



## BÀI 1. J " V J P I " V J " P I "

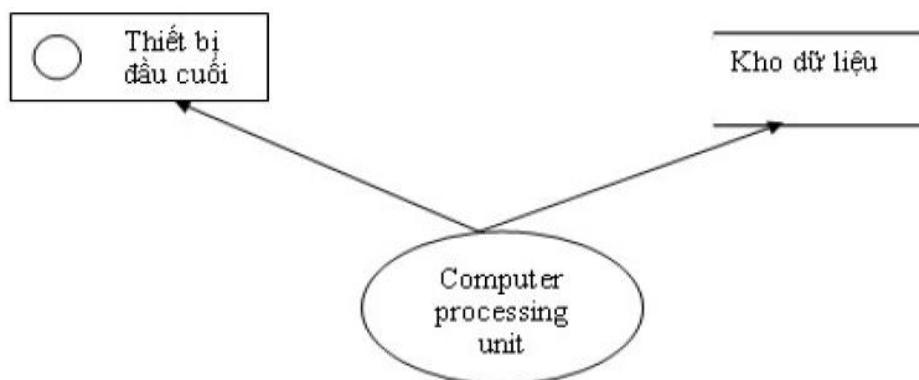
### TÓM TẮT

O e " ¶ e j "bài p ¶ p j "e w p á " e r " e j q " e j Á p i " v  
 v j p i . " j " v j p i " v j ½ p i " v k p . " e a e " o ½  
 thông tin trên máy tính ....

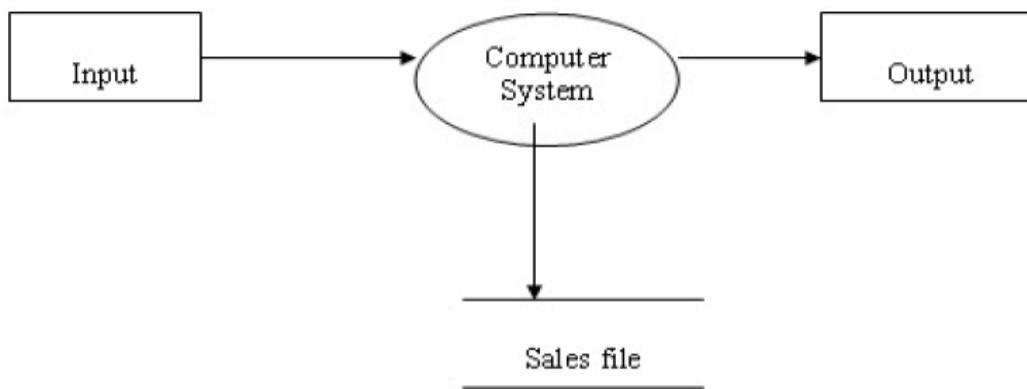
#### 1.1. J " V J P I " V J " P I " V K P

##### 1.1.1. E a e " m j a k " p k o "

- J " v (system+<" V t q p i " e a e " j q v " p i " e c "  
 j " v j p i " v t k v " j e . " j " v j p i " r j a r "  
 - " v t " p p " s w g p " v j w pe "0 v" Ov .v "" vec a "ej »" " v  
 v j p i " n « " o v " v r " j r " ix vk" .e "jo a v { "x o < »" er  
 v k p . " f " n k w . " e a e " r j p i " r j a r " z " n  
 r j p " v " e c " j " v j p i 0 " V t q p i " j " v j  
 e Á p i " j q v " p i " j p i " v k o e " ¶
- J " v j p i "(infoinhatponi systerk+p<" J " v j p i " v j ½ p i  
 v j p i " o « " o e " v k w " v p " v k e c " p »" n  
 p i " e c " e q p " p i k " v t q p i " o v " v " e  
 v j ½ p i " v k p " n « " j " v j p i " o « " o k " n k p "  
 o k " n k í k " p »" x k e a e " j " v j p i " m j a  
 x ¶ " f " x " j " v j p i " v j ½ p i " v k p 0



Hình 1.1. O a { " v ¶ p j " n « " o v " j " v j p i "



**Hình 1.2.** J " v j p i " v j ½ p i " v k p " e » " o " { " v ¶

### 1.1.2. Các n q j k " v t hōngtin è " d p "

- J " v j p i " z (Transaction processing system) là V R U + " n < " o v " v j p i " v j ½ p i " v k p " e » " e j e " p p i " v j w " v j p i j k r " x 0 "
- J " v j p i " v j ½ (Management information system - MIS) là o v " j " v j p i " v j ½ p i " v k p " e w p p i e s w " p j k p f c " v t p " x k e " z " n " i k c q " f e j " x " e a e
- J " v j p i " j " (Decision support system) ó F P J U + " n < " o v " v j p i " v j ½ p i " v k p " x c " e » " v j " v t " i k A r " e » " v j " e w p i " e r " v j ½ p i v v k p p j 0 " v t " i k A
- J " v j p i " v j ½ p (Executive information system) ó G K j U + " n < " o v j " v j p i " v j ½ p i " v k p " j " v t " p j w " e w n s w p " n " k w " j " p j 0 "
- J " v j p i " è G w k g p v l k d u v g o + " n < " j " v j p v j e " epj " wo ½ p " e c " e a e " e j w { " p " i k c " t k " o n k " n k " k e " ju " e " j f q " p p i i " p j " v j
- J " v j p i " v t w { " p " (Communication and collaboration) v " e u { u v g o + " n < " o v " j " v j p i " v j ½ p i " v k p " n nhân viên, k " v a e . " m j a e j " j " p i " x " p j " e w p i v a e " i k c " j 0
- J " v j p i " v " \* Qph kh g p " c w j v ¼ p o ic v k q p " u { u v g v j ½ p i " v k p " j " v t " e a e " j q v " p i " p i j k e ½ p i " x k e " i k c " e a e " p j " p " x k " p 0 "

### 1.1.3. P j p i è " p v i t " e " d p " e c " j " v j p i <

- J " v j p i è " y j k " v " m . " v " e j e " v t q p i " p i m k p j " v " z " j k . " v e " n < " p » " p i " f p i " n
- J " v j p i " rej " ok " e " v v k " w " n < " t c " e a e " s w { v
- J " v j p i " r j k " f " c " e ½ p i p " p e i a j e " " n v k " p j w k v " p tin.
- J " v j p i " e » " m v " e we ". o fo " " fd qq. " " v r t j " a . v " " p v - t p



## 1.2. R J P I " V J E " Z " N " V J " P I " V K P " V T Q P I " C

### 1.2.1. Z " n " v p i " v ^ a e <

Z " n p "iv" v ^ a e " n < " z " n " v j e " j k p k "v x p "i  
d k " o ^ a { "ev" ¶vpj j "e " j k p " z g p " m " p p c i w 0 "a Vé  
o ^ a { " v ¶ p j " » p i " x c k " v t ¼ p iv "t v ^ a e p k A "k v" jw ¶ e  
e " n c " e j p " e j q " e ^ a e " j " v j p i " r j k  
r j e " v r " x k " p j c w ½ p m f "j o ¼ p iv "e v ^ a t d " pp jj"  
j e 0

E q p " p i k " r j k " v j p i " z w { ' p " x p " f  
o · p j " x < q " v t q p i " s w ^ a " v t · p j " z " n 0 "

### 1.2.2. Z " n " i k c q " f e j <

Z " n " i k c q " f e j " n < " z " n " o v " { ' w " e  
v j k r " v " p "i q "k "i k e q 0 "f Z e j " v j ¶ e j " j r  
p j k w " m j " w " e " n r " x k " p j c w " " m k  
v k p " v " p i " p " j < p i " n < " o v " x ¶ " f " x "  
e ^ a e " v j ½ p i " v k p " p j r " x < q . " vck" er^a "ev" jvgj f/2"  
p " { " x k " e ^ a e " f " n k w " " e " » " v t q p i " j  
v j p i " u " ^ a r " p i " { ' w " e w " e c " m j ^ a e j

### 1.2.3. Z " n " v j g q " n ½ <

Z " n " v j g q " n ½ " j c { " e ¼ p " i k " n < " z " n "  
v r " j r " p j p e i » " v j j f/2 p e i " " v v k q p " " t u c " p v " j ½ p i " v  
f " x " z " n " v j g q " n ½ " n < " n r " d ^ a q " e ^ a c  
v j e " z " n " v j g q " n ½ " v j ¶ e j " j r " x k " p  
» < " X k e " v t w { " e r " v j ½ p i " v k w " ff k " p k  
j q " p " v q " z ^ a e " p j . " V j ½ p i " v k p " m j ^ a "  
v k p " v t · p j " z " n " n k " p " v k r 0

### 1.2.4. Z " n " v t e " v w { p <

Z " n " v t e " v w { p " e " u " f p i " v t q p i  
v p i " f ¼ p i " v j ½ p i " v k p . " vo "ppi" "oo wk" "vzkwp  
o v " e ^ a e j " v t e " v k r " v t q p i " k " v j q k  
v k p " v k " p i " p " j < p i . " e ^ a e " z " n " v k "  
x " v j ½ p i " v k p " v k " v p i " " k " v j p i " n  
z " ne " " v w t { p " n < " X k e " v t w { " eu nhien, v j ½ p  
M j w ½ p " f p i " x < " m k w " v j ½ p i " v k p " m j ½ p  
k " n k " p " v e " p i c { " v t q p i " m j k " v j e " j

### 1.2.5. Z " n " v j k " i k c p " v j e <

Z " n " v j k " i k c p " v ý ¶ p j h k j e k e " v k t p " q  
p i v " p i j ^ 3 q " e c " j " v j p i " x " v j k " i  
v j e " z w v " j k p " v t q p i " e ^ a e " j " v j p i "  
j " v j p i " k w " m k p " p j k v " " n ¼ " n w  
m j p k " p i " d c { " e c " v ^ p " n c " j q e " e ^ a e



V « k " n k w " n w " j v p j " p i k E d q '0 -Z F l P N r Y t w F i " D

v j e " r j k " o " d q " p i " d " e a e " v k p " v  
t c " v t q p i " v j e " v 0 "

### 1.2.6. Z " n " r j - p " v a p <

Z " n " e » " v j " f k p " t c " t k " e a e " d " r j p "  
e m w j a e " p j c w " x « q " p j p i " v j k " k o " e p i  
x k " p j p i " j " v j p i " e » " u " z " n " r j - p  
p j p i " x " v t ¶ " c " n " m j a e " p j c w 0 " V t q p p  
f " n k w . " e » " v j " e Á p ie " op jv " ne Á er " z p j { " rt.c " j q e " m j n g k e v p j e w 0 " X · " x { . " o v " v t q p i " p  
v - o " k " x k " e a e " z " n " r j - p " v a p " n « "

### 1.3. E f E " I K C K " Q P " V T K P " M J C K " F " f P " Z Ž [ " F

J " v j p i " v j ½ p i " v k p i " ep « p q i " mp j j a e " . d " p v » " me » " jo  
e Á p i " x k " e a e " e j w " m " u p i " e » " p j p i "  
v t k p " x « " e w k " e Á p i " v j · " d " v j c { " v j " \*  
j p . " j k p " k " j p 0 " V c " e » " v j " e j k c " e w  
e { e n g + . " e c " j " v j p i " v j ½ p i " v k p " t c " n « "  
- I k c k " q p I " ke c j k w " p q " d p " < p « { " v ¶ p j " v " m j k " v  
e w " z - { " f p i " j " v j p i " v j ½ p i " v k p " o k "  
m r " v j k " e j q " x k e " z k w w v " " j v « t p q j p " i e " a v e " " j e q j v  
- I k c k " q p " j · p j " W j e p j " x k c k j " q " p t k p « p <  
f p i " j " v j p i " v j ½ p i " v k p " e " v t k p "  
e j w { ' p " i k c " r j - p " v ¶ e j " j " v j p i . " p j « "  
p i j k ' p " e w j " p j v ¶ e j : v v j k v " m " x « " z - {  
s w p " n 0 " J " v j p i " v j ½ p i " v k p " e " v j  
u " f p i 0 "

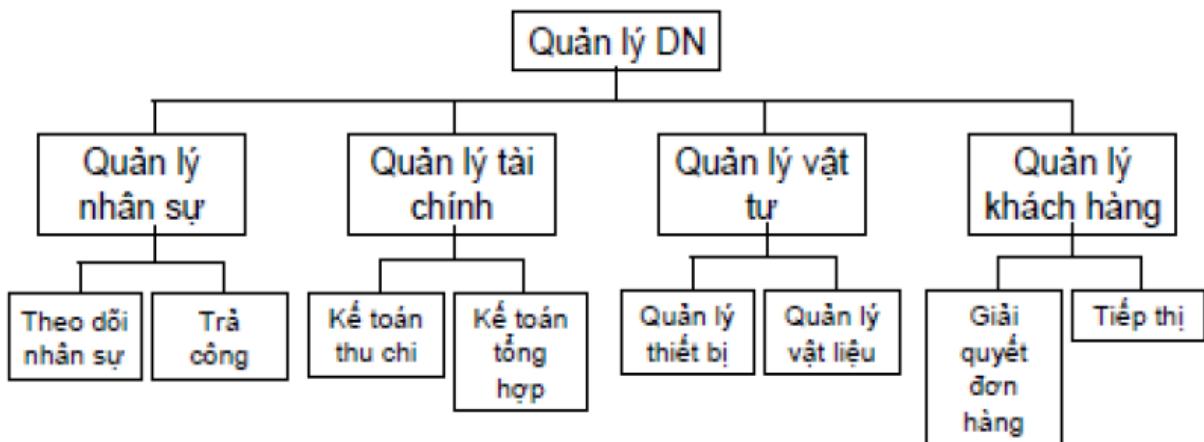
- I k c k " q p " m j c k w j ½ p f e " w j k " u p i " f p i < n « " i k  
v t q p i " x ¼ p i " k " e c " j t q p j " p i k c k j ½ p i p v  
v j p i " e x p " j « p j " r j e " x " e j q " p j w "  
v t q p i " v " e j e 0 " V t q p i " s w a " v t · p j " u " f  
e j c " " r j Á " j r " x k u " v j c { " k " x " v

- I k c k " q : p T t q p j e { ' s w j " v t · p j " u " f p i " x « " m  
i r " r j k " u " v j c { " k " x " v j ½ p i " v k p " \* v  
p j p i " u c " e j c " x « " v j c { " k " v t q p i " j "  
j q v " p i " m 2 o " j k w " s w 0 " X j " k k " { . " ej " v j v  
v j " d k " j " v j p i " v j ½ p i " v k p " o k " j q e

