are changing our lifestyle? How?

Câu 68: People

People are involved in every aspect of a communication system. They are the recipients of information, originators of information and indirect users.

RECIPIENTS OF INFORMATION

Recipients of information are people who receive data from a communication system. There are more and more people who are accessing data through communication systems and it is becoming a normal part of their lives. These include people using automatic teller machines, paying for goods by electronic funds transfer, making an airline booking at a travel agency, or people receiving data from Videotex, electronic mail or a bulletin board. The use of communication systems is rapidly expanding and we often take this technology for granted.

ORIGINATORS OF INFORMATION

Originators of information are people or organisations who are the source of the data for the communication system. For example, ATMs and EFT systems access data provided by financial organisations. The database to make an airline booking is provided by the airline companies, and Telecom is one organisation which provides Videotex services. When somebody uses electronic mail or a bulletin board to send a message, she or he is the originator of the information.

USER INTERFACE

The user interface is the interaction between users and the communication system. The characteristics of the hardware and the software will affect the way users perceive and interact with a communication system. The protocols involved in communication software often make it difficult and frustrating for inexperienced computer users. However, improvements in programming languages and database management systems are making it easier for people to use and communicate with computers.

INDIRECT (PASSIVE) USERS

Indirect users never use the communication system, but the use of the system by other people affects them. For example, people who watch television are indirect users. They are accessing up-to-date information from around the world which has originated through a satellite communication system.

1. Write down whether the following statements are true or false.

a. Recipients of information are people who are the source of data for a communication system.

b. The user interface is the interaction between users and a communication system.

c. Accessing communication systems is becoming a normal part of our lives.

d. All people in our modern society are indirect users of our communication systems.

e. Telecommuting allows groups of people in many different locations to see and hear each other.

f. Shopping could never be done at home.

g. People can access large databases on mainframe computers using their microcomputers. .

h Some people could use a communication system to work at the beach.

i. The physically impaired have no use for communication systems.

2 .What is the difference between recipients of information and originators of information?

3. Why can communication software be difficult and frustrating to use?

4. Give an example of an indirect user of a communication system.

5. Why do people take communication systems for granted?

6. Do you think the use of computer communication systems has enhanced human communication?

Câu 69: REVIEW EXERCISE

1. Copy and complete the following statements.

a. A……………….enables the transmission of data from one computer to another using   the telephone lines.

b. Distributed processing consists of two or more computers located at different sites to………….the processing.

c………………transfer transmits data one byte or eight bits at a time through   eight separate channels.

d………………mode allows, data to be transmitted in both directions at the same time.

e. A microwave is a non-cable link that sends high-frequency………….signals.

f. Wide area networks connect computers or terminals over…………….distances.

g. A……………..cable consists of a single copper wire surrounded by insulation, mesh and a plastic sheath.

h. A facsimile machine is a device used to send and receive data in the form of………….over a telephone line.

i. Fibre optic cables use a laser of………….. to carry data in small glass fibres.

j. ………………. networks have a central computer in which each workstation is directly connected

k Local area networks……………… computers or terminals within a building of group of buildings on one site.

l. Synchronous transmission requires all the data to be sent at the same……………

m…………………….. networks are connected by a common cable in a closed loop or circle.

n. The------------------- - is often a mainframe computer in a wide area network.

o Videotex is an information ----------------------service   which   uses   a   central   computer telephone lines and modified television sets.

p……..are the set of rules for transferring data.

q. Serial transfer transmits data one bit at a time through a single,

r………….mode allows data to be transmitted in both directions, but on1y in one direction at a time.

2. What type of media are used to link computing devices?

3. Explain the difference between a LAN and a WAN.

4. What is the most common topology in a local area network for a mainframe computer

5. Why do organisations use local area networks?

6. What service does electronic mail provide for its users?

7. What is the purpose of a parity bit in ASCII codes?

8 .Explain the difference between synchronous transmission and asynchronous transmission.

9 .List two situations in which parallel transfer is used to transmit data.

10. Describe an application of a communication system.

Câu 70:

A graphic is a picture or any visual image, such as a drawing, painting, diagram, photograph or chart. The use of computers to create and store graphical image is called computer graphics. Computer graphics present and communicate information to people in graphical form, and are now being used in many different fields such as industry, business, entertainment, art and education. Often people are not aware the graphic has been created using a computer.

Graphics systems are systems which produce data in pictorial form to assist people in solving problems. For example, flight simulators containing computer graphics of aircraft controls and environmental conditions have become an effective way to train pilots. Graphics systems are also used by designers to allow them to produce a graphic and modify that graphic in a variety of different ways. Designers are then able' to concentrate on the creative aspects of the problem, rather than the drawing and redrawing.

Graphics systems are also a part of many other applications. For example, disK operating systems on many microcomputers use a *graphical user interface* (GUI)" Instead of typing a command, the user selects a small picture called an icon. This makes the computer easier to use. Graphics systems have also been included in some word processing packages. Graphics can be mixed with text and modified to produce the desired result.

Graphics systems can be viewed as five sub-systems: hardware, software, data, applications and people.

Hardware

The major features of graphics systems are the need for large amounts of fast processing power and a range of peripheral devices. In some applications, such as computer-aided design (CAD) and systems used to create video clips, the peripheral devices need multiple inputs and multiple outputs.

There are a variety of input and output devices used in graphics systems depending on the application. They are an essential component of the system.

INPUT DEVICES

Graphics systems have specialised input devices 'for entering data. These include the keyboard, mouse, joystick, graphics tablet, light pen, scanner, video camera, trackball, voice actuator and concept keyboards:

Video cameras can be used to incorporate video images into a graphics system. A partiCular image is captured using the video camera and then scanned so that it can be stored as digital data in the computer's memory. It is then possible to add text or other graphics, such as cartoon characters, to this video image.

A *trackball* is a pointing device similar to a mouse, except that the ball is on top of the device instead of on the bottom. It allows the user to move the cursor to diffefent parts of the screen very quickly and the movement is far more precise than with a mouse. Trackballs are frequently used in computer-aided design applications.

OUTPUT DEVICES

There are a range of output devices used in graphics systems to present data in a pictorial form. These include monitors, plotters, printers, braille printers and videos.

The *cathoterlay tube orCRT* is a type of monitor that looks like a television screen and works in a similar manner. A beam of electrons strikes the inside of a phosphorus-coated screen causing a dot of light to appear. Electromagnets are then used to move the electron beam across the screen; this process is called scanning. Extri1 pulses of electrons are used during scanning to form the required image. This light only lasts for a short time and must be reproduced regularly, or *refreshed.* Refreshing needs to be done at least 30 times per second so that the image does not fade or flicker.

A *plotter* uses special !pens which are moved across the paper to create a drawing. A graphics plotter can select from a number of different coloured pens and can draw lines, curves and shapes very quickly and very accurately. Plotters are frequently used. in architectural and engineering design areas.

STORAGE DEVICES

Storage devices such as disk drives are used to store data in pictorial form on 4 magnetic disks, optical disks and video disks. Graphics systems need storage media which can store large amounts of data.

Hard disks are commonly used in a graphics system since they can store large quantities of data and allow fast access to data.

Optical disks are also used in graphics systems when the data does not alter but remains constant.

RESTRICTIONS

The CPU in a graphics system needs to be fast and powerful to process data in pictorial form. A special processor called a display processor is often used to improve the presentation of graphics on a monitor. It uses chips which are designed to handle a variety or graphic designs.

Primary storage for graphics systems is the same as for other applications except if the computer is using a display processor in which case the data is organised in a completely different manner.