### 1.4. E f E " O " " J , P J " D K W " F K P " J " " V J P I

#### 1.4.1. D k w " " r j - p (BFD - Business Flow Diagram):

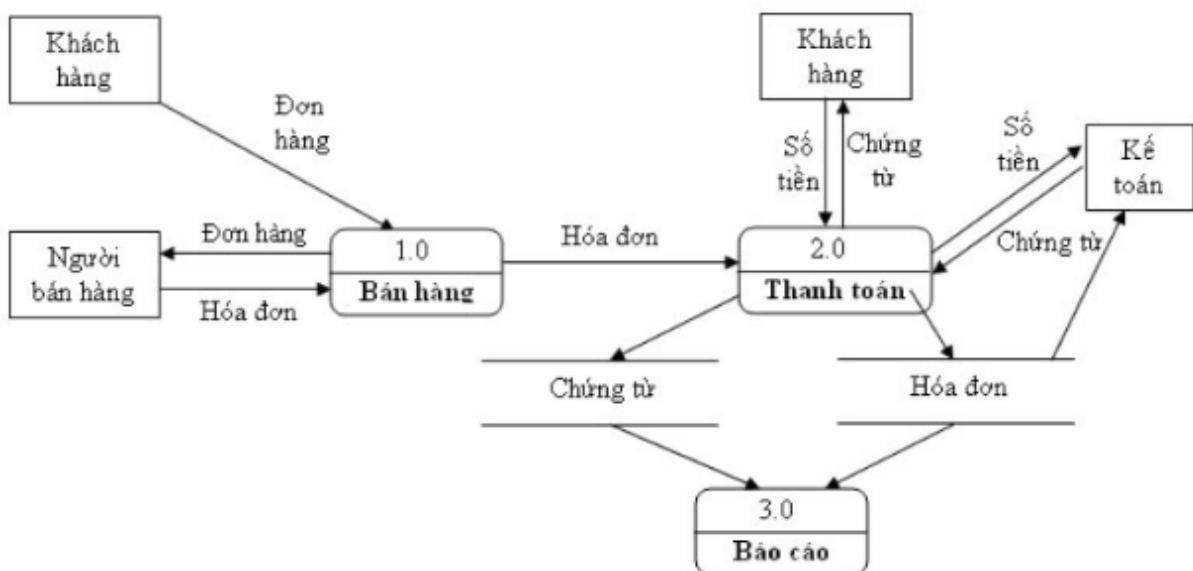
F k p " v " u " r j - p " t - " f p " f p " e a e " e j e "  
v t q p i " d k w " e j " en " p " op i 0 " e " k o " e c " d  
e j q " e a k " p j · p " m j a k " s w a v . " v " v p i " v j "  
v p j " \* m j ½ p i " v j { " v t · p j " v " z " n + = " v j  
p p i 0 " X ¶ " f " x " d k w " " r j - p " e r " e j e



Hình 1.3. D k w " n w p i " f " n k w " n < " o v " n q k " v t · p j " z " n " v j ½ p i " v k p " x k " e a e " { ' w " n < " p j o " v t " n k ö < " " j s w < " ũ Nw ö j i k A p < q A ö 0 " E j " t ö " e a e " e j e " p p i " \* e q p + " n " e p " o ½ " v 0 " E j " t ö " e a e " v j ½ p i " v k " " x < " s w c " " r j p " p < q " v j { " " e " v

#### 1.4.2. D k w " n w p i " f " n k w " n < " o v " n q k " v t · p j " z " n " v j ½ p i " v k p " x k " e a e " { ' w " n < " p j o " v t " n k ö < " " j s w < " ũ Nw ö j i k A p < q A ö 0 " E j " t ö " e a e " e j e " p p i " \* e q p + " n " e p " o ½ " v 0 " E j " t ö " e a e " v j ½ p i " v k " " x < " s w c " " r j p " p < q " v j { " " e " v

- D k w " f " h w k p w " n < " o v " e ½ p i " e " f Á p i " e j ¶ p j < " R j - p " v ¶ e j < " e " f Á p i " " z a e m DFD f Á p i " " x e j " m " j q e j " x < " o k p j " x k p " j " v j p i " x < " p i k " f " j k w " k " x k " V < k DFDke jwq" r j 2 r " d k w " f k p " v < k " n k w " . " u Á e " v ¶ DFD" exw< p" ip" ie pr" "ie jpø" " p i " k " u v p i " v j " x " j " v j p i " e p " v j ½ p i " v
- D k w " f " h w k p w " n < " o v " e ½ p i " e " f Á p i " e j ¶ p j < " R j - p " v ¶ e j < " e " f Á p i " " z a e m DFD f Á p i " " x e j " m " j q e j " x < " o k p j " x k p " j " v j p i " x < " p i k " f " j k w " k " x k " V < k DFDke jwq" r j 2 r " d k w " f k p " v < k " n k w " . " u Á e " v ¶ DFD" exw< p" ip" ie pr" "ie jpø" " p i " k " u v p i " v j " x " j " v j p i " e p " v j ½ p i " v



Hình 1.4. D k w " n w p i " f " n k w



V « k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N t Y t w F i " D

- O e " pDFD h e " è k À r " e j À p i " v c " v j { " " e "
- v z " t{ c" v t q p i " j " v j p i 0
- D k wDFD f " c " x < q " r j p i " r j a r " r j a v " v t k p i o " d c " phân tích chung: v "
- D k wDFD o ½" v " s w c p " j " i k c " s w a " v t · p j "
- V " k p " p j " p i j c " f " n k w " o ½" v " e a
- Z a e " p j " s w a " v t · p j " z " n . " o ½" v " s w a
- DFF " f k p " v " j c k o " e " a q 'i k e Ø " x v " n " x < "
- O e " x v " n < " O ½" v " j " v j p i " n < o " p j "
- O e " n q i k e < " O ½" v " j " v j p i " n < o " i · A

**1.4.3. R j ¬ p " o e " e a e " e j e " p p i " e c " j " v j p i**

- E » " d c " o e " e " d p " e " p i " f p i <"
- O e DFD o " e " p i " e p j " \* Eq p v g z v " Ng x g n " F H
- O e DFD o " e " p j " \* V q r " Ng x g n " F H F + 0 "
- O e DFD o " e " f k " p j " \* Ng x g n n k p i " F H F + 0
- DFD o e " p i " e ip " " o \* 1/ø " je " p2 j+ < j " v j p i " " o
- z g o " e " j " v j p i " p j " o v " e j e " p p i 0 "
- p j v " o v " e j e " p p i 0 "
- DFD o e " p j i " \* ø " p j k + w " e j e " pDFD ø " e " e " r
- p i " e p j " x k " e a e " e j e " p p i " r j ¬ p " t - "
- e erj e " p . p i " D H F
- DFD o e " f k " r j j p " DFD ø " v & " < " p j 0 " E a e " e j
- e " p j " p i j c " t k p i " v p i " d k w " " j
- v t p i " j rp " " dikk wp " 0 "

### CÂU HÌNH O LU N

3 0 3 " P ' w " m j a k " p k o " x " j " v j p i " x < " j "

x " j " v j p i " x < " j " v j p i " v j ½ p i " v k p A "

3 0 4 " R j ¬ p " n q k " x < " p ' w " " p i j c " e c " e a e "

3 0 5 " P ' w " m j a k " p k " ø j x e " e froglmáyjtinh?j Chop i " v k p "

x ¶ " f " o k p j " j c " A "

O v " u " d < " kn " < v " prj " np ip " d < k " v r " p j o " a p j "

n < " v j e " j k p " z ¬ { " f p i " o v " j " v j p i " "

M j q " u a v " v j e " v " x < " z a e " n r " e a è " { ' w



## Giáo trình R j ~ p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

v j p i = " Z ~ { " f p i " x < " e < k " v " j " v j p  
i k " " f k " ~ { " j q e " v " c " t c " " v

STT	Tên h th ng thông tin qu n lý	Mô t
1	H th ng qu n lý h c sinh ph thông trung h c	Qu n lý h u c sịnh, k t qu h c t p các môn h c, k t qu t ng k t cu k " p
2	H th ng qu n lý khách s n	Qu n lý phòng, khách thuê phòng, các d ch v m j a e j d' p i l ù
3	H th ng qu n lý giáo viên ph thông trung h c	Qu n lý thông tin giáo viên, các quá trình, s m k p " n k p p i' ks w q p x k
4	H th ng qu n lý v t t	Qu n lý tình hình xu t nh p v t t í "
5	H th ng qu n lý th vi n	Qu p " n " aig³ , tinh hình m n tr í "
6	H th ng qu n lý sinh viên i h c	Qu n lý h u " u k p qü kh k t pp qu n lý các môn h c c a h e " u k p j
7	H th ng qu n lý d c	Qu n lý quá trình xu t nh p thu c, bán thu c cho b p j " p j ~ p . í 0 "
8	H th ng qu n lý tuy n sinh i h c	Qu n lý thông tin tuy p " u ki p q, k' t qu v j kh" e í 0 "
9	H th ng qu p " n "nd	Qu n lý các h r " p i " o w c a' k khách hàng, phân lo i h r "ng, qu n lý m c tiêu th k





## BÀI 2. MJ Q " U f V " JK P " VT PI V J W " V J R " V J " PI " V

V » o " v P u j k ' p " e w " e a e " r j p i " r j a r " " m j  
v j ½ p i " v k p " r j e " x " e j q " x k e " r j n p " v ¶ e j  
sát thw " v j r " v j ½ p i " v k p " e " v j " p j " u c w <"  
o w . " r j n p " v ¶ e j " v « k " n k w " p j " n p i " 1

### 2.1. RJ PI " RJ f R " RJ PI " X P

- R j p i " x p " n « " o v " r j p i " r j a r " s w c p " v t  
e w " e c " j " v j p i " v j ½ p i " v k p 0
- X k r g " p i " x p " p j o " r j a v " j k p " v j ½ p i " v k p  
E a e " m k p " e c " p i k " e " r j p i " x p  
E o " i k a e " e c " p i k " e " r j p i " x p 0  
V t p i " v j a k " j k p " v k e c " j " v j p i 0  
E a e " o e " v k ' w " e c " e q p " p i k " x « " v " e j  
E a e " v j " v e " p i j k r " x " m j ½ p i " e j ¶ p j " v
- X k e " n r " m " j q p e i j " " v r t j k p " i s w x c " p 7 " v d j e <"  
e " e a e " v « k " n k w " e " d p 0  
V j k v " n r " e a e " o e " v k ' w " r j p i " x p 0  
Z a e " p j " p i k " k " r j p i " x p 0  
E j w p " d " p i k " e " r j p i " x p 0  
S w { v " p j " e w " v t Á e " x « " m k w " e n w " j k
- Z n { f p i " e n w " j k " r j p i " x p " r j k " v j w  
E n w " j k " o 0  
E n w " j » p k i 0

#### 2.1.1. F p i " e n w " j k " o "

- E a e " e n w " j k " r j p i " x p " o " e j q " r j ² r " p j  
p j p i " i · " j " o q p i " o w p " x « " o e " " o q p i
- E a e " e n w " j k " o " r j Á " j r " m j k " p i k " r j n  
e c " e n w " v t " n k 0
- E a e " w " k o <  
N « o " e j q " p i k " e " r j p i " x p " e o " v j  
E j q " r j ² r " p i k " r j p i " x p " v r " v t w p i "  
r j p i " x p <  
R j p " a p j " v t · p j " " x p " j » c . " e a e " i k a "  
E w p i " e r " o e " " e j k " v k v " e c q 0  
R j a v " j k p " e a e " e n w " j k k ö v k \* e 0 " e j c "  
N « o " e j q " p i k " e " r j p i " x p " v j { " v  
E j q " r j ² r " v ¶ p j " v " p j k ' p " e c q " j p 0



## Giáo trình R j -> p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

I k À r " p i k " r j p i " x p " f " k w " e j p  
 J w " ¶ e j " m j k " p i k " r j p i " x p " m j ½ p i  
 - E <sup>a</sup> e " p j e " k o <  
 E » " v j " v j w " e " s w uah. p j k w " e j k " v k  
 E » " v j " o v " k " v ¶ p j " k w " m j k p " e w  
 E » " v j " o v " s w <sup>a</sup> " p j k w " v j k " i k c p "  
 E » " m j " p p i " v j " j k p " t p i " p i k " r  
 E » " v j " i - { " p " v p i " t p i " p i k " r j  
 k " e - w ö "

### 2.1.2. F p i 'j e -kw' → p i "

- E - w " j k " » p i " j p " e j " u " e - w " v t " n  
 - E - w " j k " » p i " r j Á " j r " " v q " t c " f "  
 " r j - p " v ¶ e j 0  
 - R j p i " r j <sup>a</sup> r " n r " n w p " j k w " s w " x « "  
 x p  
 - E <sup>a</sup> e " w " k o <  
 V k v " m k " io k <sup>a</sup> p j " r j p i " x p 0  
 F " f « p i " u q " u <sup>a</sup> p j " i k c " e <sup>a</sup> e " n p " r j p  
 F " v " Á p i " o e " ¶ e j 0  
 M k o " u q <sup>a</sup> v " e " e w e " r j p i " x p 0  
 V j w " j q e j " e " e <sup>a</sup> e " f " n k w " n k ' p " s  
 D c q " r j " o v " r j o " x k " t p i " n p " o v "  
 - E <sup>a</sup> e " p j e " k o <  
 P j « o " e j <sup>a</sup> p " k " x k p " p i k " e " r j p  
 M j » " v j w " e " p j k w " e j k " v k v 0  
 E » " v j " o v " k " e <sup>a</sup> e " " v p i " e j ¶ p j 0  
 M j » " v q " e " o k " i k c q " v k r " v v " i  
 r j p i " x p "

### 2.1.3. E <sup>a</sup> e " f p i " e - w " j k " o " m j <sup>a</sup> e "

- E <sup>a</sup> e " e - w " j k " n p i " e e <  
 N « " p j p i " e - w " j k " e » " v j " ý q " è n' õ k " x  
 ö " j q e " õ m j ½ p i " p i " ö 0 "  
 E <sup>a</sup> e " e - w " j k " p « { " e j . " p ' p " f Á p i " m j k "  
 - E <sup>a</sup> e " e - w " j k " v j o " f ¼ <  
 E <sup>a</sup> e " e - w " j k " v j o " f ¼ " i k " t c " v ¶ p j " e  
 O e " ¶ e j " e c " e - w " j k " v j o " f ¼ " n « <  
 sáng rõ, Khai th <sup>a</sup> e " x « " o " t p i " e <sup>a</sup> e " s w c p " k c

### 2.1.4. V j " v " v " e - w " j k "

- D c " e <sup>a</sup> e j " e " d p " " e w " v t Á e " e w e " r j  
 F p i " 3 < " o " w " x k " e <sup>a</sup> e " e - w " j k " » p i



## V « k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N r Y t w F i " D

O " w " t v p è j k " v k p i " e j e " e - w " j k " "

O " t p i f è d e p e - w " j k " o p xi " s p w j a v p ij " p - 0 w "

D k v " p i k " e " r j p i " x p " e p " e " j p i " v k " e j " 0

F p i " 4 < " o " w " x k " e a e " e - w " j k " o " x < "

O " w " ex - wk " je ake " o . " o c p i " v p j " v p i " s v

M v " v j A e " d p i " e a e j " v j w " i j " x rk " ee a eu " e - fw  
e a e " e - w " j k " » p i 0

E w p i " e r " e a e j " v j e " ef " f " f "  $\phi$  i v " m j w p o " r j p i " x p 0

E » " p ej " m j k " p f x p " e o è v j j { p v j p ej " x k

F p i " 5 < " o " w " » x p i k . " ev ake " re - vw " e j " x k " k " e a e " v j A e " d p i " e a e " e - w " j k " » p i "

V k r " v j g q " e a e " x p " z g ö v z p v 0 s w a v " j p

M v " v j A e " x k " e a e " e - w " j k " e " v j 0

F p i " p « v " j m " v o " p j r " e c " e " e " 4 " f p i " v t

O v " p j k w " v j k " i k c p " j p " e a e " f p i " m j

### 2.1.5. O v " u " n k o è i m j k " k n " v " v j A e " x < " u c w " r j p

N w ½ p " n w ½ p " j k " ñ N k o w " d ¼ p " e w " p ". d m " u w p i "

V » o " v v " x < " e w p i " e r " r j k " p r " j j p k i " " x p 0 p " v

J k " z g k o " p k i r " v j g q " p p " r j p i " x p " n < " c k

V j kn vr " e a e " e w e " j p " i r " v k r " v j g q 0

E o " p k " p è " r j p i " x p " x < " d v " v c { 0

D a q " e a q " r j p i " x p 0

X k v " e e p p i ü v o v " p i c { " u c w " m j k " r j p i " x p

E w p i " e r " o v p d p w v " a c w " v " d v j " e j k " v k

Z g o " n k " d a q " e a q " x k p i k " e " r j p i

### 2.2. R J P I " R J f R " F , P I " R J K W " J K

- R j k w " j k " p v j w " e j e " r v j v j p i x k p " e j "

V j a k "

P k o " v k p

Hành vi

Tính cách

R j k w " j k " e » " i k a " v t " p w <

Các thành x k " p " e c " v " e j e " r j - p " v a p " t p i

P j w " v j " p j " x k " p " v j c o " i k c " x < q " f " a p

E p " x k e " e » " v p j " v j o " f ¼

E a e " e - w " j k " e " v j kw v " m " v j g q " o v "

E - w " j k " o "



## Giáo trình R j ~ p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

E " i p i " q " p " v t e " e ~ w " v t " n k " u  
 R j Á " j r " " v j w " e " e " e " m k p "  
**E ~ w " j k " » p i**  
 U " f p i " m j k " v v " e " e Ø e " n c " e j p "  
 M j k " e " e " n c " e j p " n q k " v t " n p " p j c

### 2.2.1. V j k v " m " r j k w " j k "

- P i ½ p " p i " f Á p i " v t q p i " r j k w " j k " p ' p < pk" ip "
- E " v j "
- M j ½ p i " v j « p j " m k p "
- M j ½ p i " e » " x " d " v t ' p "
- E j ¶ p j " z ª e " x " o v " m " v j w v "
- J p i " p " p j p i " p i k " e » " j k w " d k
- R j Á " j r " x k " m j " p p i " e " j k w " e c
- R j k w j j k k e j ¶ p j " z ª e " x « " ª p i " v k p " e {  
 V ¶ p j " v k p " e { " v j " j k óppi "ju c " "pnj " "vv"j sww " e ª e " m v " s w " p w " p j " e Á p i " o v " r j k m k p "
- V ¶ p j " e j ¶ p j " z ª e " n « " o e " k è r w " p " k  
 o w p " ª p j " i k ª 0
- V " n " e ~ w " v t " n uk " v kv "we"»e"jv jp j"ker»j"Á " j  
 " t c " p j k w " m j q p i " v t p i "
- D " v t ¶ " m j q p i " v t p i " n p " " x k v l i
- V q " k w " m k p " e j q " p i k " v t " n k " f
- P j v " s w ª p " x " j · p j " v j e "
- V j " v " e ~ w " j k <  
 v " e ª e " e ~ w " j k " s w c p " v t p i " p j v " n ' p  
 P j » o " e ª e " Á p w " p k " f w p è " n k " x k " p j c  
 c " e ª e " e ~ w " j k " ¶ v " i { " v t c p j " n w p

### 2.2.2. E ª e " r j p i " r j a r " r j a v " r j k w " j k "

- V r " j r " v v " e " p j p i " p i k " v t " n k
- R j ª v " r j k w " j k " e j q " v p i " e ª " p j ~ p "
- I k " r j k w " j k " s w c " p i " d w " k p "
- R j ª v " r j k gwd " j j ck " es "wvc j" Y " k p " v . " e » " e ª I k o " e j k " r j ¶ "
- V j w " v j r " x « " n w " v t " e ª e " m v " s w " f
- R j k w " j k " f p i " y g d " v j p i " i o <  
 J r " x p " d p " p " f ¼ p i "  
 J r " x p " d p " e w p . " f Á p i " o v " j q e " p



## V « k " n k w " n w " j v p j " p i k E d q '0 -Z È l P N r Y t w È i " D

J r " e j p " f « p j " e j q " e <sup>a</sup> e g / sei - w " v t " n k " e  
 P À v " v Á { " e j p " e j q " e <sup>a</sup> e " e - w " v t " n k " o  
 j q e " À p i l u c k "  
 J r " f c p j " u <sup>a</sup> e j " v j " z w p i " " e j p "  
 P À v " U w d o k v " \* z <sup>a</sup> e " p j p + " j q e " T g u g v " \* z

### 2.3. R J P I " R J f R " N [ " O W

- N { " o w " n « " s w <sup>a</sup> " v t · p j " n c " ev j " p " ok " vf " ke a  
 e c " o v " o w 0 " V j c { " x · " p i j k ' p " e w " v v  
 d p " i j k " v t q p i " e <sup>a</sup> e " v r " j q e " e " u " f  
 f p i " m " v j w v " n { " o w " " e j p " t c " o  
 r j e " x " e j q " xik" vek"pz"afek" p "ptjc""vvjt/zqpp i " j " v
- D c q " i o " j c k " s w { v " p j " s w c p " v t p i <  
 P j p i " v « k " n k w " x « " y g d u k v g " s w c p " v t p  
 P j p i " p i k " p « q " p ' p " e " r j p i " x p "
- N " f q " p i k " r j - p " v ¶ e j " e p " n { " o w " n « .  
 I k o " e j k " r j ¶ "  
 V p i " v e j " ws " w v <sup>a</sup> j " v rt "· fp j " " n k w "  
 E k " v j k p " j k w " s w "  
 I k o " x k e " v r " v t w p i " v j w " v j r " f " n k

#### 2.3.1. E <sup>a</sup> e " r j p i " r j <sup>a</sup> r " v j k v " m " o w "

- " v j k v " m " o v " o w " v v . " p i k " r j - p "
- sau:

Z <sup>a</sup> e " p j " f " n k w " e p " e " v j w " v j r "  
 Z <sup>a</sup> e " p j " v { " r o' e w p " e " n  
 E j p " n q k " o w "  
 S w { v " p j " m ¶ e j " v j e " o w "  

- S w { v " p j " m ¶ e j " v j e " o w " p ' p " e " v  
 o « " p i k " r j - p " v ¶ e j " j " v j p i " n « o " x k e  
 N { " o w " f " n k w " v t ' p " e <sup>a</sup> e " v j w e " v ¶ p j  
 N { " o w " f " n k w " v t ' p " e <sup>a</sup> e " d k p "  
 N { " o w " f " n k w " p j " v ¶ p j "

#### 2.3.2. E <sup>a</sup> e " m k w " n { " o w "

- N { " o w " v Á { " <  
 E <sup>a</sup> e " o w " m j ½ p i " i k k " j p . " m j ½ p i " o c p i "  
 F " u r " z r "  
 M j ½ p i " <sup>a</sup> p i " v k p " e { " p j v "  
- N { " o w " e » " o e " ¶ e j <  
 F c " v t ' p " u " <sup>a</sup> p j " i k <sup>a</sup>"  
 P i k " r j - p " v ¶ e j " e j p " p j » o " e <sup>a</sup> e " e <sup>a</sup> " p j  
 F c " v t ' p " e <sup>a</sup> e " v k ' w " e j w p "



## Giáo trình R j - p " v ¶ e j " v « k " n k w " p j " v ¶ p j "

O w " m j p i v k p " e { " o e " x c " r j k "  
 a p i " v k p " e { " o e " x c " r j k "  
 - N { " o w " p i w " p j k ' p " p " i k p <  
 F c " v t ' p " f c p j " u a e j " e a e " e q p " u " e c  
 O k " p i k " j q e " v « k " n k w " w " e » " e  
 - N { " o w " p i w " p j k ' p " r j e " v r . " e » " d c  
 N { " o w " v ej » " pji "  
 N « " r j p i " r j a r " p " i k p " p j v " e c  
 E j p " o k " e a " p j - p " v j " m " v t q p i " f c p  
 M j ½ p i " j c { " p w " f c p j " u a e j " e " u r  
 N { " o w " r j - p " v p i "  
 N « " r j p i " r j a r " s w c p " v t p i " p j v "  
 Z a e " p j " e a e " v r " n { " o w " e q p "  
 E j p " e a e " k " v p i " j q e " e q p " p i  
 D Á " x « q " u " n p i " m j ½ p i " e - p " v k " e  
 p j 0  
 E j p " e a e " r j p i " r j a r " m j a e " p j c w "  
 con khác nhau  
 N { " o w " v j g q " p j » o "  
 E j p " p j » o w " e j a q e " ev " e k q " p n " k p i k " p i j  
 E j p " e a e " p j » o " k p " j · p j " k " f k p

### 2.4. R J Ź P " V ^ E J " V ĩ K " N K W " P J " V ^ P J 1 " P J "

#### 2.4.1. R j - p " v ¶ e j " v « k " n k w " p j " n p i "

- P i j k ' p " e w " f n k w " e p i " n « " o v " r j  
 v j w " v j r " v j ½ p i " v k p "  
 - F "wn"ke p i " e » " v j " v j w " v j r " v <"  
 R j - p " v ¶ e j " e a e " v « k " n k w " p j " n p i  
 p j "  
 E a e " d a q " e a q " v j e " v j k "  
 E a e " j u "  
 E a e " o w " v j w " v j r " f n k w "  
 E a e " i k c q " f e j " p i j k r " x "

#### 2.4.2. R j - p " v ¶ e j " v « k " n k w " p j " v ¶ p j "

- Z g o " z ² v " e a e " v « k j "wn" k w "e < p j " v ¶ p j "  
 E a e " v j ½ p i " v k p " v k o " o " s w c p " v t p i "  
 V t p i " v j a k " v - o " n "  
 P j p i " i . " e " e q k " n « " v v l z w "  
 J · p j " p j . " n q i q . " d k w " v p i "  
 - V « k " n k w " p j " v ¶ p j " d c q " i o <"  
 E a e " d p " i j k " p j "



**V « k " n k w " n w " j v p j " p i k E d q '0 -Z F l P N r Y t w F i " D**

F w " j k w " v t ' p " e ^ a e " d p " v k p " Y g d u k v g " e  
 E ^ a e " v « k " n k w " e j " f p "  
 U " v c { " ^ a x e j " e ej ¶ φ " j v " u " e j e "

## 2.5. R J P I " R J f R " S W C P " U f V

- X k e " s w c p " u ^ a v " e w p i " e r " u " j k w " d k v "  
 v j e " u " c p i " n < o "
- P j . p " p j p " v t e " v k r " e ^ a e " s w c p " j " v p "  
 e ^ a e " v j < p j " x k ' p " m j ^ a e " e c " v " e j e "
- M v " j w c p " " suw v " r j - p " v ¶ e j " d { " r j p " v " o ½ k  
 X " v t ¶ " x p " r j ¼ p i "  
 X " v t ¶ " d < p " n < o " x k e "  
 V j k v " d " x p " r j ¼ p i "  
 V « k " u p "  
 E ^ a e " p i w p " v j ½ p i " v k p " d ' p " p i q < k "  
 O < w " u e " x < " ^ a p j " u ^ a p i " x p " r j ¼ p i  
 V t c p i " r j le " t e c ' c s' w ¶ v " p j

## CÂU H Í TH Ô LU N

4 0 3 0 " P ' w " e ^ a e " roj ep"iv"kx' wp"0e" c " x k e  
 4 0 4 0 " M " v ' p " e ^ a e " f p i " e - w " j k " e » " v j " f  
 4 0 5 0 " P ' w " " p i j c " e c " x k e " n { " o w 0





## BÀI 3. PHÂN TÍCH J " V J P I

### 3.1. M J f K " PHÂN TÍCH J " V J P I

**3.1.1. R j - p " v ¶ e j " j " v j p i " \* U { u v g o " C p c n { u**  
 N « " i k c k " q p " r j " v " v tik" xp "q v" teq "pe i" "xo p v" " f  
 x ¶ " f " p j " p j p i " i " j " v j p i " r j k " n  
 i k c q " f k p . " e " n r " x k " m " v j w v " e " x p " " » 0 "

**3.1.2. V j k v " m (System Design): p i "**

N « " i k c k " q p " ix j " q v " x v t k e " p z " " v { " rf " v p t i w " p x i " "  
 v j w v " e c " j " v j p i " \* e a e j " v j e " o " "  
 v j p i + 0 "

### 3.2. E f E " J P I " V K R " E P " R J Ž P " V ^ E J " J " V J

**3.2.1. V k r " e p " r j - p " v ¶ e j " j p i " o ½ " j · p j "**  
 - P j p " o p j " x k e " x " e a e " o ½ " j u h oajv a l j " v  
 m k o " v t c " j " v j p i " j k p " v k " e p i " p j  
 - E w k " e Á p i " v j " o ½ " j · p j " j " v j p i " v t  
 m " x « " z " f p i " o v " j " v j p i " e " e  
 - R j - p " v ¶ e j " j p i " e w " v t Á e " v ¶ e j w e j v w  
 o ½ " j · p j " n " o v " m " v j w v " n { " s w a " v  
 v j p i " c p i " e » " x « " z a e " p j " e a e " { ' w "  
**Chú ý:** c " t c " o ½ " j · p j " o k p j " j c " e a e " v j « p  
 \* e a e " e j e " p p i p " i v j q q p y a er + j " p " h p k " p "  
 ra và các file.