1. Copy and complete the following statements.

a. A ....is an input device consisting of a ball on top of the device.

b. Scanning occurs in a CRT when an.....................beam is moved across the screen.

c. A plotter uses special pens which are moved across the paper to create a...................

d Graphics systems are systems which produce data in................form to assist people in solving problems.

e..................................disks are hard metal disks which use laser technology to store tremendous amounts of data.

f. When........................are used in the creation and storage of graphical images it is called computer graphics.

g. The GUI allows the user to select a small picture called an......................instead of typing a command.

h. Flight........................contain computer graphics of aircraft controls and environmental conditions.

i. The CPU in a graphics system needs to be...............................and powerful toprocess data in pictorial form.

j. Graphics systems need storage media which can store................amounts of data.

2. What is a graphic?

3. How are computer graphics used in a flight simulator?

4. What is a graphical user interface?

5. Why is refreshing required in a CRT?

6. Explain the purpose of a display processor in a graphics system.

7. How can a video camera be used in a graphics system?

8. Why is a trackball often used instead of a mouse in computer-aided design applications?

9. When are optical disks used in a graphics system?

10 .How does a graphics plotter present data?

Câu 71: Software

Graphics systems need software to produce data in pictorial form. There are three main types of software used in graphics systems programming languages, graphics packages and special effects software.

PROGRAMMING LANGUAGES

Graphics can be produced using programming languages. Logo is a graphics oriented language since it Uses turtle graphics. The user can move the 'turtle' around the screen and draw pictures. BASIC and Pascal are general purpose languages that can be used to produce graphics. They contain a series of instructions or commands which enable the user to draw a picture.

GRAPHICS PACKAGES

Graphics packages include painting programs, drawing programs and desktop pubHshing programs. They have become essential tools for people creating computer graphics.

Drawing and painting software enables the user to draw and 'paint' images on the computer. There are a rahge of these graphics packages which are very easy to use and don't require the user to learn a programming language. Most drawing and painting programs contain the same tools and techniques.

You choose the tool by pointing at the icon using the mouse and clicking the mouse with the mouse button, The tool can then be used for drawing or painting by moving the pointer across the screen and holding down the mouse button.The above picture contains some typical icons which represent tools used in graphics packages. These include:

. a pencil to allow the user to draw freehand sketches

. an eraser or rubber to remove unwanted areas

. a brush to paint freehand (usually available with different brush forms)

. a spray can which allows the user to 'spray paint'

. a line tool for drawing straight lines

. a text tool for inserting text in different fonts and sizes

. a rectangle tool for drawing accurate rectangles

. a circle tool for drawing accurate circles

. an area fill tool so that any closed area can be filled with a colour or pattern

. line width options to change the thicknesses of the lines   .

. pattern options for filling areas, and for the brush and spray tools colour options for the various drawing tools.

Desktop publishing, or DTP, software controls the appearance of a document; it involves arranging text and graphics on the same page. DTP software lets the user arrange text in multiple columns and formats, insert graphics, move text rand graphics anywhere on the page, and display the text in a variety of fonts or typefaces. Although DTP software generally includes some text editing features and some graphics tools, they are limited. This means that DTP software must be capable of 'importing' text from word processors and 'importing' graphics from drawing and painting programs.

SPECIAL EFFECTS

Graphics systems can use computer graphics to produce special effects including animation, holography and three-dimensional graphics.

Animation of computer graphics allows images to move and come to life.

Programming languages can be used for animation. The process is achieved by drawing the object, erasing the object, and then redrawing the object in a slightly different position. Each drawing is a frame; if 10 or more frames are presented in one second the human eye cannot notice the individual frames and the object I will appear to move. With computer animation packages it is not necessary to draw every single frame. Animators can draw the initial position and the last position of an object and use the computer to produce the frames in between.

Three dimensional (3-D) graphics can be drawn on the computer using computer-aided design software. Shading and colour can be used to give a sense of realism to the object. It can also be transformed or moved in many different ways, so that the features of the object can be seen from different perspectives.

1. Write down whether the following statements are true or false.

a. Logo is mainly a graphics-oriented language.

b. With computer animation packages it is necessary to draw every single frame.

c. DTP software is a general purpose language that can be used to produce graphics.

d. CAD software can be used to produce animation.

e. Painting programs do not allow the user to correct graphics.

f. Icons are small pictures frequently used in graphics packages.

g. BASIC programming language does not include any commands to enable the user to draw a picture.

h. Three-dimensional graphics can be transformed on the computer so that the

object can be viewed from different perspectives.

2. How do computerised methods of animation surpass manual methods?

3. What is the purpose of desktop publishing software?

4. How do you choose a tool in a drawing or painting program?

Câu 72: Data

A computer is only a two-state device and at its very simplest level its electronic circuits are either *'on'* or *'off'*. Therefore, data for graphics output is stored in memory in the same form as any other data. It is the software which translates the data into graphics.

PIXELS

Images on the monitor screen are made up of tiny dots called *pixels,* or picture elements. The screen is divided into a grid consisting of a. number of columns and rows; the intersection of a column and a row forms the pixel. All text, including letters, numbers and symbols, and graphics shown on the screen are made up of pixels. The computer controls the number, size, tone and colour of each pixel. These characteristics determine. the quality of the image and the amount of memory needed to store the image.

MEMORY MAPPING

Memory mapping, or bit mapping, refers to the relationship between the bits that represent the image in memory and the image displayed on the screen. In a computer system a bit is the smallest unit for storing data and can only represent a 0 or a 1. One or more bits must be stored for each pixel on the screen. At the simplest level one pixel can represent one bit, where a 0 bit means the pixel is off and a 1 bit means the pixel is on. For example, a monochrome monitor might I contain 640 pixels horizontally and 400 pixels vertically. This amounts to a total of , 256 000 pixels on the screen and would correspond to 256 000 bits or 32 kilobytes , (dividing the number of bits by eight, since one byte consists of eight bits, and then dividing this result by one thousand, since a kilobyte is approximately one thousand bytes). This means to store an image for display on this monitor requires 32 K of memory.

Tones, or shades of grey, are needed for most graphics and this requires more memory. Instead of one pixel representing one bit, one pixel can represent a number of bits, depending on the tone variation required. For example, if one pixel represents two bits it allows the monitor to display four shades, since two bits allows four numbers: 00, 01; 10 and 11. If one pixel represents three bits it allows the monitor to display eight shades, since three bits allows eight numbers: 000, 001, 010, 011, 100, 101, 110 and Ill. An increase in the number of bits assigned to each pixel multiplies the number of tones or shades by two. If a monochrome monitor with *640* pixels

horizontally and *100* pixels vertically displayed an image with 64 tones or shades, it would need one pixel to represent six bits. This would then require six times the amount of memory to store the. image (192 K).

Colour images are obtained from an RGB .(red-green-blue) monitor which use! combinations of red, green and blue colours. The minimum number of colours is eight; this consists of red only; green only; blue only; red and green (yellow); and blue (magenta); blue and green (cyan); red, blue and green (white); and no colour (black). If the intensity of the electron beam is varied, many more colour can be generated, but this requires more. bits per pixel. The number of bits controlling each pixel depends on the number of tones and the number of colours. If one pixel represents eight bits it allows the monitor to display 256 tones or colours. This might consist of 256 colours, or 64 colours with 4 tones, c or 16 colours with 16 tones. A colour monitor containing *640* pixels horizontally and 400 pixels vertically with 256 colours would require 8 bits per pixel. This would require (640 X *400* X 8) bits or 256 kilobytes of memory to store the image.

RASTER AND VECTOR GRAPHICS

Graphics are created in a CRT using two different methods; one method is called raster graphics and the other method is called vector graphics.