**3.2.2. T k r " e p " r j - p " v ¶ e j " j " v j p i " p j c p j**  
 - P j p " o p j " x k e " z " f p i " e a e " d p " o  
 p i j k r " x " x « " e c p i k " f Á p i " k " x  
 - Z " f p i " d p " o w j w " f Á p w " o v ž me "  
 p i j k r " x " e c p i k " f Á p i " d p i " e a e j  
 p j c p j " x « " v j ½ " e c e a e " { ' w " e w " » 0

### 3.3. E f E " I K C K " Q P " R J Ž P " V ^ E J " J " V J P I

**3.3.1. I k c k " q p " z a e " p j " r j o " x k "**

D e 'xâk 0 3 p e j a 'e " x p " . " e " j thek c áctiêu' chí w " v  
 sau:

V ¶ p j " m j v p q p e i " r m j q p i " v j k " i k c p " p " q " v  
 j q e " e " j k " j q p " { w " e v " p " j e j p " t ic j A 0 k

**Tính rõ ràng:** O e " " v j { " e " e c " e c " o v  
 k " x k " i m j q e j p " p a p " k " w w j p p j A 0



V ¶ p j " j O w ¶ ej j < v j p i " o k " j q e " i k k " r j a  
i k o " ¶ j jk < pr ij " p o " n ' p 1 z w p i " d c q " p j k ' w A

V ¶ p j " ¶ " o k x p ¶ " p j p i " e - w " v t " n k " v t ' p .  
e " j { k w x w " e j k " r j k " n < " p j " v j " p < q A 0

I k R ¶ R y j x < q " j k l c k " q p " w " e c " f " a p . "  
v " " f p i " i k p " p " u c w < " " p i w { ' p .  
e p i " e " j " v j p i " j k p " e » . " V j k v " m " .  
v j p i " o k 0 "

D e " 3 0 4 < " V j q " i n w p " u " d " r j o " x

M v " s w < " d D " a x q k " e f a q " " a r p j " \* i k k " j p " e c " f "

P j p q " k " f " n k w " p < q " e p " p i j k ' p " e w 0

P j p i v " t s w p { j " p i j k r " x " p < q " e p " c " x < q 0

J " v j p i " i k c q " p k r k p f Á p v j x " " p " e q " e x j k " v j

*Chú ý:* p w " u c w " p < { " r j o " v n c q j e' d p k i " w p j ' p " p i - p  
v j c { " k " r j Á " j r 0

D e " 3 0 5 < " a p j " i k a " v ¶ p j " m j " v j k " e c " f

ñ N k w " f " a p " p < { " e » " a p i " e " z g o " z 2 v "

Phân tích chi ph ¶ " 1 " n k " ¶ e j 0

S w { v " p j 0

R j ' f w { v " f " a p 0

J { d " f " a p 0

Z g o " z 2 v " n k " r j o " x < k " " n f e " j a " p d " k \* " x w k k " w p " i e - j p " p u

D e " 3 0 6 < " n r " d k w " x < " n r " m " j q e j " p i -

M v " s w < " d a q " e a q " f " a p 0

N r " m " j q e j " v j e " j k p " e j q " v q < p " d " f  
d " v t ¶ " p j - p " u 0 "

D e 3 0 7 < " V t · p j " d < { " f " a p " x < " m " j q e j "

V t · p j " d < { " x < " j ¶ q " j x " v ' t f " e a p . k m " p i " v j o

M j k " w " e j ¶ p j " v j e " f " a p " x < " v j ½ p i " d a

e j q " f " a p 0

### 3.3.2. I k c k " q p " r j - p " v ¶ e j " x p "

D e " 4 0 3 < " P i j k ' p " e w " n p j " x e " x p "

V · o " j k w " n p j < " x e a e e " ev j cw " xv " pp " i " " pxi j k r " x

F " n k w < " d p i " h w k " v te ".n" e a e " v j w v " p i " p i j k

Các quá trình < " e a e " u " m k p " p i j k r " x " j k p " e » 0

E a e " i k c q " f k " p & ¶ e x < " p i w k " f Á p i " j k p " v

M v " s w < " z a e " p j " x " n p j " x e " j " v j p  
có.

D e " 4 0 4 < " R j - p " v ¶ g j k e a e " x p " " x < " e



## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

P i j k ´ p " ḡw {w"pe"ap ej" - pp " x < " j " s w " e c " v p  
e » " v j " {n' pk" "pnj < " pp" iew c " p j p i " x p " " m j  
M v " s w < " e a e " d a q " e a q " x p " " - j e " e  
s w " e c " v" xp < i " ex "pj" k 0

D e " 4 0 5 < " dR"j s-wp" "vv¶te·jp"je" a p i j k r " x " \* e j  
s w { " v t · p j " p i j k r " x + "  
a p j " i k a " i k a " v t " i k c " a v" vpt i · "pj j q" e "k i" kx  
e j e 0

U " n p i " w " x < q . " v j k " i k c p " a r " p  
v p i . " e a ex "kj e k" "q c e " j r " n " j » c " s  
M v " s w < p"je" a s ew" a o" ½ "t j · p j " p i j k r " x " j k

D e " 4 0 6 < " Z a e " n r " e a e " o e " v k ' w " e k " v  
Z a e " p j " e a e " o e " v k ' w " a ee " tv < j p i " ed wk " ev"  
o k " x p " 0

E a e " o rej" vkk" ewje ¶ p" jv "j z a" e .q " e 0

E a e " t < p i " d w e " x " n e j " d k . w . " e j k " r j ¶

M v " s w < " e a k " φ " q " v k j w p a " k " v j d a q " e a q "

D e " 4 0 7 < " E r " p j v " m " j q e j " f " a p "  
E r " p j v " f " a p <"

V j w " j r " r j o " x k . " e j " i k r "j Á j" j pk i" " x  
v j k " j p l p i - p " u a e j 0

O " t p i " r j o " n x ke" jx "d" k kw "wx" e "j p ip - j p " u a

M v " s w < " m " j q e j . " f " a p " " e " e r

D e " 4 0 8 < " v t · p j " d < { " e a e " p j p " z 2 v " x < "  
M v " es we " o e " v k ' w " e k " v j k p " j " v j p i  
S w { v " p j < " v k r " v p e j k k p w v e j p j 1 j {

### 3.3.3. I k c k " q p " r j - p " v ¶ e j " { ' w " e w

D e " 5 0 3 < " z a e " p j " e a e " { ' w " e w " j " v j  
E a e " { ' w " e we " a ee j " jeq" p v "p i < p i " x < " f e j " x  
e a e " e j e " p p i " p i j k r " x . " e a e " w " x

E a e " { ' w " e w " e j k e " " evjt ep"ip. "p ih < e " v k j o " z j  
v j c " a p i < " j k w " u w v . " v < k " n k w . " p i  
e j k " r j ¶ . " v k v " m k o " v j k " i k c p . " c p " v

M v " s w < " r j a e " v j q " e a e " { ' w " e w " e j  
e k " v j k p " x < . " e we " x < w a . " v t wp" jt . " f " n k  
" v " . " e o e " v k ' w

D e " 5 0 4 < " R j - p " o e " w " v k ' p " e j q " e a e " {  
E a e " { ' w " e w " o c p i " v ¶ p j " d v " d w e " e » "  
V k o g " d q z k p i < " c " t c " j " v j p i " f k " f  
v t q p i " o v " m j q p i " v j k " i k c p 0 "



## V « k " n k w " n w " j v p j " p i k E d q '0 -Z F l P N t Y t w F i " D

R j k ' p " d p " w " v K w p e v f v j p i v e { w " x < " e " D  
**D** e " 5 0 5 < " E r " p j v " m " j q e j " f " a p "  
 P w " e a e " { ' w " e w " x v " s w a " r j k ' p " d p "  
 ngân sách  
 M v " s w < " e a e " { " w " e e w v j p v j p p i v \* e a e "  
 v k ' p " - " e " d " u w p i + "

### 3.3.4. I k c k " q p " o ½ " j · p j " j » c " n q i ¶ e

**D** e " 6 0 3 < " R j - p " v ¶ e j " e a e " { ' w " e w " o c p i " v  
 E a e " o ½ " j · p j " j " v j p i " n ½ i ¶ e < " j " v j p i "  
 v j ". p < q +  
 Z - { " f p i " e a e " n d p " " o a ew " { ' w " z e a e w " i k c q " f k  
 s w < " e a e " o ½ " j · p j " f " n k w " \* G T F + . " e a e  
 j · p j " i k c q " f k p " \* d k w " p i " e p j . " d  
 v p i " \* e a e " d k w " " W O N + " e c " j " v j p i

### **D** e " 6 0 4 < " M k " e " w t o k p i k v ¶ p j " e j e " p p i

M k o " v t c " v ¶ p j " { " . " z g o " z ² v " n k . " v j  
 e a e " o ½ " j · p j " j " v j p i " x < " e a e " d p " o w  
 e " z a e " p j " v j c " a p i 0 "

N k ' p " m v " e a e " { ' w " e w " r j k " e j e " p p i 0 x

### 3.3.5. I k c k " q p " r j - p " v ¶ e j " s w { v " p j

N « i k c k " q p " e j w { p " v k r " i k c " r j - p " v ¶

**D** e " 7 0 3 < " z a e " p j " e a e " i k k " r j a r " " e  
 Z a e " p j " v v " e " e a e " i k k " r j a r " " e " e  
 M v " s w < " o c " v t p " e a e " j " v j p i " \* i k k " r

### **D** 7e0"4 < " R j - p " v ¶ e j " e a e " i k k " r j a r " " e

X k e " r j - p " v ¶ e j " v ¶ p j " m j " v j k " e " v j  
 v - o " v k " v ¶ p j " m j " v j k " e c " e a e " " e " m

R j - p " v ¶ e j " v ¶ p j " m j " v j k <

**V** ¶ p j " m j " v :j N k' x w " " m k " k v " j w j a v r " e " r j Á " j r "  
 N k w p i " k f " a p " e " e j w { ' p " i k c " m " v j w " phap?.

**V** ¶ p j " m j " v j :k N' k x w " " j i q k v k " " r j p a i r " e " v j e " j k  
 p i k " f Á p i A " " o e " " p < q A " I k k " r j a r  
 e c " p i k " f Á p i " p j " v ý j " p " q Á " P v j k p f Á  
 r j a r " p j " x { A 0

**V** ¶ p j " m j " v N k " w " v k p j f ý a k " e " e j k " r j ¶ " j

**V** ¶ p j " m j " v N k " w " e k " k r w a r " e " v j " e  
 v t q p i " o v m j q p i " v j k " i k c p " e j r " p j p

### **D** e " 7 0 5 < " U q " a u r a " p j " " e e a e " i k k " r j



## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

E j p " i k k " r j <sup>a</sup> r " " e " e » " u " m v " j r "  
x " m " v j w v . " j q v " p i . " m k p j " v " x <

M v " s w < " i k k " r j <sup>a</sup> r " e " z w v 0

D e " 7 0 6 < " E r " p j v " m " j q e j " f " a p  
w " x < q < " i k k " r j <sup>a</sup> r " z w v "

Xem xét x < " e r " p j v " n e j " d k w " o k " p j v "

M v " s w < " e r " p j v " m " j q e j " f " a p 0

D e " 7 0 7 < " z w v " o v " i k k " r j <sup>a</sup> r  
M v " s w < " z w v " f " a p

### 3.4. Z f E " P J " E f E " [ žW" E W" E C " P I K" F ' P ]

#### 3.4.1. X c k " v t ¼ " e c " x k e " z <sup>a</sup> e " p j " { ' w " e w

- [ ' w " e w " \*j { "w "je kpwr" "p xi + " n < " o v " o ½ " v  
o w p " k " x k " o v " j " v j p i " v j ½ p i " v k  
p p i . "p i " e\* "v j tw e " v ¶ p j + " x < " e <sup>a</sup> e " t < p i " d

- E <sup>a</sup> e " { ' w " e w " o c p i e " e ¶ p j " e j p e ' p p i " p i < ' j  
e » " v t q p i " o ½ p i " j v k p j p i p w j v j c " o - p " p  
v j " e j r e' p j l p " k " k Á p ii

- E <sup>a</sup> e " { ' w " e w " e j k " e j e e v p p i < " e k  
j " v j p i " e p i " p j " d v " m " e <sup>a</sup> e " t < p i " i k k " r j <sup>a</sup> r " e " z w v 0

**Chú ý:** Z <sup>a</sup> e " p j " e <sup>a</sup> e " { ' w " e w " m j ½ p i " e j ¶ p j

- J " v j p i " e » " v j " v p " p j k w " e j k " r j

- J " v j p i " e » " v j " j q < p " v j < p j " o w p "

- J " v j p i " e » " v j " m j ½ p i " r j Á " j r " x  
x < " u " m p ½ p i " j " e k " w ¼ " m j k p " j " m j ½ p

- E j k " r j ¶ " d q " v t · " x < " p - p i " e r " j " v

- J " v j p i " e » " v j " m j ½ p i " e j e " e j p "

- W { " v ¶ p " e c " e <sup>a</sup> e " e j w { ' p " i k c " v t q p i "  
v j " v " e j k " p Á q n < " f q " c k " i - { " t c " v j · " e  
án

#### 3.4.2. V k ' w " e j w p " e c " x k e " z <sup>a</sup> e " p j " { ' w "

- P j v " < s "we<sup>a</sup> a p e " { ' w " e j w " p j ½ p p i " φ - j w r " p j p i

- V q < p " < f " k e <sup>a</sup> p e " { ' w " e w " o ½ " v " o k " w x  
v j p i 0

- M j hi' < v " e <sup>a</sup> e " { ' w " e w " e » " v j " e " v j q "  
d w e " u p " e » 0

- E p " e j k <sup>a</sup> v " { ' w " e w " n < " v j e " u " e p "  
v j p i 0

- **Chính xác** < " e <sup>a</sup> e " { ' w " e w " e " r j <sup>a</sup> v " d k w " e



- V « k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N r Y t w F i " D
- F " v j g q e f e k { ' w " e w "" n w k k p " e m f e v " e v j t e e " p v k p i  
e c " j " v j p i 0
- E » " v j " m'k e ^o e " v { t c w " e w " - " e " e j p i " o k
- 3.4.3. S w { " v t · p j " z ^a e " p j " { ' w " e w**
- R j - p " v ¶ e j " e ^a e " { ' w " e w " " i k k " s w { v  
v j w p " p j c w . " m j ½ p i " m j " v j k . " v t Á p i " n r
- Chính v j e " j » c " e ^a e " { ' w " e w < " n r " v « k " n k  
u " v j c o " i k c 0 " X k e " n r " v « k " n k w " { ' w " e  
j " v j p i " e » " v j " e w p i " e r 0

### CÂU HÌNH O LU N

5 0 3 0 " R j - p " d k v " R j - p " v ¶ e j " j " v j p i " x « "  
5 0 4 0 " Ví j « " mp « " q " j w v " r j - p " v ¶ e j " j p i " e w "  
5 0 5 0 " P ' w " x « " r j - p " v ¶ e j " e ^a e " i k c k " q p " r





## BÀI 4. O " J , P J " J ~ C " E J E "

**Tóm tắt:** Bài này tập trung vào việc mô hình hóa các chức năng của hệ thống thông qua phân tích. Nơi dung bao gồm khái niệm và các nguyên tắc xây dựng bài toán phân cấp cho các phần mềm.