Raster graphics are produced by filling in each dot or pixel on the screen. Each pixel is formed by an electron beam striking the inside of the phosphorus-coated screen. The electron beam covers or scans the entire screen in a regular pattern, known as a raster scan. It usually moves from left to right in each row, starting with the row at the. top of the screen and finishing with the row at the bottom of the screen. Thirty of these scans are completed every second so that the image does not fade or flicker; this is called refreshing.

Vector graphics are produced by drawing lines between two points. The electron beam draws a straight line called a vector between two points whose co-ordinates have been determined by the CPU. The image is completed when Raster graphics require more memory and faster processing speeds than vector graphics. However, raster graphics are more widely used than vector graphics as they provide more realistic images. Vector graphics have difficulty with shading objects, but the jagged or all the lines have been drawn. Vector graphics are maintained either by vector refresh or vector storage. Vector refresh redraws the image thirty times every second. Vector storage traces the image on a storage grid or mesh inside the CRT and then continually hits the grid with electrons to form the image on the screen. This image is static and does not change until a new image has been drawn on the storage grid staircase effect on diagonal lines is reduced. They are mainly used in applications where clearness of lines is important, such as computer-aided design.

RESOLUTION

Resolution refers to the quality of the image on the monitor screen and is measured in the number of pixels that occupy the screen 'or the number of dots per inch (dpi). The more pixels on the screen, the higher the resolution and the better quality the image. Resolution is usually given as the number of pixels across the screen multiplied by the number of pixels down the screen. It ranges from low-resolution screens which contain 160 X 192 pixels to high-resolution screens containing 1024 X 1024 pixels. Screen resolution is improving as computer systems develop and become more powerful.

1. For each of the following statements select a matching word or phrase from the list below.

a. Formed by the intersection of a row and a column.

b. Graphics produced by filling in each dot or pixel.

c. The quality of the image on the screen, measured by the number of pixels that occupy the screen.

d. Graphics produced by drawing lines between two points.

e. The relationship between the bits that form the image in memory and the image displayed on the screen.

f. The pattern in which the electron beam covers the entire screen in a CRT.

g. Repeated thirty times every second so the image does not fade or flicker.

h. The smallest unit for storing data.

scan   vector pixel   resolution

bit   memory map   refresh raster

2. How is the resolution of a screen determined?

3. Explain the difference between raster graphics and vector graphics.

4. What characteristics of a pixel determine the quality of the image?

5. Why are most images raster graphics?

6. What is a pixel?

Câu 73: Applications

Graphics systems are used whenever people require data in pictorial form. There are many situations in which a computer can be used to create and store *graphic* images. The main fields are in industry, computer-aided design, computer-aided manufacturing and entertainment.

INDUSTRY

There are many ways graphics systems are used in industry, such as in creating charts and graphs, facsimiles, animated advertising, professional presentation phototypesetting, photo production and simulations.

Charts and graphs are used by industry to present data in an easily understood form. Line graphs, bar charts and pie charts enable the user to analyse data determine trends and to explain particular features. These graphs can be constructed easily using a computer. Software packages can be purchased that can create line charts; bar graphs and pie charts. Many spreadsheets and database management systems can present data in the form of graphs.

Animated advertising uses computer graphics. to present products success on television and video. Graphics packages are available which produce image that can be chained together in a slide-show effect to help sell a company's goods or services.

CAD/CAM

Computer-aided design and computer-aided manufacturing are processes involving computers in the design and manufacture of a product.

Computer-aided design (CAD) permits professional designers to prepare complex drawings quickly and easily, reducing the time they spend at the drawing board. Drawings can be entered using a light pen, trackball or mouse. The designer can then make changes to the drawing and examine and test these changes before the product is actually manufactured. in industry, CAD is used for designing products such as cars, buildings, aircraft, ships, clothes and for drawing town plans.

If the design has been entered into a computer with CAD, the calculations used to generate the design can be used by the computer to simulate the manufacturing process. This information can then be used to direct the movements of computer-controlled machines in the actual manufacturing. *Computer-aided manufacturing* (CAM) occurs when machines and/or robots in the manufacturing process are controlled by a computer system. For example,

some engineering manufacturers produce small numbers of components such as gears, shafts, nuts and screws. Each component is produced by a series of machines or workstations under computer control. Conveyors and robots move the components from one workstation to another until all processes have been completed. The computer controls the workstations and the material handling, and makes sure everything is happening in the correct order.

CAM systems are used to control assembly lines in which robots complete dangerous or repetitive tasks.

ENTERTAINMENT

. the use of computer graphics in entertainment has been rapidly increasing me of the applications include games, movies, TV logos, cartoons, story.

. boarding and video clips.

Computer games, or video games, have always used computer-generated graphics to excite the user. They have been responsible for many of the developments which have occurred in computer graphics. Improvements processing power, monitor resolution and storage capacities have enabled games played on personal computers to approach the same level of realism in interaction as arcade games.

Recently, movies have been created which rely heavily on computer graphics movies such as *Star Wars* and *Who Framed Roger Rabbit?* have mixed computer graphics with live film footage to create startling special effects.

1. Copy and complete the following statements.

a........................is when machines and robots in the manufacturing process are controlled by a computer system.

b. Charts and graphs are used by industry to...........................data in an easily understood form.

c........................have been responsible for many developments which have occurred in computer graphics.

d........................... permits professional designers to prepare complex drawings quickly and easily.

e CAM systems are used to..........................assembly lines which use robots to complete dangerous or repetitive tasks.

f.............................packages can be purchased that can create line charts, bar charts and pie charts.

g. Some movies mix.........................with videotape to produce a film.

h CAD systems allow..............................to be easily modified.

2. How are computers used in a CAM system?

3. Why are games on personal computers approaching the same level of realism and interaction as arcade games?

4. Why are graphs such as line graphs, bar charts and pie charts used by industry?

5 .What is a slide-show effect?

6. List any products that could be designed using a CAD system.

7. Name any movies which you think have used computer graphics.

Câu 74: People

Graphics systems produce data in pictorial form to assist people in solving problems. People are involved in every aspect of a graphics system. They are the creators of graphics and the users of graphics.

DISABLED PEOPLE

A range of alternative input and output devices have enhanced the lives of disabled people. Many of these devices have used the technology that was developed for graphics systems. Voice recognition devices have enabled people to communicate with the computer using their voice. A person can instruct a computerised robot to pick up an object, dial a telephone number or turn the channel on the TV. Voice synthesis has allowed people who cannot speak to communicate with others. They type words into a computer system and then instruct the computer to say the words. Blind people can use a special computer that can recognise letters in a book and read the book aloud.

Electronic systems can help disabled people control equipment in their homes. For example, by pressing a button a person can switch on an outside alarm, unlock the front door and turn on or off a light, the radio or the TV. If the person is unable to use his or her hands, input devices are available which can be operated by foot, by head or by blowing and sucking on a tube.

CREATORS OF GRAPHICS

Creators of graphics are people who produce the picture or visual image. There are more and more people who are using graphics to present and communicate information. People in many different fields which are not directly related to graphics. systems create graphics for their presentations. In addition, there are people who earn a living from creating graphics, such as architects, engineers, graphic designers, cartographers, cartoonists, video game designers and artists.

USERS OF GRAPHICS

Users of graphics are people who are affected by graphics. Anybody living in today's modern society is influenced by images from newspapers, magazines, television, videos, billboards and advertising material. Society seems to be increasing its dependence on graphics as

a means of communication. Our use of graphics is reflected in the saying 'a picture is worth a thousand words.

We are all directly affected by graphics. We often use a particular product and give very little thought to how it was designed. For example, thousands of hours are spent designing. and testing every part of a new car. Graphics systems are used to model and test the part before it goes ,into production.