### 4.1. O " J , P J " J ~ C " E J E "

#### 4.1.1. E a e " d e " o ½ " j · p j " j » c " j " v j p i "

Trong bài 3, chúng ta đã xác định các bước để giải bài toán:

- Đọc kỹ yêu cầu
- Phân tích yêu cầu
- Thiết kế giải pháp
- Đánh giá và tối ưu hóa

**Mô hình** là cách diễn đạt các bước trên dưới dạng:

- Đọc kỹ yêu cầu
- Phân tích yêu cầu
- Thiết kế giải pháp
- Đánh giá và tối ưu hóa

**Mô hình hóa** là cách diễn đạt các bước trên dưới dạng:

- Đọc kỹ yêu cầu
- Phân tích yêu cầu
- Thiết kế giải pháp
- Đánh giá và tối ưu hóa

**DFD** (Data Flow Diagram - DFD) là cách diễn đạt các bước trên dưới dạng:

- Đọc kỹ yêu cầu
- Phân tích yêu cầu
- Thiết kế giải pháp
- Đánh giá và tối ưu hóa

**ERD** (Relationship Diagram - ERD) là cách diễn đạt các bước trên dưới dạng:

- Đọc kỹ yêu cầu
- Phân tích yêu cầu
- Thiết kế giải pháp
- Đánh giá và tối ưu hóa

**UML** (Unified Modeling Language - UML) là cách diễn đạt các bước trên dưới dạng:

- Đọc kỹ yêu cầu
- Phân tích yêu cầu
- Thiết kế giải pháp
- Đánh giá và tối ưu hóa

#### 4.1.2. O e " ¶ e j " e c " o ½ " j · p j " j » c " j " v j p i "

" j k w " t c " j p " x " j " v j p i < " e a e " e " trúc quy trình).

" n k p " m v " e a ee " ej «cp "j j" x "kv" jx «p" ie" \*we" avet "À{ v j ½ p i " v k p 1 f " n k w " x « " e j e " p p i 1 s w { " v t e " s w c p " j » c " x « " k w " m j k p " m k p " m k o " u q a v " p j p i " t k " t q " v t q p i " s w a



V « k " n k w " n w " j v p j " p i k E d q '0 -Z F l P N r Y t w F i " D

**4.1.3. E<sup>a</sup> e " v j c q " v<sup>a</sup> e " o ½ " j · p j " j » c " e j e " p p i**

**4.1.3.1. N r " m " j qn e je " ej j k' vpj" p i**

E<sup>a</sup> e " o ½ " j · p j " s w<sup>a</sup> " v t · p j " p i j k r " x " e  
p i j k r " x " s w c p " v t p i "

**4.1.3.2. V<sup>a</sup> k " e w " v t Å e " s w { " v t · p j " p i j k r " x**

E<sup>a</sup> e " o ½ " j · p j " e j e " p p i " ö C u " k u ö " n < o "  
{ w " \* J " v j p i " j k p " v k + 0 "

E<sup>a</sup> e " o ½ " j · p j " g φ " a " p " p i p ö V k " φ " x k e " e  
o k " e " z w v + 0 "

**4.1.3.3. R j ~ p " v ¶ e j " j " v j p i "**

O ½ " j · p j " j » c " j " v j p i " j k p " e » " d c q " i  
(lôgic)

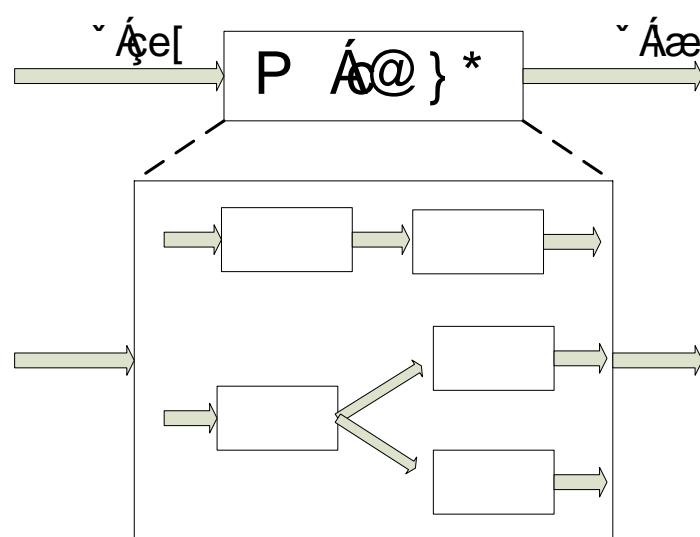
O ½ " j · p j " j » c " e<sup>a</sup> e " { ' w " e w " n ½ i ¶ e " \* e<sup>a</sup> e "  
j " v j p i " e " ö F H F " fn ½ pi i ¶ " e v j e " ep " " qj " v j  
z w v 0

O ½ " j · p j " j » c " e<sup>a</sup> e " i k k " r j<sup>a</sup> r " m " v j w v "

O ½ " j · p j " j » c " i k k " r j<sup>a</sup> r " e " e j p " \* F H

**4.1.4. M j<sup>a</sup> k " p k o " j " v j p i "**

O v " j " v j p i " v p " v k " d p i " x k e " n { "  
w " x < q " p & " { o x w " v w " t c 0 " O v " j " v j p i "  
p j k w " j " v j p i " e q p 0 " O v " j " v j p i " e q p  
w " t c " e c " o v " j " v j p i " e q p " e » " v j " v  
con khác.



**Hình 4.1. J " v j p i n g consonant J " v j**



## 4.2. MÔ HÌNH LOGIC

### 4.2.1. R j - p " d k e " o ½ " j · p j " n q i ¶ e " x < " o ½ " j · p

*Mô hình logic* e j q " d k v " j " v j p i " n < " i · " x < " n < m " v j w v 0 " P » " o k p j " j c " d p " e j v " e e " i k " n < " o ½ " j · p j "od" op½"ejj· pvj." "poi½j "kj

O ½ " j · p jm"j x½ pvi "" ne j " v j " j k p " j " v j p i " e a e j " v j e " j " v j p i " e " e < k " v " o e a e " n c " e j p " e ½ p i " p i j 0 " O ½ " j · p j " x e < k " v · pj jc " {m" o ½ v" jjw v 0 "

### 4.2.2. U " e p " v j k v " e c " o ½ " j · p j " n ½ i ¶ e

E a e " p j < " r j - p " v ¶ e j " j " v j p i " - " p j p p i j k p " e w " p i j k r " x " x k " x k e " p i j k u " f p i " e a e " o ½ " j · p j " j " v j p ir " " nx½ i " ¶ xe e a e " o ½ " j · p j " j " v j p i " x v " n " " o k p

E a e " j q v " p i " e c " p i k " r j - p " v ¶ e j " j · p j " j " v j p i " n ½ i ¶ e " x · " p j p i " n " f q

- E a e " o ½ " j · p j " n ½ i ¶ e " n q k " d " v " v v j e " e < k " v " j " v j p i " - " e » " j q e " x " e a e j " e < k " v " e j q " j " v j p i 0 " F q

- E a e " o ½ " j · p j " n ½ i ¶ e " n < o " i k o " m j " I v t q p i " v t p i " j r " e q pw " pxi " ek " ed " m " evj " v ¶ p j " m " v j w v 0 " P j " x k e " v a e j " d k

v j e " j " v j p i " v j e " j k p " o < " e j Á p i e w " p j o " o " d q " v ¶ p j " j q < p " v j k p .

- E a e " o ½ " j · p j " n ½ i ¶ e " o " p j " p j 2 r k v f Á p i

p i ½ p " p i " r j k " m " v j w v " j q e " ¶ v " m "

## 4.3. DK W" " R J Ź P " T ĩ "(Business Function Diagram)

### 4.3.1. M j a k " p k o " D H F "

D H F " n < " u " " r j - p " t - " e » " v j " d e " e a e e j k " v k v 0 " O k " e j " e " p " p q " e » " p y k w " e e " v j " j k p " v t q p i " o v " m j w p i " e c "

" p i j c " e c " D H F < "

- I k k " j p " r j o " x k " e c " j " v j p i " e

- V k r " e p " j " v j p i " x " o v " n q i k e " v j p i " v j e " j k p " e " t j p e " v ¶ e " j e " j k " e a

- R j - p " d k v " e a e " e j e " p p i " x < " p j k o v " " n e " d " p j p i " e j e " p p i " v t Á p

V w { " p j k p . " D H F " m j ½ p i " e » " v ¶ p j " p i . m j ½ p i " v j " j k p " v t p p p i v " " z e " p i " " p j c "

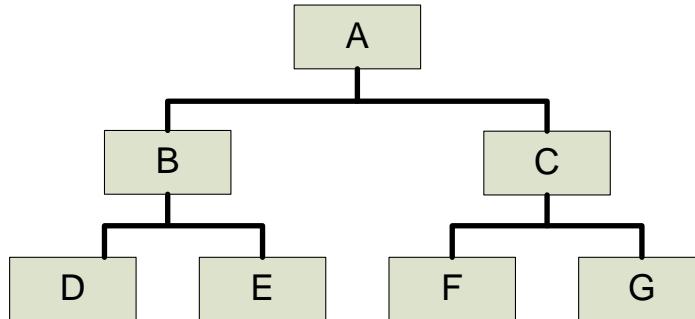
v j ½ p i " v k p " i k c " e a e " e j e " p p i 0 " F q " j · p j " e j e " p p i " v t q p i " d e " w " r j - p



### 4.3.2. R j p i " r j ^ a r " z ^ { " f p i " D H F

#### 4.3.2.1. R j ^ p " o e " e ^ a e " e j e " p p i <

D H F " e " z ^ { " f p i " v j g q " o ½ " j . p j " r j σ p " o  
o v " p g k e w " e j e " p p i " e q p " v t q p i " u " 0



**Hình 4.2.** O ½ " j . p j " D H F " r j ^ p " o e

Nhìn mô hình trên, f " v j { " e j e " p p i " C " d c q " i o " p  
p D i " h k " d c q " i o " F " x < " G  
E j A " " n < " x k " o v " u " . " mpj i½"pvi j"·p"·5p""oe »e"  
r j A " j r " x k " e ^ a e " j " v j p i " v t w p i " d . p j  
s w ^ a " 8 " e j e " p p i " e q p " x . " p j " x { " u " n  
m k o " u q ^ a v 0 "  
P w " i r " v t p i " j r " e " s w ^ a " p j k w " e j e "  
e ^ a e j " v q " t w j p i o " i d c p " v " p j " o " e ^ a e " e j e "  
d q " v ¶ p j " e ^ p " d p i " e c " u " . " p i j c " r  
p ^ p " e " u " v p i " e " p x k " p j c w " j x e " m ¶ e j " v  
O k " e j e " p p i " r j k " o c p i " o v " v ^ p " f w { " p  
khác; tê p " r j k " v j " j k p " m j ^ a k " s w ^ a v " e ^ a e " e j  
e " v j e " v " p i j k r " x " o < " p " v j e " j k  
d p i " p i " v . " x ¶ f " p j " o n r " p " j < p

#### 4.3.2.2. Z ^ a e " p j " e ^ a e " e j e " p p i 0 "

" o e " e c q " p j v " e c " p i j k r v x v t q p j " e " p  
sau:

- U p " z w v " u p " r j o 0 "
- E w p i " e r " f e j " x " \* d ^ a p " j < p i . " d q " f
- S w p " n " v < k " p i w { " p " \* v < k " u p . " p i w p
- M j k " - " z ^ a e " p j " e " n q k " o < " p " v j w e  
p j v " p < { 0 " V k r e v g q j " e " p z p e " e q p " j v j .  
e j ¶ p j . " v c " v " p " v t q p i " e j w " m " u p i " i
- Z ^ a e " p j " p j w " e w 0
- Mua bán.
- D q " j < p j . " d q " f p i 0 "
- V j c p j " n " j q e " e j w { " p " p j p i 0 "

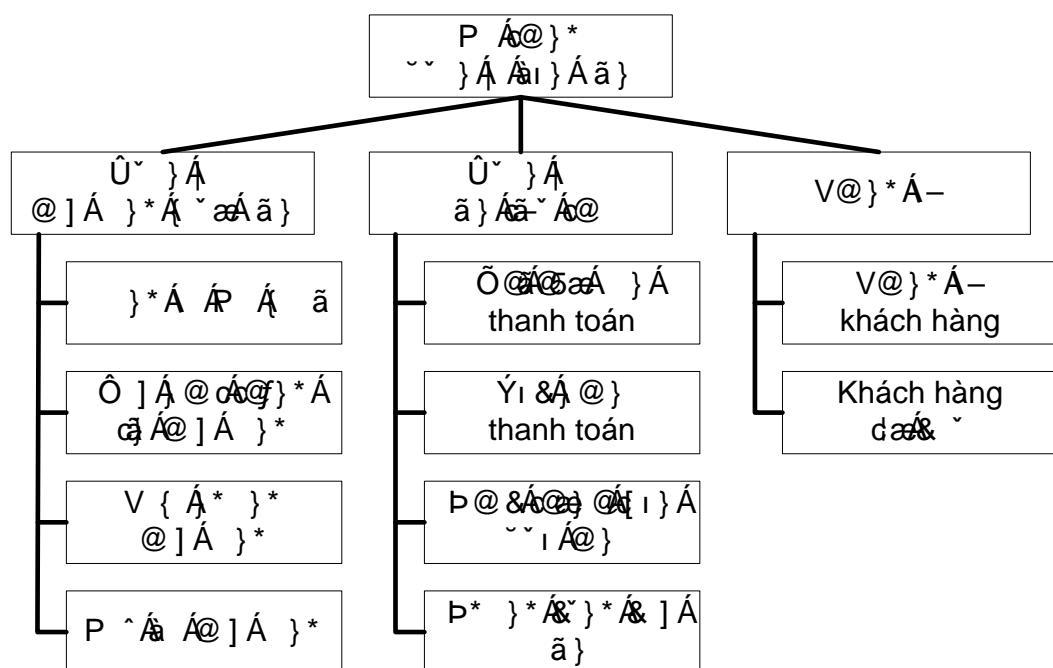


Giáo trình R j  $\neg$  p " v ¶ e j " v j k v " m " M j "q vc j" Mpj iq "c v' jj $\frac{1}{2}$  pe i"