1. Vowels have been omitted from these words. Write out the completed words.

a _n_m_t- _n   f d_skt_p   p....bl_sh_ng

b p_x_l   g. r –st_r

c v_cLr   h sc_n

d r_s_l_t- _n   i v- _c- synth_s_s

e d_s_gn_rs   j. tr _ckb_ll

2. List people who earn a living from creating graphics.

3. What are voice recognition device's?

4. Why are people increasing their dependence on graphics?

5. What is voice synthesis?

6. List the type of input devices which have been designed for disabled people.

7. Do you think the development of computer graphics has enhanced human communication?

Câu 75: REVIEW EXERCISE

1. Copy and complete the following statements

a. ……………..systems are being used to control assembly lines which use robots to complete dangerous or repetitive tasks.

b. Optical disks are hard metal disks which use……………….. technology to store tremendous amounts of data.

c .The……………...allows the user to select a small picture called an icon instead of typing a command.

d Three-dimensional graphics can be…………………… on the computer so that the object can be viewed from different perspectives.

e. …………..graphics are produced by drawing lines between two points.

f. ……………occurs in a CRT when an electron beam is moved across the screen.

g. A pixel is formed by the………………………of a row and a column.

h. Logo is mainly a graphics……………………language.

i. ……………. software controls the appearance of a document; it involves   mixing text and graphics on the same page.

j. Raster graphics are produced by filling in each………………………….

k. A ………………….use special pens which are move across the paper to create a drawing.

l.…………….   is the quality of the image on the screen.

m. A bit is the………………… unit for storing data.

n. CAD systems permit professional designers to prepare complex……………… quickly and easily.

2. What are computer graphics?

3. Describe the characteristics required by the central processing unit in a graphics system.

4. Why does DTP software need to be compatible with word processing and drawing/painting programs?

5. What advantages are there in using CAD software to draw three-dimensional graphics?

6. How do programming languages achieve animation?

7. What is the difference between a pixel and resolution?

8. Why are raster graphics widely used instead of vector graphics?

9. Calculate the memory requirements of an image produced on an RGB monitor whose resolution is 640 by 480 pixels and which supports 4096 colours.

10. Describe an application of a graphics system.

ĐÁP ÁN

Câu 1:

1) a-T   b-F   c-F   d-T   e-T   f-F   g-T   h-T   i-F   j-T

2) input: butter, water, heat, egg, wheat flour

process: cooking

output: butter toast

3)

input: soil, water, tree

process: planting

output: tree

Câu 2:

1) a-subsystem, b-levels, c-synthesis, d-system, e-input, f-refinement, g-water cycle,

h-people, i-system, j-process.

2+3+4) Refining a system means analysing it in more detail and breaking it down into smaller components. Each part of the process may be considered either as a system in itself, or as a *sub-system.* A sub-system is a small system which is part of a larger system. It also contains a group of elements which work together to achieve a purpose.

Synthesis is the reverse process; it involves combining simple sub-systems into a larger, more complex system.

Câu 3:

1) a-blackbox, b-subsystem, c-boundary, d-refinement, e-environment, f-output, g-system, h-process, i-input, j-synthesis.

2) Many people do not understand how a system works, yet they know that if the system is given a certain input it will produce a certain output. For example, in a recorded music system when a CD is placed in the CD player and the play button is pressed, the music will be heard. Most people are not concerned with how the CD player works. A system such as this can be called a 'black box' because the internal components of the system are not fully understood by most people. Their main concern is that the system accomplishes its task.

3) The limit of a system is called its boundary. It is determined by the observer who decides which parts it takes up the system and where the boundary is drawn.

4) Yes. Systems work under certain physical conditions or surrounding influences which are called their environment.

5) Because most of them do not know exactly how computer works.

6) telephone, fax machine, T.V, radio

Câu 4:

1) a-processor, b-environment, c-system, d-input, e-subsystem, f-resources, g-procedures, h-boundary, i-synthesis, j-output.

2) because they are system's component

3) Procedures are the set of instructions which specify what processing is to be performed or what course of action is to take place. The processor and the resources are closely linked. The processor is whatever carries out or executes the procedures. The person making the cup of coffee is the processor since she or he performs all the above procedures.

   The resources are used by the processor to perform the task. They include, anything which supports or assists the execution of the procedures, but do not include the inputs.

4) because it need to achieve a purpose of the system

Câu 5:

1. a-T, b-F, c-F, d-T, f-T, g-F, h-F, i-F, j-T

2+3+4+5)

Just as we can refine a system into sub-systems, we can also refine a process into *sub-processes,* -also called *modules.* Each of these modules contains only one process.

We can illustrate the different levels of the process using a *hierarchy chart.* The major module is shown as the top level and it can be refined into lower level modules as more detail is required. Control passes from the top level down to the next lower module or first refinement, then to the next lower module or second refinement, and' so on. As well as containing only one process, each module should contain a single entry and a single exit.

Câu 6:

1) a-IPO, b-system, c-instruction, d-processor, e-subsystem, f-subprocesses or modules, g-processor, h-top, i-blackbox, j-environment

2) input: coffee, milk, hot water, cup

   process: put coffee into cup, pour hot water, add milk, stir

   output: white coffee

3) Because it is quick, clear and efficient

Câu 7:

1) a-F, b-T, c-T, d-F, e-T, f-T, g-T, h-T

2) An algorithm is a series of steps which, when performed correctly, will solve a problem in a finite time.

3) procedures are essential if the system is going to achieve its purpose and are stated in the form of an *algorithm.* An algorithm is a series of steps which, when performed correctly, will solve a problem in a finite time.

4) it is modified or discarded

5) because there are many ways to solve a problem

Câu 8:

1) a-flowlines, b-pseudocode, c-decision, d-flowchart, e-Englishprose, f-terminal, g-indentation, h-programming, i-algorithm.

2) a-English prose is a description of the steps required to solve the problem in plain English without a structure.

   b-Pseudocode is a limited form of English which relies on indenting lines and using keywords to highlight the structure of the algorithm.

   c-Flowcharts are a way of describing algorithms in pictorial form.

3)They are often favoured since it is easier to follow the structure in a picture than in words.

4) When the flow of control is from top to bottom or from left to right.

5) it is very easy to draw a flowchart which is complex and difficult to change into programming language.

pseudocode is written in text form which allows it to be easily modified with word processor.

6) to emphasize and draw attention to the type of action being performed

7) the indentation is used to show the structure of the algorithm.

Câu 9:

1) a-sequence, b-flowchart, c-selection, d-repetition, e-guarded loop, f-pseudo code, g-control structure, h-English prose, i- unguarded loop, j-flowlines.

2) Control structures are used in an algorithm to control the flow of logic; that is, they indicate the order in which the statements are carried out. Algorithms are composed of three basic control structures: *sequence/ selection* and *loop.*

3) Sequence is where the steps are executed' one after another. Each statement is performed only once and is then fol1owed by the next statement in order.

   Selection allows for different steps to be carried out in different conditions.

   A loop or repetition allows a number of steps to be repeated until some condition is satisfied.

Câu 10:

1) a-blackbox, b-limit, c-instructions, d-hierarchy, e-purpose, f-larger, g-from, h-environment, i-IPO, j-processor, k-subsystem, l-actions, m-order, n-selection, o-pictorial,

p-steps, q-English prose, r-repeated, s-keywords, t-sequence.

Câu 11:

1) a-presenting, b-high, c-changing, d-retaining, e-software, f-control, g-hardware,

h-purpose, i-input, j-instructions

2. A computer is an electronic tool capable of doing calculations and processing information accurately at a very high speed

3. A computer system is made up of hardware and software which work together, processing data to achieve a purpose.

*4)*Computer systems can be viewed as five co-operating sub-systems. Input - entering data into the system for processing.

Output - presenting data/information which can be used outside the system

Processing - changing data to produce information

Storage - retaining data for later use by the system.

Control - coordinating the operations of the input, processing, output and storage sub-systems.

Câu 12:

1.Write down whether the following statements are true or false..

a. F b. F c. T d. T e. F   f .T   g .F

h. T   i .F   j. T

Câu 13:

1. a. input b. LCD c. monochrome d. output e.   keyboard   f. hardware

g. dot matrix   h. Enter i .Escape

2. This type of display is very light and requires less power than a CRT, allowing it to be run on batteries.

3. The monitor is the most popular output device. It is similar to a television screen, but superior in clarity.

4. A computer allows data to be presented on paper as a 'hard copy' or printout.

5. A printer must have power, be connected to the computer and have the paper inserted correctly.

Câu 14:

1. Vowels have been omitted from these words. Write out the completed words.

a. silicon chip   f. integrated circuit

b. micro processor   g. laptop

c. monitor   h. data

d. information   i. devices

e. process j. instruction

2. CPU carry out the processing in a computer.

3. Data are the raw facts put into the computer system by an input device. When this data is processed or ordered and given some meaning, it is called information. This information is then presented for use outside the system by an output device.

Câu 15:

1. Write down whether the following statements are true or false.

a. F b. T c .F d. F e. T   f .T

2. primary storage is generally limited in size and is often too small to contain all the necessary data, most computers use secondary storage.

3. The disk drive spins the disk at a constant speed and data is read from or written to 'tracks' located on the surface of the disk.

4 .Keep floppy disks in a protective envelope when not in use.

. When transporting or posting disks, always use a protective box.

. Never expose disks to temperatures above 50 °C or below 10°C. Temperatures inside a car can exceed 50 °C on a hot day.

. Magnetic fields destroy data on your disk. Magnetic influence can be caused by any magnet, monitor, disk drive or electronic appliance that generates a magnetic field. Always store your disks in storage boxes at least 10 cm from all electrical appliances or computer components.

5 .A hard disk works on the same principles as a floppy disk except that it is rigid and much thicker, and spins much faster. It is usually housed in a special casing inside the computer and is not removed like a floppy disk. Hard disks hold much more data than floppy disks.

Câu 16:

1. **e.** *computer*   **a.***microcomputer*   **c.** *microprocessor*   **b.***tiny* **d.***supervisor*

2. The control unit doesn't process data itself, but selects, interprets and oversees the execution of the program's instructions. It controls all the parts of the computer system, just as the central nervous system controls the muscles and other parts of the human body.

3. central processing unit

*4 .*The number of these electrical pulses per second indicates the speed of the processor.

Câu 17:

1. Copy and complete the following sentences.

a. A **hacker** is a person who gains illegal access to a computer system from   her or his personal computer.

b. Secret words or numbers to gain access to a computer system are referred to as **password**

c. The process of decoding and encoding data is called **cryptography**

d. **Security** involves a system of safeguards designed to protect a computer   system   and its data.

e. The loss of **data** is the major concern in the security of a computer system.

f. The weakest link in the security of any computer system is the **people** in it.

g. Security of data could include internal controls where a list is kept of every time someone has gained **access**   to certain data.

h. Loss of software is not a problem if **backup** copies of software have been kept.

i . Shredders are used to destroy **waste**.

2.The loss will probably be covered by insurance and the equipment can be replaced.

3. Waste must be secured since discarded printouts, printer ribbons and the like can be sources of information to unauthorised persons. This kind of waste can be destroyed using shredders. Passwords are secret words or numbers that must be typed on the keyboard to gain access to the system. Good data protection systems change passwords often so that only authorised persons can have access to certain data.

. Internal controls are controls that are planned as part of the computer system. For example, the computer system could keep a list of every time someone has gained or attempted to gain access to certain data.

. Data sent over communication lines can be encoded (cryptography). The code can only be decoded by the person who is to receive the data.

. The weakest link in the security of any. computer system is the people in it. Employees need to be screened carefully. Dishonest job applicants should not be employed. There are a number of ways to restrict data to authorised persons.

4. There are a number of ways to restrict data to authorised persons. These include using a key, badge, plastic card, password, identification number, personal signature, and devices which recognise individual body characteristics such as fingerprints and voice.

Some systems use a combination of the above techniques. For example, access to an automatic teller machine requires both a plastic card and a personal identification number.

Câu 18: REVIEW EXERCISE

1. Copy and complete the following sentences.

a. The monitor is the most popular form of **output** device.

b. To obtain a hard copy output a **printer** is needed.

c. The physical equipment that makes up the computer system is referred to as **hardware**

d .The **cursor** is generally a rectangle the size of a capital letter which appears (sometimes flashing) on the screen of a monitor to indicate the current display position.

e.Devices used to present data are called **output** devices

f. A common form of secondary storage device is a **disks**

g. The processing in a computer is carried out by the **CPU**

h. A type of computer screen that is similar to a television set is called a **monitor**

i Devices used to enter data are called **input** devices.

j Monitors tare available in **monochrome** or colour.

2. input, output, processing, storage, control.

3. floppy disks vary in size from 9-20 cm, the most popular standard sizes are 9cm and 13cm.

the floppy disk can be removed and cheap.

4. a. Monitor is the most popular output device.

b. Mouse is a pointing deice that can be used to point the cursor at the desired position on the screen.

c. Key board is the main device that you use to communicate with your computer.

d. to be used, a floppy disk must be inserted into the right size disk drive. It spins the disk at a constant speed and data is read from or written to tracks located on the surface of the disk.

5. Because primary storage is limitted in size.

6. The control unit uses a system clock to synchronise all the tasks by sending out electrical pulses. The number of these electrical pulses per second indicates the speed of the processor.

Câu 19:

1. Copy and complete the following sentences.

a. Supercomputers are mainly used in **scientific** applications.

b. Pre-packaged **chip** is available, so that microcomputers are easy to use.

c. Mainframe computers can accommodate input from **1000** workstations or terminals.

d. A billion bytes of data is referred to as a **gigabytes**

e. **A minicomputers** is a general purpose computer that calculates at rates from 5 to 50 MIPS.

f. A technique that allows many people to access the same computer at the one time is called **time-sharing**

g. A **microprocessor** is a central processing unit contained on one silicon chip.

h. **hardware** is the set of physical objects that make up a computer or any device working with the computer.

2. they have brought computing into people's homes and have been used for an increasing number of applications.

Câu 20:

1. Vowels have been omitted from these words. Write out the completed words.

a. hardware	f. periphera1
b. mainframe	g. supercomputer
c. devices	h. micro_computer
d. micro_processor	i. minicomputer
e. MIPS	j. configuration

2. Peripheral devices are pieces of computer equipment other than the central processing unit.

3. Central processor devices are associated with processing, control and primary storage.

4. They are usually located on the computer's *motherboard*

Câu 21:

1. Copy and complete the following sentences.

a. The **QWERTY** keyboard was purposely designed to slow typists down.

b. A **Scanners** is used to convert text and graphics into bit patterns which can   be   read   by the computer.

c. The **Dvorak** .keyboard places the most commonly used letters on the middle row.

d. A device that allows the computer to read the barcodes found on many products is called a **barcode wand**

e. The **keyboard** is the most commonly used input device on a computer.

f. **graphics tablet**

g. A document reader can **receive** Information from specially printed answer sheets.

h. A **Touch screens** detects the touch of the human finger.

i. An input device mainly used for computer games is called a **Joysticks**

2. He soon found that the primitive wooden type bars, which were slow to fall into place, jammed as typists of the day became more proficient.

3. To change this world standard would require a lot of retraining, and many users would be reluctant to change, regardless of the benefits.