O k " i k c k " q p " e » " v j " e » " o v " j q e " p  
 p p ip "" Dj <sup>a</sup> « p i " v j . " i k c k " q p " z <sup>a</sup> e " p  
 n « " S w p " n " v j  $\frac{1}{2}$  p i " v k p " m j <sup>a</sup> e j " j « p i . "  
 p j v " p " j « p i í "

P i k " r j  $\neg$  p " v ¶ e j " r j k " z <sup>a</sup> e " p j " e  
 x k e " r j  $\neg$  p " v ¶ e j " d e kj e " " φ p " i Θ j " e " " pp j p ip  
 d p i " e <sup>a</sup> e j " z <sup>2</sup> v " z g o " e » " r j k " e j e " p  
 p j » o " e <sup>a</sup> e " p j k o " x " p j 0 "

M j k " z  $\neg$  { " f p i " D H F " e p " o " d q " v ¶ p j "  
 0 " X k " e <sup>a</sup> e " j " v j p i " n prang, teang l l à j " v  
 D H F " o e " e c q " p j v " \* o e " 2 + . " v k r " v j  
 r j  $\neg$  p " v ¶ e j " e <sup>a</sup> e " v t c p i " u c w " v k " e j e



**Hình 4.3.** X  $\Downarrow$  "f " d k w " " r j  $\neg$  p " e r " e j e " p

**4.4. D K W " " NW RP I WData\*FlowNDiagram)**

**4.4.1. O½ " j · p j " j » c " e j e " p p i " x k " F H F "**

V t q p i " e j p i " p « { . " e j À p i " v c " v r " v t w p  
v t q p i " i k c k " q p " r j - p " v ¶ e j " j " v j p  
p p i " n « " o v " m " v j w v " x' « " n'we j p ie "" fx  
e p i " p j " n½ i ¶ e . " p i " n k " x « " e ª e " v  
e c " o v " j " v j p i 0 " O v " v t q p i " e ª e " o  
e j ¶ p j " n « " u " n w p i " f " n k w 0

O v " u " n w p i " f " órF H Fw " \*n Fk c' v c " v H je d/2 y " "  
 " o ½ " v " n w p i " f " n k w " n w - p " e j w {  
 p i " z " n " e " v j e " j k p " d k " j "  
 e ^ e " v ' p " d k k w " kndj k^ " e w " h v<sup>k</sup> v<sup>a</sup> d k " p . " p j k e' j e "



V k " u c q " u " f p i " F H F A "  
 - U " o ½ " vi ½ " pd" ppi i "" pj p i " v k " u " i k k " v j  
 v j ½ p i " v k p " s w c p " v t p i 0 "  
 - U " o ½ " v " " j c " o k p j " j c " e " n w p  
 qua DFD.

D k w " " n w p i " f " n k w " " t v " r j " d k  
 F H F " " e " q " k v " φ j k " p j " f x p i " e c " p » "  
 v t A e " s w { " v t . p j " p i j k r " o D R T \* 0 w M k j p g w u k " "  
 e j e " p j p " v j { " t p i " j w " j v " e a e " j " v  
 m j ½ p i " j k w " s w " x « " t o " t « " x j " v o j k " v e  
 p j " x « q " x k e " v " e j e " n k " e a e " s w { " v t .  
 v t e " v k p " d p i " x k e " o ½ " j . p j " j » c " e a e  
 r j - p " v ¶ e j . " v j k v " m " n k " x « 1 j q e " e k "  
 v k p " e » " v j " " a e § " ü f p f " p i q ö e y q e e a e " s w {  
 e " e k " v j k p " p j o " v k " c " j » c " i k a " v

#### 4.4.2. Vai trò của DFD

F H F " v « k " n k w " j » c " o v " v j c q " v a e 1 j q v "  
 v j p i " v j « p j " o v " s w a " v t . p j 0 " E H F h o ½ v t q  
 x « v k " d k p " i k k " e c " j " v j p i 0 " F H F " v  
 i k c " e a e " s w a " v t . p j " e c " j " v j p i . " e a e  
 i k c " e a e " s w a " v t . p j 0 "  
 F H F " n ½ i ¶ e " p o ½ " v v j ½ " p n i " v k p " e c " o v " j " v j p  
 F H F " x v " n j " v j ½ " e v " o e v a " e j " v j p i " v j ½ p i " v l  
 n « o . " d p i " e a e j n a o p « q . " d p i " e ½ p i " e "  
 O ½ " v " e a e j " v j e " o v " j " v j p i " v j ½ p i " v  
 e a e j " p « q . " d p i " e ½ p i " e " p « q + "

#### 4.5. E f E " R J P " VDFD E C "

##### 4.5.1. E a e " d " m " j k w " e c " F H F "

E » " x « k " w d " F H F " " o j k " Gane/Särsonkvå Demarco/Yourdon.

V t q p i " » . " d " m " j k w " I c p g " ( " U c t u q p "

Gane/Sarson      Demarco/Yourdon

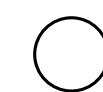
Tác nhân ngoài



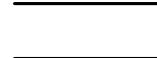
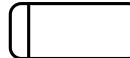
Š } \* Á Áã ^



Quá trình



S @ Á Áã ^



Hình 4.4. J c k " d " m " j k w " F H F " e c " I c p g I U c t u



#### 4.5.2. Tác nhân ngoài

**M j " k " p k o < "**

O v " v a e " p j - p " pp i" qewkp "i n" & e " or " vj "q p ie w p j  
e c " j " v j p i 0

O v " v a e " p j - p " pi q < k " m j ½ p i " r j k " n <  
o k " sw c p " j " ik c " j " v j p i " x k " o ½ k

P j - p < " V ' p " e c " v a ef" cppj j - "pv" p0i q < k " r j k

O v " v a e " p j - p " ppi iq < kk" .z "a oe " v " p j p " ox v " e c  
e j e " m j a e " p o " p i q < k " r j o " x k " e c " f  
c p i " e " p i j k p " e w 0 "

E a e " v a e " p j - p " pi q < k " z a e " p j " ð d k ' p  
e " o ½ " j · p j " j " c 0 " M j k " r pj i q " kx "ke" »v "j w  
v j < p j " e a e " sw a " v t · p j " x < " p i e " n k "

V a e " p j - p " pi q < k " v j p i " n < "  
R j ¼ p i " d c p . " d " r j p " v t q p i " v " e j e "

O v " e j k " p j a p j " j q e " v " e j e " d ' p " p i

O v " j " v j p i " v j ½ p i " v k p " m j a e " e c " v

P i k " f Á p i " e w nk " j eq oe " jp i " v jk " ps iw p "

þ@À& } \* & ]

Ú@} \* Á Á[ i }

#### 4.5.3. M j q " f " n k w "

**M j " k " p k o < "**

- O v " m j q " f " n k w " n < " o v " m j q " n w " v

- M j q " e j c " x v " n " n < " r j k " x v " e j v .  
máy tính.

P j - p < " V ' p " e c " mvj "q " fw c " phnj kp " wp " »r p » k " d  
dung thông tin.

O v " m j q " f " n k w " n < " ð f " n k w " v p j ö " n  
p i ö 0 " O v " m j q " f " n k w " e p " d k w " f k

n w " v t " f " n k w . " ð p j p i " v j ö " v j p  
- E q p " p i " kp < j " x " m " j f a e j " j < p i . " r j ¼ p i . "  
x k ' p . " p j < " e w p i " e r í "

- E a e " c " k o < " x ¶ " f " p j " p k " u k p j  
- E a e " k " v p i < " x ¶ " f " p j " u a e j . " o

d p " sw { p " r j p " o o . " i » k k r p " p " p " v o .  
- E a e " u " m k p " \* f " n k w " e " v j w " v j

i k k " v j p i . " u " v t · " j q - p . " n r " j  
m . " v " e j í "

- E a e " m j a k " p k o " \* f " n k w " x " e j Á p i "  
giá, tài kho p . " m j » c " j e . " e j v " n p i í "



## V < k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N t Y t w F i " D

E » " v j " z <sup>a</sup> e " p j " e <sup>a</sup> e " m j q " f U " h n k Táow p " x k " e nhân ó c " k o 0 " E <sup>a</sup> e " m j q " f " n k w " e " o / e <sup>a</sup> e " v j " j k p " e c " e <sup>a</sup> e " v j e " v j " f " n k j " s w R D) " j " G

Öæ @ &@ } \* Áææ

VeÃ@ } Á@ áæ

### 4.5.4. N w p i " f " n k w "

M j <sup>a</sup> k " p k o <

- O v " n w p i " f " n k " w f k l k e j w ff k p 'p e o c 'v f " n l i k c " e <sup>a</sup> e " s w <sup>a</sup> " v t · p j " j q e " m j q " f " n k w 0
- O v " n w pkhôngfd k" nwk" fwk" p " o v " v < k " n k w " j c d k w ü f k v pthông tin v k q p i " v < k " n k w " j q e " x " e » " v ' p " x < " m j <sup>1/2</sup> p i " v t Á p i " n r " x k " e <sup>a</sup> e " n n q i k e " e c " v j <sup>1/2</sup> p i " v k p " e j " m j <sup>1/2</sup> p i " r j k " d pf ic p j " v 0
- O v " n w p i " f " n k w w " x dk lq " w f " f k n k p wo" vv 'k " o v t c " f " n k w " v " o v " s w <sup>a</sup> " v t · p j 0 "
- O v " n w p i " f " n k w " e p i " e » " v j " e " f j q e " e r " p j v " f " n k w " v t q p i " o v " h k n g f " n k w + 0 "
- O v " n w p i " f i » " k n k " w < " i g <sup>2</sup> v " n w p i " f " n k w khác.

**G H b d\ JH**

### 4.5.5. Quá trình

M j <sup>a</sup> k " p k o <

- O v " s w <sup>a</sup> " v t · p j " n < " o v " j q v " p i " e " v q " o v " n w p i " f " n k w " t c 0 "
- N < " e j e " p p i " e " v j r e " p k " p k " k " f " n w j q e " k w " m k p " x < q 0 p " i p " j v " p i < " p U " p " j f " p p " ie " j q p i " v j e " j k p " p " v t q p i " F H F " x v " n + 0 "
- O v " s w <sup>a</sup> " v ¶ v p p j n y " p l evào " và " h v k " p w j " n w " p i v " f " m a k w "

**Thanh toán  
<OR b**

E <sup>a</sup> e " n q k " s w <sup>a</sup> " v t · p j " n <sup>1/2</sup> i ¶ e <

- E j e " p p i < " o v " v r " e <sup>a</sup> e " j q v " p i " v k f " p j " x k e " d a p " j < p i "

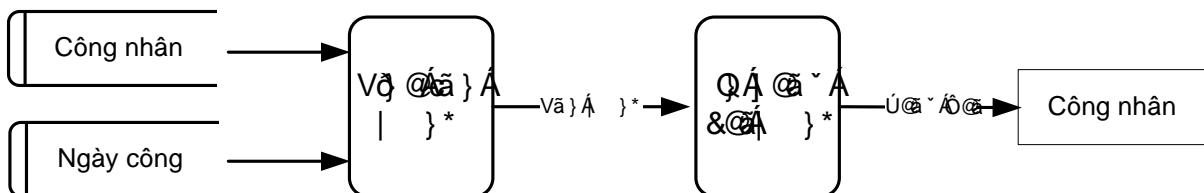


## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

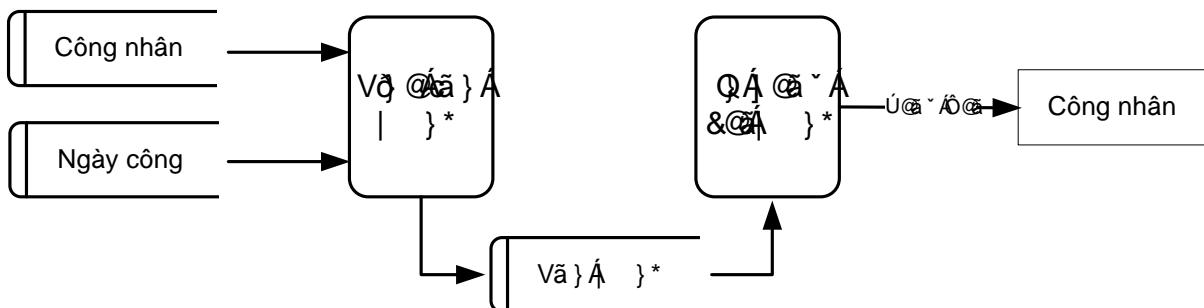
- U " m k p " \* j c { " i k c q " f e j . " j q vhành p i + v q < p " d " \* j q e " p j " o v " r j p " e c " o v j c p j " v q a p " \* n < " o v " e ½ p i " q p " v t q p i
- S w a " v t · p j " e " d p " \* j c { " v j c q " v a e + < " o t e " e { ' w " e w " " a i ". h o k v ö u v " w p j " x { " r j k " e " j q < p " v j < p j " " a thanh toán

### Cách tách các quá trình:

- O k " j " v j p i " e » " v j " e " e j k c " v j < p e a e j " m j a e " p j c w 0 " E a e " s w a " v w t · npwj "pei»" "v v k p " k " i k c " e j A p i 0 "
- k w " m k p " " v a e j < " p w " e a e " v k j p " ve t m j ½ p i " e A p i " o v " p k " j q e " m j ½ p i " f q " c v t c " s w a " v t · p j " v a e j " d p i " e a e j " e w k " V k p v k t r p' j g q " e » " v j " v j e " j k p " V k p " v t · p j " v k r " v j g q " e » " v j " v j e " V k p " v t · p j " v k r " v j g q " e » " v j " e "
- P w " o v " v t q p i " d c " e - w " j k " v t ' p " n < " e x f " n k w " i k c 0