Câu 22:

1. For each of the following statements select a matching word or phrase from the list below.

a. dot-matrix printer

b.LCD

c. laser printer

d. plotter

e. bubble jet printer

f. monochrome

g. ink-jet printer

h. 24-pin matrix

i . CRT

j .pin matrix

2. This printer prints characters as a series of dots, very much like the characters formed on the visual display unit. Each single dot is formed by the impact between a pin, a printer ribbon and the paper.

3. A *plotter* is a specialised printer that is used in the architectural an engineering design areas.

Câu 23:

1. Write down whether the following statements are true or false.

a. T

b. F

c .T

d. T

e. F

f. F

g. F

 h. T

i. F

j. F

2. RAM, ROM

3.internal storage, main memory, primary memory, main storage, just memory.

4. It located on the computer's motherboard where it is linked directly to the central processing unit (CPU) so that access to data for processing is very fast.

5. It affects the computer's memory capability.

6.Primary storage provides both temporary storage, called random access memory (RAM), and permanent storage, called read-only memory (ROM).

7. Primary is internal storage

8. when the power to the computer is shut off, everything stored in RAM is lost.

9.RAM is where data and program instruction are held temporarily so that they can be manipulated or executed.

ROM allows the user to read, but not to write data.

Câu 24:

1 Write the word that best fits the empty spaces in the sentences of the passage. Below is a list of words you can choose from. There are more words in the list than you will need.

a. primary   **e.** disk drive   **d.** secondary

c. RAM   **b.** ROM   **f** .tape drive

2. The vowels have been omitted from these words. Write out the completed words.

a. sequential   f. volatile

b. storage   g. read

c. random   h. memory

d. secondary   i .write

e. bytesj. drive

3. primary storage is limited in size and is often too small to contain a11 the necessary data.

4.Sequential access is a similar process to playing an audio cassette on a cassette player.

Random acces is similar to playing a record on a turnable, where any track can be played at any time without having to start from the beginning.

5. Secondary storage is the memory that is stored away from, or external to, the computer's motherboard.

Câu 25:

1. Copy and complete the following sentences.

a. A cadtridge tape looks like a cassette tape but holds more data.

b .External storage of data is usually located away from the computer's motherboard and is called **secondary memory**

c. Magnetic tapes can store large quantities of data inexpensively, so are often used as a **backup** medium.

d. **cassette** were a popular means of data storage with personal computers.

e. Magnetic tapes are not used for data that is used, revised or updated often, since access to data is **sequential**.

f. **slow** access cannot go directly to the required data, but must read from the beginning.

g. Internal storage of data is usually located on the computer's motherboard and is called **primary** .

h. **random** access allows the required data to be read directly.

2. 40 megabytes of data.

3 .It is relatively inexpensive but cannot hold much data and access to that data is slow.

4. Magnetic stored much data on.

5.Magnetic tape is not well suited to data which is used, revised or updated often, since tape's sequential access to data is too slow.

Câu 26:

1.

d.removable cartridge   h.write-protection notch   f.disk-pack   a.sectors

e.density   c.double-sided b.fixed disk   g.tracks

Câu 27:

1. The vowels have been omitted from these words. Write out the completed words.

a. magnetic   disk   f. cassette tape

b. removabe cartridge g. sectors

c. double   density h.laser disk

d. optica1   technology   i .tracks

e. floppy   disk   j. megabytes

2.advantage: storing data remains constant

disadvantage: read only

3. 1 terabyte

4. optical laser disk, optical card, optical tape

5. It can store 2 megabytes of data. It may lead to a cashless society.

6. because it can store much and durable.

7. It is hard metal disk ranging from 12 centimetres to 36 centimetres.

Câu 28:

1. a-CPU, b-millions, c-ALU, d-pulses, e-motherboard, f-millionths, g- 100 and 200, h-control unit, i-billionths.
2. processor
3. 16 millions pulses per second
4. 3 and 4 MIPS
5. Registers are a temporary storage are for data in the CPU
6. ALU's tasks are: basic maths operation, comparison and logical operations

Câu 29:

1.
- liquid crystal display- output devices
- keys-input devices
- semi-conductor-CPU
- wires-buses
- memory-primary storage

2. a-buses, b-peripheral, c-memory, d-registers, e-silicon, f-hardware.

3. because buses link the components of a computer system.

4. addresses of the source and destination of data.

Câu 30:

1. a-abacus, b-punched card devices, d- Charles Babbage, c- Blaise Pascal, e- collecting and tabulating data, f- integrated circuit, g- analytical engine, h- Napiers Rods
2. a-the first mechanical calculator, b-Leibniz's wheel, c-difference engine, d-mechanical machine, e-automatic calculator.

Câu 31:

1. a-system, b-operating, c-machine, d-resident, e-system, f-DOS, g-single, h-programmer, i-interface.
2. The process of loading the disk operating system into RAM is called booting DOS
3. system software, application software.
4. it changes program into machine language.

Câu 32:

1. a. program   f .single-tasking

   b. translater   g. programing system

   c. application   h. software   package

   d. custom-made software   i. multi-tasking

   e. DOS j. boot

2. program designed or written to fit the requirements of the problem.

3. because it is very expensive.

Câu 33:

1. a-assembly language, b-compiler, c-machine language, d-interpreter, e- low level language, f-logo, h-high level language, g-assembler.

2. It was used in early day of computing.

3. Compiler changes the entire high level program into machine code. Interpreter changes one instruction at a time. Compiler is faster but editing is more difficult.

4. High level language.

5. Faster in machine language, require thousands lines of code (time consuming, repetive and error-prone).

Câu 34:

1. They are spread between computer systems when data is copied onto a floppy disk and loaded onto another system.

2. Authors would be reluctant to spend time developing good software.

3. It is a program which infects your computer by inserting itself into your data.

Câu 35:

1. a- Binary system, b-information, c-bit, d-digital data, e-decimal system, f-data.

2. Data are the raw facts put into the computer system. Information is data which has been ordered and given some meaning.

3. Digital, analogue

Câu 36:

1. a-byte, b-binary, c-bits, d-1001011, e-world length, f-nibbles, g-dump

2. It provides an early method to represent a byte.

3. a-A bit is the smallest unit for storing data and is either 0 or 1.

b-A byte consists of 8 bits and represents a single character.

c-The 8 bits in a byte are divided into two bit groups called nibbles.

d- A word consists of the number of bits that can be processed in one operation by the computer.

Câu 37:

1. a-analog, b-ASCII, c-hexadecimal, d-digital, e-word, f-binary, g-byte, h-bit

2. Computer is only a two-state device.

3. They don't require any storage capacity, they can collect and process data at high speeds.

4. Analog device has data using continuously variable physical quantities. Digital device has data in the form of digits.

5. It is designed to perform arithmetic functions upon numbers of which are represented by some physical quantity such as voltage.

Câu 38:

1. a-F, b-T, c-T, d-F, e-T, f-T, g-F, h-T, i-F, j-T.

2. by its baud rate or the number of bits per second.

3. it is used to change paralleled signals to serial and serial signals to parallel.

4. it transfers eight bits at a time.

5. it is a device that allows computers to transfer data over the telephone lines.

6. because it can transfer over telephone lines.

Câu 39:

1. a-serial transfer, b-interface, c-baud rate, d-parallel transfer, e-protoc, f-handshaking, g-analog, h-digital, i-bit, j-byte.

2. It is like a bridge that allows data to be exchanged between two devices.

3. a - modems, printers, light pens, b – disk drives, robots, joysticks.

4. Protocols are sets of rules for transferring data through an interface.

5. baud rate, word length, the number of bits separating the bytes or characters the parity (an error checking procedure)

Câu 40:

1. a-optical, b-electrons, c-media, d-magnetic, e-paper, f-pin, g-pixel

2. Data is recorded by directing a laser beam onto the surface of the medium.

3. Impact printers make an image on the paper by striking the paper with a metal print head. Nonimpact printers make an image using some other method.

4. Images are produced by a beam of electrons of different intensities moving back and forth across a phosphor-coated screen.

5. optical, electrical, magnetic, paper.

6. the surface of the medium consists of a thin layer of iron oxide or chromium dioxide so that when data is recorded it appears as magnetic spots.

Câu 41:

1. a-digital, b-binary, c-byte, d-analog, e-protocol, f-information, g-serial, h-hexadecimal, i-word length, j-interface.

2. It is the right of control over one's personal data.

3. mistakes in gathering the data or in data entry, a mismatch of the data and the person, an outdated information.

4. It enables the user to store and organise a lot of data. It allows other users quick access to everything that is stored.

5. Data about our personal details, educational achievements attitude towards various issues, lifestyle and other aspects of our life.

Câu 42:

1. a-T, b-T, c-T, d-F, e-F, f-F, g-T, h-T, i-F, j-T

2. a-dot matrix, b-plotter, c-document reader, d-abacus, e-megabyte, f-super computer, g-monitor, h-vacuum tubes, i-mainframe, j-minicomputer.

3. The second generation used transistor. The third generation used integrated circuit.

4. LST stands for large-scale integration.

5. Peripheral devices are pieces of computer equipment other than central processing unit

Câu 43 :

1. a-application, b-package, c-DOS, c-binary, e-assembler, f-copyright, g-operating, h-custom-made, i-virus, j-compiler.

2. system software, application software.

3. programmer

Câu 44:

1. a-parallel, b-digits, c-byte, d-interface, e-baud rate, f-analog, g-1000011, h-two, i-medium, j-8.

Data are the raw facts put into the computer system. Information is data which has been ordered and given some meaning.

Câu 45:

1. a-computer engineers, b-system, c-system, d-team, e-smaller, f-software

2. A detailed description of the program required.

3. a-A system analyst: technical computing skills, good management, personal skills. b-Computer programmers: tertiary institution, know several programming languages, types of hardware. c- Computer engineer: university degrees, a high level of technical knowledge and experience with computer.

Câu 46:

1. a-operators, b-system programmers, c-data entry operators, d-manager, e-consultant, f-specifications, g-engineers, h-application programmer, i-system analysts, j-technician.

2. Computer operators run large computer system.

3. They answer questions on hardware and software.

4. When a new computer system is installed.

5. Computer consultants give advice on a computer system that will solve a particular problem.

6. good typing skills, enter data accurately and quickly.

7. Yes, I do. Because they need to be logically minded people who can work under pressure.

8. They oversee the computer operation.

9. they need to be logically minded people who can work under pressure.

10. They install, maintain and repair the hardware of a computer system.

Câu 47:

1. a-computer technicians, b-system analyst, c-managers, d-programmers, e-computer operators, f-engineers, g-data entry operators.

2. Users are people who are affected by computer systems.

3. a-Direct users interact with or are in control of a computer system. b-indirect users don't use a computer system, but the use of computers by other people affects them. c-intermediary users interact with a computer system to provide a link for indirect users.

   7. the user interface is the interaction between users and a computer system.

Câu 48:

1. a-numeric keypad, b- disked, c-parallel, d-acoustic, e- non-reflective, f-adjustable, g-chair, h-screen, i-ergonomic, j-right, k-hour.

2. RSI: repetitive strain injuries.

3. between 0^0 and 30^0.

Câu 49:

1. a-T, b-F, c-T, d-T, e-F, f-F, g-T, h-F, i-T, j-F, k-T.

2. Ergonomics refers to the relationship between people and their work environment.

Câu 50:

1) a- testing the solution, b-defining the problem, c-designing a solution, d-reporting the solution, e-implementing the solution, f-planning a solution.

Câu 51:

1) a-explain, b-user, c-implementing, d-designing, e-understand, f-reporting, g-planning, h-testing

2) Documentation is a written description to explain the development and operation of a computer solution.

3) Because it makes the computer solution easy to understand

4) It includes: problem statement, method of solution, test methods, results obtained, user

manual.

5) It is left until last

Câu 52:

1) a-T, b-F, c-F, d-T, e-T, f-F, g-T, h-F, i-F, j-T

2) It can be easily be translated into a programming language.

3) Intrinsic documentation involves writing the program so that it can be easily read. This means using correct programming techniques and meaningful variable names. Internal documentation is any comments or remarks within the program code to describe its purpose. External documentation includes any written support material. This may include the problem statement, input data, output data, processes, algorithm, test data and a listing of the program.

4) When the program is completed or interpreted, an error message will appear if the program contains any syntax errors. Logic errors result from an incorrect series of steps in the algorithm.

5) A compiler translates the program into machine code so the computer can implement the solution.

6) Because it is very time-consuming to find and correct logic errors.

7) Bugs mean errors that have been made in the program.

8) Sequence, selection, loop.

Câu 53:

1) a-logo, b-programming, c-logic errors, d-BASIC, e-FORTRAN, f-Pascal, g-COBOL, h-debug, i-documentation, j-syntax error.

2) A-C, b-FORTRAN, c-COBOL, d-BASIC, e-logo, f-Pascal.

3) A program is a series of instructions or statements written in a form acceptable to the computer.

4) C, Pascal

5) Constants are items of data which do not change, they are fixed values. Variables are items of data which may change. A variable name is used to store the data in a location of memory.

6) They can be used more than once to reduce the amount of programming.

7) Input/ output statements allow data to be received from an input device or sent to an output device.

Câu 54:

1) a-words, b-BASIC, c-faster, d- grammar, e- variables, f-data, g-constants, h-subprograms, i-control.

6) It provides a quick and easy solution.

7) the program is big or is going to get bigger, it is useful to use Pascal.

Câu 55:

1) a-F, b-T, c-T, d-T, e-T, f-F, g-F, h-F.

2) Computers have replaced people in many unskilled jobs. The number of clerical jobs is being reduced as word processors allow typist to work more quickly and accurately.

3) Design, construction, operation, maintenance of computer systems. jobs include systems analysts, programmers, engineers, managers, operators, consultants, technicians.

Câu 56: Review exercise

1) a-implementing, b-designing, c-documentation, d-logic, e-program, f-syntax, g-C, h-assignment, i-data, j-subprograms, k-structured, l- testing and debugging the program.

2) Defining the problem, planning a solution, designing a solution, implementing the solution, testing the solution, reporting the solution.

3) Because it explains the development and operation of a computer solution.

4) It means having a definite form, breaking the problem down into smaller problem.

5) Logo, BASIC, Pascal.

7) If the program is small enough to fit on the screen then use BASIC, if it is bigger then use Pascal.

Câu 57:

1) a-information, b-accurate, c-processor, d-census, e-time-sharing, f-output, g-storage.

2) Today's society deals with more information than any other time in history.

3) They are often used for spreadsheet, word procession and database management applications.

4) They are responsible for reading this data from an input medium and converting it into a form that the computer can understand and process.

6) it provides a medium to store large quantities of data.

7) keyboard, mouse, document reader, modem and scanner.

10) printers, monitors, communication devices such as modems.

Câu 58:

1) a-F, b-T, c-T, d-F, e-F, f-T,g-T, h-T

Câu 59:

1) a-record, b-direct access, c-search, d-array, e-file, f-sequential, g-sort, h-field, i-data manipulation, j-data preparation.

2) To store and process data.

3) Magnetic tapes.

4) The terminals are connected to computer, it is called online entry. If they are required to save data to a disk, it is an example of off-line entry.

5) Alphabetical, numerical, chronological.