**Hình 4.5.** S w a " v t · p j " v je ej p jc "" v q a pe "" nw a e pj i



**Hình 4.6.** E a e j " v a e j " s w a " v t · p j " v j c p j "

### 4.6. D K W " " NW P I " F P'IN K' EW "POJ 'E

- D k w " " n w p i " f " n k w " o e " p i " e p j j · p j " e j e " p p i " e " f Á p i " " v < k " n l e ¼ p " oe ½ " i j kp" jn " " 0 ½ k " v z - { p f p i " d k w " r j k < " Z a e " p j " d k v j p 'p ii k" k " e c " j Z a e " p j " e a e " v a e " p j - p i q < k "



V « k " n k w " n w " j v p j " p i k E d q '0 - Z p l P N t Y t w E i " D  
 M j ½ p i " e j k " v k v " x " e " e " s w " v t · p j " x « "  
 E j k p " n e " e " v j " z { " f p i " d k w " " p i  
 - E q k " e " j " v j p i " n « " o v " õ j r " g p ö . "  
 x « " e j " s w c p " v - o " v k " m j ½ p i " d r p " l p i z q k " k  
 j q v " p i " d ' p " v t q p i 0 "  
 - J k " p i k " u " f p i " e w k " e c " j " v j p  
 j " v j p i " r j k " a r " p i 0 " » " e j ¶ p j " n « "  
 n w p i " x « q . " e p " z a e " p j " p i whànþ " v p i  
 e a e " v a e " p j - p " p i q « k " v t q p i " u " " p i "  
 - J k " p i k " u " f p i " e w k " x " p j p i "  
 v j p i 0 " » " e j ¶ p j " n « " e a e " n w p i " t c e c  
 ¶ e j " e c " p » 0 " E a e " ¶ e j " » " e p i " u " v t  
 - Xác p j " e a e " m j q " f " n k w " p i q « k 0 " T v  
 x « q " e a e " v r " j q e " e " u " f " n k w " e c "  
 X " o v " d k w " " p i " e p j " f c " v t ' p " v v  
 o k p j " j c " p j p i " n w p i " f " n k w " v j " j k  
 v j p i " p j o " v t a p j " x k e " d k w " " p i " "  
 vào/ra.

## 4.7. V T , P J " V " X i " S W [ " V E " Z Ź [ " F P I " F H F

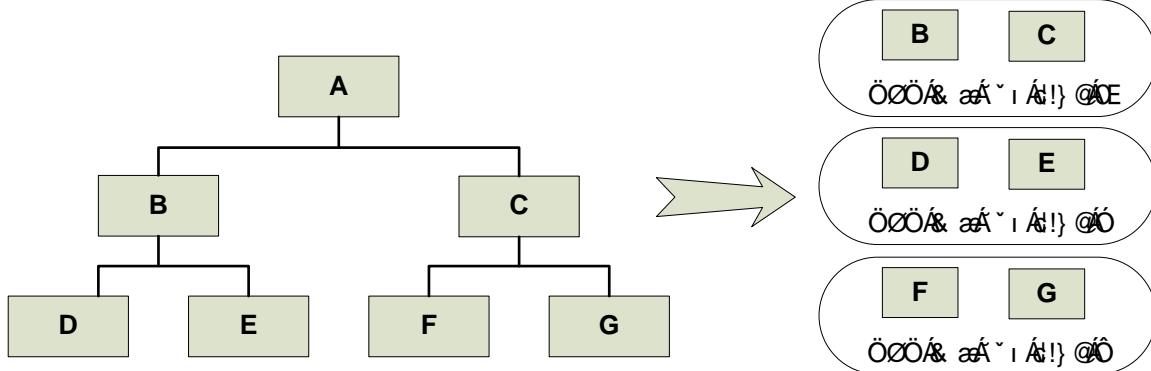
### 4.7.1. E a e " d e " z { " f p i " F H F "

M " v j w v " r j " d k p " e " f Á p i " " z { " f  
 v j g q " D H F " e c " j " v j p i . " ¶ j Á p w " v c è u " b z  
 o e " j v k j p " v t ' p " o v " j q e " p j k w " v t c p i 0 "  
 v ' p " e c " e j e " p p i " c p i " e " r j - p " v ¶ e  
 r j - p " v ¶ e j " v k o e " 2 v j . " v ' p " e c " p » " e  
 D k w " " p i " e p j "  
 - Z a e " p i j " x j « " iv k j l p " j p " e c " p » " \* p i " e  
 - Z a e " p j " e a e " v a e " p j - p " p iv q k l p i \* p k p " k j  
 v j p i " e c + 0  
 - Z a e " p j f e " n k w " p ii q « k " \* w " x « q . " v  
 - E j Á " < " d p " v j - p " v q « p " d " j " v j p i " n  
 d k p k " « pp » j " v j w " t c + " F H F " o e " 2 0  
 - Z a e " p j " p j p i " i . " c p i " e " v j e " j  
 v p i " p i "  
 - Z a e " p j " e a e " s w a " v t · p j 0  
 - Z a e " p j " e a e " n w p i a " e f " p " j n k p " w p i p q i k " k x " il  
 trình.  
 - Z a e " p j " e a e " n w p i " v f t · " k n j k e x we " " p m i j q q k " k f " i "  
 E a e " F H F " o e " 3 0  
 - N « " e a e " s w a " v t · p j " e q p " e c " e a e " s w a " v



BFD

LzW b\ WdWzWei z\Hfb\ Hfcba[ 8:8



**Hình 4.7.** M " v j w v " r j - p " o e " FHF " f c "

**4.7.2. E<sup>a</sup> e " s w { " v e " z - { " f p i " FHF "**

S w k " v e " 3 < "p ø " le » d kt kw "p v " o v " p j - p " f w { p j o "

S w k " v e " 4 < " U " f p i " o v " P I " V " " " s w<sup>a</sup> " v t · p j " n « " o v " j « p j " p i # # # + "

S w k " v e " 5 < " O k " new " npki "pf " m" nvk " xw " kr "j ¶ vk "" p S w k " v e " 6 < " R j k " e » " o v " i » e " v ½ " o " t p i ¶ v t q p i " e Á p i " o v " d k w " 0

S w k " v e " 7 < " O v " s w<sup>a</sup> " v t · p j " r j k " nw ½ p S w k " v e " 8 < " M j ½ p i " e p " e » " o v " nw p i " m v " x k " o v " s w<sup>a</sup> " x t { p j ¶ \* x ½ " j k<sup>a</sup> v v t p

S w k " v e " 9 < " E<sup>a</sup> e " c " quá trình " c " t t · p j " e p c " e " c " e p " e<sup>a</sup> e " nw p i " f " nk w p j " q " e " c " s w k " p i " p j n w p i " f " nk w " e c " t k p i " p » + 0

S w k " v e " : < " E<sup>a</sup> e " nw p i " f " e k w " m j ½ p i " S w k " v e " ; < " O v " i » k " f " n k w " ee » v " tvwj { " p p i " v j k " v k " e p i " o v " ¶ e j 0

S w k " v e " 3 2 < " M j ½ p i p i " o k " v p " j c k " e j k x « " nw p i " t c " \* v t ¶ e j " v j ½ p i " v k p + " e c khác nhau.

**4.7.3. R j - p " v ¶ e j " j p i " (down)" v t Á e " e " k p "**

3 0 "FHF " n ½ i ¶ ef "q fy pp" ie " v cq" rj " v j p i " j k p " e x v " n - "f fq ypp i " v q" rd k w " f k p " u " e « k " d c q " i o " e<sup>a</sup> e " i k k " j p " e c " p » 0 "

4 0 " E j w { " p " k " e<sup>a</sup> e " FHF " x v " n " v j « p j "

5 0 " X " e<sup>a</sup> e " FHF " i " q " y " p q " f d k w " f k p " o v " j " v

6 0 " O ½ " v " v v " e " e<sup>a</sup> e " nw p i " f " n k w . " k p " f " n k w 0 "



## V « k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N t Y t w F i " D

7 0 " O v " e<sup>a</sup> e j " v w " e j p . " a p j " f w " e<sup>a</sup> e " d  
i k k " r j<sup>a</sup> r " x v " n m j<sup>a</sup> e " p j c w 0 "

6. X " e<sup>a</sup> e " F H F " x f q v y " p n " d " k f w p " i f " k v q p r " i k k " r j<sup>a</sup> r

### 4.7.4. R j - p " v ¶ e j " j p i " e w " v t A e " j k p " k " \*

3 0 " X " o v " F H F " p i " e p j " z<sup>a</sup> e " n r " r j

4 0 " X " o v " d k w " r j - p " t - " e j e " p p i " v j g c q n.

5 0 " V q " o v " f c p j " u<sup>a</sup> e j " e e c<sup>a</sup> u e g " e<sup>a</sup> j r q " j p i " " v u j " p m  
p j " e<sup>a</sup> e " u " m k p " o < " j " v j p i " r j k " e " »

6 0 " X " o v " F H F " u " m k p " \* j c { " d " z " n " u

7 0 " M v " j r " e<sup>a</sup> e " F H F " u " m k p " x v j k " " p e j<sup>a</sup> " e o " j v " v j p i " n p " v j · " n < " e<sup>a</sup> e " d k w " j " v j p

8 0 " X " e<sup>a</sup> e " F H F " e j k " v k v " e j q " e<sup>a</sup> e " d " z "

9 0 " V « k " n k w " j q<sup>a</sup> " e<sup>a</sup> e " n w p i " f " n k w " x « "

### 4.7.5. U q " u<sup>a</sup> p j " F H F " x k " d k w " " n w p i " v k p "

Các quá trình v t q p i " F H F " e » " v j " v j e " j k p " u q p gian)

- E<sup>a</sup> e " s w<sup>a</sup> " v t · p j " v t q p i " h n q y e j c t v " v j  
F H F " v j " j k p " n w p i " f " n k w " z w { ' p " u w
- H n q y e j c t v " v j " j k p " n w p i " k w " m j k  
m j k " ¶ e<sup>a</sup> e " s w<sup>a</sup> " v t · p j " v t q p i " o v " F H F " e » " m " \* j < p i " p i < { . " j < p i " v w p . " e r " d<sup>a</sup> e j +
- E<sup>a</sup> e " s w<sup>a</sup> " v t · p j " v t q p i " h n q y e j c t v " n < " o p j v " x k " v j k " i k c p " p j v " s w<sup>a</sup> p 0 "

### 4.7.6. U " d q " v q < p " f " n k w "

N « " x k e " d q " o n k w p " i e j p " v e j n w c p f " f n k w  
v t · p j " p j p " p » 0 "

- Z<sup>a</sup> e " p j " x « " n q k " d " p j p i " r j p " m j ½
- p " i k p " j q<sup>a</sup> " x k e " i k c q " v k r " i k c " e
- R j k " z<sup>a</sup> e " p j " e j ¶ p j " z<sup>a</sup> e " m v " e w " f  
d k w " f k p " f t A e " f f p l h k<sup>a</sup> w " e v w q p i " r j  
n k w + 0

	Ch e " p	Lu ng d li u	Kho d li u	Tác nhân ngoài	Tác nhân trong
<b>nh p i j</b>	Nhi m v x lý thông tin	Thông tin vào / ra m t ch c p p lý"	P k " n tr thông tin trong m t th i gian	P i i hay t ch c ngoài h th ng có giao ti p v i h th ng	M t ch c p p i " tj h conc a h th p i " p j c mô t trang khác
<b>V ' p</b>	ng t	Danh t	Danh t	Danh t	ng t



## Giáo trình R j ∉ p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

kèm	(+ b ng )	(+ tính t )	(+ tính t )		
<b>Bi u</b>	Tên	Tên	Tên	Tên	Tên
<b>Ví d</b>	Làm đơn đặt hàng	Hoá đơn đã Xác nhận chi	Đơn hàng	Nhà cung cấp	Thanh toán

D p i "D6 0p"i3"0v » o «'p j 'v r'je "p "x q " " p i j c "

## CÂU HÌNH LUẬN

6 0 3 0 " R j ∉ p " d k v " o ½ " j · p j " n ½ i ¶ e " x « " o ½ "  
 6 0 4 0 " " p i j c " e c " d k w " " r j ∉ p " e r " e  
 6 0 5 0 " P ' w " x c k " v t ¼ " e c " F H F 0 "  
 6 0 6 0 " M j k " z ∉ { " f p i " F H F . " e » " v j " i r " p





## BÀI 5. O " J , P J " J Q f " F " N K

**Tóm tắt:** T p trung vào vi c mô hình hóa d li u bao g m khái ni o " x < " r j p i " pháp xây d ng bi w " th c th quan h và bi w " d li u quan h .