6) direct access files

Câu 60:

1) a- maintenance, b-field, c-array, d-sequential, e-manipulation, f-online, g-retrieval, h-file, i-record, j-direct access.

2) The data is current.

3) Personnel: address, family, previous employment details. Payroll: name, hour worked, rate of pay, taxation.

4) It is online to database system of the bank.

5) You type in PIN and the amount you purchase is subtracted from your bank account when you present your card.

Câu 61:

1. a-T, b-T, c-F, d-F, e-T, f-F, g-F, h-T

2. Systems analysts, system managers, programmers, operators and data entry personnel.

3. Data is inaccurate, illegal access is obtained, data is combined, sold and exchanged

Câu 62: Review

1. a-Information, b-direct, c-database, d-write, e-calculation, f-prepared or closed databases, g-collect, h- sequential, i-record, j-updating, k- online, l-people, m-privacy.

Câu 63:

1. a-microwave, b-packet switch system, c-modem, d-coaxial cable, e-bus, f-facsimile, g-fibre optic cable, h-satellite, i-acoustic coupler, j-telephone line.

2. Communication systems are concerned with the transfer of data/information from one location to another location.

3. Telephone line, coaxial cable, fibre optic cable, microwave.

4. The packets of data can come from different sources and share the same link. It allows data to travel at speeds of 48000bits per second.

5. They are free from electromagnetic and radio inference provide absolute security and can transmit data at high speeds without errors.

7-They can transmit large amounts of data over long distances and at great speeds

Câu 64:

1. a-local area, b-central, c-distributed, d-wide area, e-loop, f-peripheral, g-workstation, h-topology, i- fileserver or network server, j-mainframe.

2. one computer is connected directly to another computer using a cable.

3. It connects computer or terminals within a building or group of building on one site.

4. Bus networks do not have a central computer and all workstations are connected by a common cable called a bus. Star networks have a central computer to which each workstation is directly connected. Only one workstation can transmit data at a time. Ring

networks do not have a central computer. All workstations are connected by a common cable in a closed loop or circle.

5. it is a number of computers and their peripheral devices connected over a distance.

6. Within a building or group of buildings on one site.

Câu 65:

1. a-F, b-T, c-T, d-T, e-T, f-F, g-T, h-T, i-F

2. It is a writing tool that can be used to create text to be communicated.

3. They allow the transfer of data/ information from one location to another location.

4. News, weather, sport, travel and holiday facilities.

5. Fast, cheap, sent to more than one user.

6. manage the network and allow the workstations and fileserver to communicate.

7. It is created by users with a common interest.

Câu 66:

1. a-synchronous, b-half-duplex, c-serial, d-protocol, e-simplex, f-asynchronous, g-parallel, h-full-duplex, i-bits per second, j-parity.

2. When data is being transferred.

3. Simplex mode sends data in one direction only. Half-duplex mode allows data to be transmitted in both directions but only one direction at a time. Full-duplex mode allows data to be transmitted in both directions at the same time.

4. Caused by source, the receiver, by interference on the link.

5. Two computers are compatible or have the same protocols.

6. ASCII and EBCDIC

7. Because it has fewer error and it is cheaper.

8. asynchronous transmission.

Câu 67:

1. a-transmission, b-telecommuting, c-modem, d-video conference, e-simplex, f-video text, g- communication links, h-parity, i-asynchronous, j-protocols.

2. People in different location can see and hear each other. It saves money on airfares, hotel rooms, meals and time. It requires specialized equipment, camera crews, satellite time, consultants and conference rooms.

3. People who are physically impaired or who look after small children.

4. They use microcomputer.

5. Yes, for example, you can shop on your computer.

Câu 68:

1. a-F, b-T, c-T, d-T, e-F, f-F, g-T, h-T, i-F.

2. Recipient of information are people who receive data from a communication system. Originators of information are people who the source of the data for the communication system.

3. Protocols involves in communication software often make it difficult and frustrating for inexperienced computer users.

Câu 69: Review

1. a-modem, b-share, c-data, d-full duplex, e-radio, f-large, g-coaxial, h-documents, i-light, k-connect, l-time, m-ring, n-central computer system, o-retrieval, p-protocols, q-channel, r- half-duplex.

2. A telephone line, coaxial cable, fibre optic cable, microwave.

3. LANs connect computers or terminals within a building or group of building on one site. WANs connect computers or terminals over large distances.

4. Star networks.

5. They allow limited hardware resources. Application software can also be shared. Messages can be sent.

6. E-mail allows users to transmit mail from one computer to another.

7. to convert all characters into binary data.

8. ATM sends data by identifying each byte with special start and stop bits. STM requires all the data to be sent at the same rate

Câu 70:

1. a-trackball, b-electron, c-drawing, d-pictorial, e-optical, f-computers, g-icon, h-simulators, i-fast, j-large.

2. A graphic is a picture or any visual image such as a drawing, painting, diagram, photograph or chat.

3. They contain computer graphics of aircraft controls and environmental conditions.

4. It lets the users select a small picture called an icon.

5. Because the light only lasts for a short time.

6. It is used to improve the presentation of graphics on a monitor.

7. A particular image is captured using the video camera and then scanned so that it can be stored as digital data in the computer's memory.

8. It allows the user to move the cursor to different parts of the screen very quickly and the movement is far more precise than with a mouse.

9. When the data does not alter but remains constant.

10. It can select from a number of different coloured pens and can draw lines, curves and shapes very quickly and accurately.

Câu 71:

1. a-T, b-F, c-F, d-T, e-T, f-F, g-F, h-T.

2. Animators can draw the initial position and the last position of an object and use the

computer to produce the frames in between.

3. it controls the appearance of a document.

Câu 72:

1. a-pixel, b-raster graphics, c-resolution, d-vector graphics, e-memory map, f-scan, g-refresh, h-bit.

2. screen resolution is improving as computer systems develop and become more powerful.

3. Raster graphics are produced by filling in each dot or pixel on the screen. The electron beam covers or scans the entire screen in a regular pattern. Vector graphics are produced by drawing lines between two points. The electron beam draws a straight line called vector between two points whose coordinates have been determined by the CPU.

4. The more pixels on the screen. The higher the resolution and the better quality the image.

5. Because they provide more realistic images.

6. Images on the monitor screen are made up of tiny dots called pixels.

7. They are mainly used in applications where cleaners of lines is important.

Câu 73:

1. a-CAM, b-present, c-computers, d-CAD, e-control, f-software, g-computer graphics, h-drawings.

2. Machines or robots in manufacturing processing are controlled by a computer system. The computer controls the workstations and the material handling, and makes sure everything is happening in the correct order.

3. Because of improvements in processing power, monitor resolution and storage capacities.

4. Because they present data in an easily understood form.

5. graphics packages are available which produce images that can be chained together.

Câu 74:

1. a-animation, b-pixel, c-vector, d-resolution, e-designers, f-desktop publishing, g-raster, h-scan, i-voice synthesis, j-track ball.

2. architects, engineers, graphic designers, cartographer, cartoonists, video game designers and artists.

3. they have enabled people to communicate with computer using their voice.

Câu 75:

1. a-CAM, b-optical, c-GUI, d-drawn, e-vector, f-scanning, g-intersection, h-oriented, i-DTP, j-dot, k-plotter, l-resolution, m-basic, n-drawings.

2. The use of computers to create and store graphical images is called computer graphics.

3. it needs to be fast and powerful.

4. Because it can import text from word processors and graphics from drawing and painting programs.

5. Shading and colour give a sense of realism to the object. It can be transformed or moved in many different ways so that the features of the object can be seen from different perspectives

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Chịu trách nhiệm bản thảo

TRUNG TÂM ĐÀO TẠO BƯU CHÍNH VIỄN THÔNG 1