### 5.1. O " J , P J " J ~ C " F " N K W "

#### 5.1.1. M j a k " p k o "

O ½ " j · p j " j q a " f " n k w " \* o ½ " j · p j " j q a " e " o v " mv " v j w v " e j e " x < " v < k " n k w " j q a " f j · p j 0 " M " v j w v " p < { " z a e " p j " e a e " { ' w n k w 0 " O ½ " j · p j " j » c " f " n k w " v j p i " e w k " e Á p i " o v " o ½ " j · p v j " f p j " h k w u " n w f / p " n D k w " s w c p " j " v j e " v j G T F G p o k v v " T g n c f k " f p i " e a e " v j e " v j " x < " e a e " s w c p " p j " e a e " p x " v j ½ p i " v k p " e " u " e p e a e " o k f k w c p e j Á p i 0 " P i j c " n < " v v " e " e o v " n p " v t q p i " v q < p " d " j " v j p i 0 "

#### 5.1.2. V " o ½ " j · p j " f " n k w " v k " e < k " v " e " u G T F < " n < " o v " o ½ " j · p j " m j a k " p k o " e c " e a e k o + " x < " e a e " s w c p " j e " k x e k Á p f e v v q p e " v j p i " v j ½ p i " v k (Phân tích) e " n r " m " v j w v + 0 " O ½ " j · p j " f " n k w " s w c p " T j F O " \* < T " g o n c w " k d q p p c " h v j e j q " x k e " e < k " v " e c " o v " o ½ " j · p j " f v t p i " e " u " f " n k w " \* w j d k p " v j m " \* e " n U " s w c p " j " < " o v " u " " v j " j k p " e v " x k " j " s w p " v t " e " u " f " n k w " \* U g t x g \* t E í < k 0 " " v +

#### 5.1.3. X c k " v t ¼ " e c " d k w " s w c p " j " v j e " v j E " u " f " n k w " ? " f " n k w " - " s w c p " j " G T F " e " f Á p i " o ½ " j · p j " j q a " f " n k w " x < G T F " n < " o v " d k w " f k p " j q " e c " o ½ " j · G T F " n < " e " n r " v < k " p i w { ' p < " p » " m j ½ p i " n k w " e " v j " p < q 0 "

### 5.2. E f E " R J P " V " E C " D K W " " S W C P " J " V J E "

#### 5.2.1. V j e (Entity)

V j e " v j " n < " o v " p j » o " e a e " v j w e " v p j " v o < " e j Á p i " v c " e p " v j w c " a v e j " x r " v x " < v j n . w " e v q t p " k o . " u " m k p . " m j a k " p k r j p " o v j w e " v x p q v j e " v j " m j a e 0 V j e " v j " m j a e 0 V j e " v j p " e a e " v j k " j v k p i " o < " p » " d k

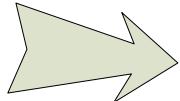


## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

V j e " v j " r j k " e » " o v " v ´ p " f w { " p j v " \*  
x « " ¶ v " p j e v v ¶ p ý " ¶ p j " n « " v " p j " f  
E a e " n q k " v j e " v j " e » " v j " e » <  
- E q p " p n « " k p j p i " p i k " p v i j " p e " q j k " p " v et jq p ei  
j " v j p i 0 " X ¶ " f < " e ½ p i " v { . " m j a e j " j «  
x k ´ p . " u k p j " x k ´ p . " p j " e w p i " e r í "  
- c " nk " op < k " e " u " f p i " d k " e q p " p i  
r j ¼ p i . " e j k " p j a p j í "  
- X v " nv < j " p < j p p " i " x k v v n " v j { " t i 0 " X ¶ " f  
p i w { " p " n k w " v j ½ . " e ½ p i " e í "  
- U " m k " p p j p i " i " z { " t c " v j g q " v j k " j  
p j 0 " X ¶ " f < " i k k " v j p i . " u " j w "  
p . " x k e " v " j u p i k k j e p . " p i " m v "  
- M j a k " p k " op < j p i " i " m j ½ p i " v j " p j · p "  
m j q p i " v j k " i k c p . " m j q a " j e . " p i w p "  
V t q p i " G T F . " v j e " v j " e " m " j k w " n «  
p ik " xo v " d p i " f " n k w " v t q p i " e " u  
e c " v j e " v j < " n « " o v " v j e " v j " e "  
p j k w " v j F " pjVkt , Hòa á p j "

Ôi & Á @ & Á @

Hk 7 Hk



Ôi & Á @ Á @ }

Mã SV	<	Tên
A001	Þ* } Á } Á	Ö } *
A057	V! } Á@ @	Hòa
C172	V@ ÁÓ & Á@ Á	Tinh
B226	P* } @Ó [	V! } *
---	---	---

Hình 5.1. X ¶ " f " x " v j e " v j " U k p j X

### 5.2.2. V j w e " v ¶ p j " \* R t q r g t v k g u +

O k j e " v j " d c q " i o " p j k w " v j ½ p i " v k p  
v r " v j e " v j . " p i " x k " o v " v t p i "  
m j a e j " j « p i " P i w { p " X p " C " e » " p o " u l  
: 7 5 6 í " 0 " V r " v j e " v j " mpjj a " e õ jp " jo « " puik " puj  
k p " v j q k ö 0 " O v " v j w e " v ¶ p j " n « " o v  
e c " o v " v j e " v j 0 "

M k w " f\* F'c nv k c " w v { r g + " e c " o v " v j w e " v ¶ p  
v t " e " v t q p i " v j w e " v ¶ p j " » 0



V « k " n k w " n w " j v p j " p i k E d q '0 -Z F l P N r Y t w F i " D

R j o \*'E x k o c k p + " e c " e " v " p j W e è è v ¶ p j " z t " o  
e » " v j " e j c " o v " e a e j " j r " n 0  
I k " v t " d g b k w n p j x c n w g + " e c " o v " v j w e "  
p w " m j ½ p i " e " z a e " p j " d k " p i k " f Á  
O v " u " m k w " f " n k w " k p " j · p j <

Ki u d li u	" p i j c
NUMBER	Có th là s th c ho c s nguyên
TEXT	M t chu i ký t , bao g m c các con s
MEMO	V p p j v " V G Z V " p j p kihōng & xác" m nh. M t s h th p i " i khk p j p i " p « W " x pn đàl trong b p " i j kd" lè u " u
DATE	P i « { i'b f k nh d ng nào
TIME	Gi f i b t k nh d ng nào
YES/NO	M t thu c tính ch có th nh n m t trong hai giá tr bên
VALUE SET	M t t p h u h n các giá tr . Trong h u h v " e a ng " h p, m v " a " mā s c xây d ng (ví d M=Nam gi i, F=N gi i)
IMAGE	Các lo i hình nh

D p i "O7 0v""3u0 " m k w " f j q h k j w " e k v p p j " p j c " v

Ki u d li u	Ph m vi giá tr	Ví d
NUMBER	i v i s p i w { ' pnh p̄h zm a vie i v i s th e . " zh a ple m vi và chính xác	{10-99} {1.000-799.999}
TEXT	Kích th c l n nh t c a thu c tính Các giá tr th c t th ng là vô h n; tuy nhiên, ng i dùng có th z a eh" các h n ch p « q " » "	Text(30)
DATE	S bi p " k " v t 'nlp d" ng a e " MMDDYYYY	MMDDYYYY
TIME	i v i th i gian AM/PM: HHMMT i v i th i gian 24 gi : HHMM	HHMMT
YES/NO	{YES, NO}	{YES, NO}
VALUE SET	{giá tr #1, giá tr % 4 . í i#lk} a " v {b p i " e a e " o - " x « "	{M=Nam gi i F=N gi i}

D p i "R7j0 "o4"0x k " i k a " v t " j r " n " e c " e "

Giá tr m c nh	Di n g i i	Ví d
M t giá tr h p l t ph m vi	i v i m t th hi n c a thu c tính, n u ng k " f Á p i " mnjh k iáptri thì s d ng giá tr này	0 1.00
NONE ho c	i v i m t th hi n c a thu c tính,	NONE NULL

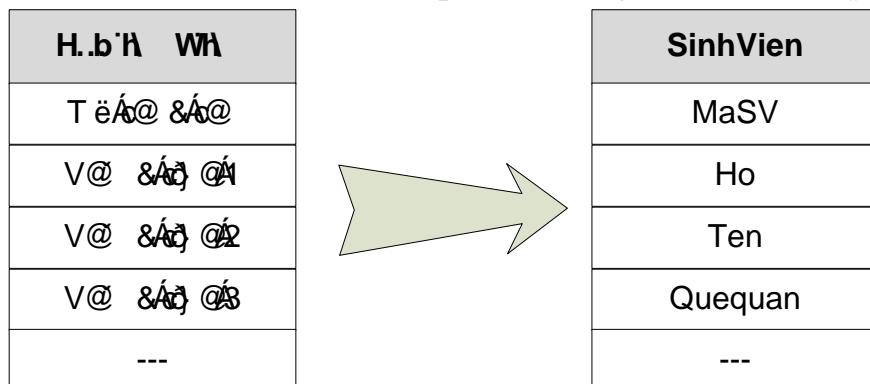


NONE	n u ng k " f Á p i " mnj giáp tri v j tr "ng	
Required hay NOT NULL	i v i m t th hi n c a thu c tính, ¼ kí ng j i dùng ph i nh p vào m t giá tr h p l t ph o " x k ¼này* c dùng khi không có giá tr nào trong ph m vi có th làm giá tr m c nh nh ng l i nh t thi t ph i có giá tr c nh p)	REQUIRED NOT NULL

D p i "E7"0e""5i0k " v t " o e è " e þ q " e ð e ð v þ w

E » " 5 " n q k " :v j w e " v ¶ p j " u c w

- V j w e " v ¶ p j Ømø » v  $\leq$  j q e " p j k w " v j we " e "  
f Á p i " " i a p " e j q " o k " v j " j k p " v j e "  
f " v j w e " v ¶ p j " Oe " " wjk p "jU'kxpkj' "px"kv'tpq'p i " v
  - V j w e " v ¶ p m j " œ½ 'è v v  $\leq$  w e " v ¶ p j " f p "in" kx «w"  
m j ½ p i e " e j p " n  $\ll$  o " v j w e " v ¶ p j " m j " c 0 " X  
c " e j í "
  - V j w e " v ¶ pnj « " " mv jvw" pe "kv<¶ p j " o  $\ll$  " x k " v j e "  
v "n þ j x k " v j e " v j " m j a e " v j " n  $\ll$  " v j w  
e a e " v j e " v j " e » " s w c p " j " x k " p j c w "
- X ¶ " f " x " e a e " n q k " v j w e " v ¶ p j <



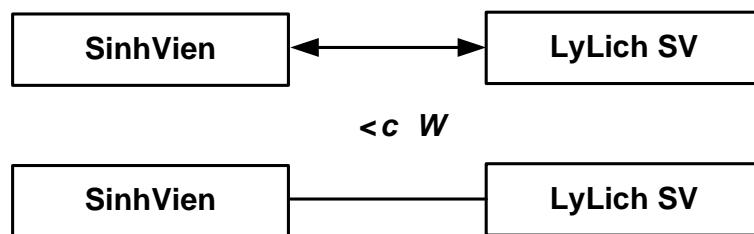
Hình 5.2. X ¶ " f " e " e " v j w e " v ¶ p j " e c "

### 5.2.3. O k " s w c p " j "

O v " s w c p " j " v  $\ll$  k " n k w " j q k " þ q v e " h þ j þ " w  
r j k " e » " o v " e a k " v ' p " \* x  $\ll$  " e » " v j " o c p

#### 5.2.3.1. S w c p " l j " 3

N  $\ll$  " o k " s w c p " j " v t q p i " " o þ "i v j p ei " " w  
f w { " p j v " o v " v j e " v j " e e n c 'k v " K " v j f e  
v j Sinh"viên e j i " xp k " f w { " p j N v " " no evj " " ouþk" pej " " vx  
p » 0 " S w - c p " þ " d k w " f k p " d p i " o v " o k  
q p " v j p i í

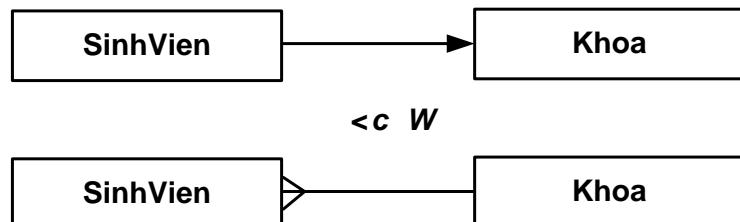


**Hình 5.3.** S w c p -T j " 3

S w c p " j " p « { " u " f p " v k " x k e " p j r " e j w p  
v j r . " v v j e " v j " o k " r j k " d c q " i o " e a e " v j

### 5.2.3.2. S w c p -nj " 3

N « " o k " s w c p " j " o « " v t q p i " » " o v " v j e "  
x k " p j k w " v j e " v j " e Khoa ve » r " v j " e " Khoa  
Sinh viên nên o v " v j Khoa trong j v " r " v Sinh viên 0 j S w c -pp " j j k " w 3"  
e " d k w " f k p " d p i p o " v " o d k p v p p k 3 w " v w  
n « " o v " q p " v j p i " x p i k " x o " v d " p " w p " j n k " w v i t



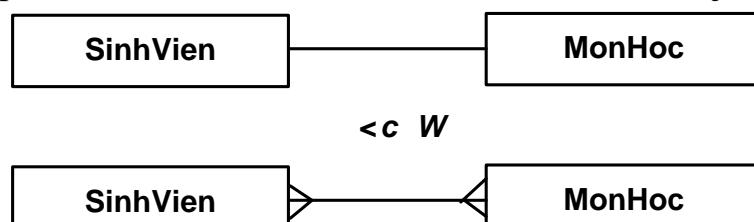
**Hình 5.4.** S w c p -h j " 3

S w c p " j " p « { " » p i " x c k " v t 1/4 " t v " s w c p " v t  
v j " v t q p i " o 1/2 " j · p j 0 " " " v j w e " v ¶ p j  
p k " e c " d p " p j k w 0 "

### 5.2.3.3. S w c p -nj " p

N « " o k " s w c p " j " o v j " v " t q p i " v » r " o v j v " e v j v j e "  
x k " p j k w " v j e " v j " e e " cn " vko0 r Sinh vien fe ". v j "  
trong v r " v Sinh vien e p " c v p j k O 1/2 w p " tjong ev r " v j e " v j  
O 1/2 p " v à nge " e " on O 1/2 p " p " p " e v j ej " e " pdj k Sinh "  
viên.

Qu c p " j -" ppj jkk w " d k w " f k p " d p i " o v " q p "  
v j p i " e » " v t e " d c " " e " j c k " w i

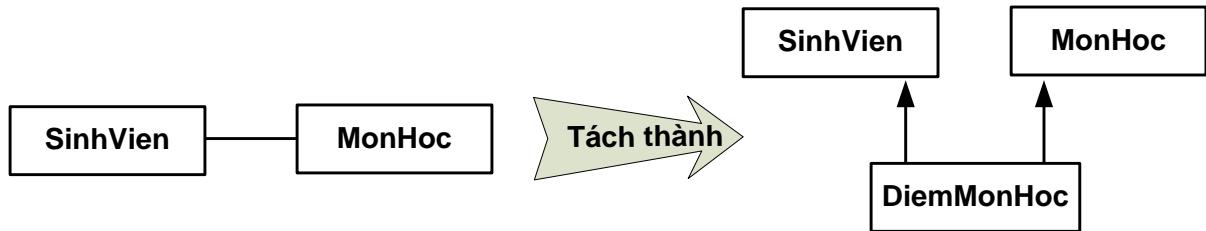


**Hình 5.5.** J · p j " s w c p " j " p



## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

S w c p " j " p « { " m j ½ p á " k v " j s w c j p " j " i k c " j  
 m j ½ p i " e j q " v j { " r " k x w . " i p p " l p " v v " j e j " v v " p p " p  
 j - "p 3" d p i " e a e j " v q " o v " v r " p " j x e k " v e  
 j c k " v r " v j e " v j " - p " " i SinhQdienVaO½ p " , jx ek  
 v c " u " v q " k " a " o ½ p » " j s w c p " " Sinh viêm k " o " v  
 p j k kw o " o ½ p " O½ p " n j le " p i " k b " p ½ p " v "



**Hình 5.6.** V " e j " s wpc "pv"jj« p"jp" e -ñ e " s w c p " j

U " { w " v " v « p k i " h k a " w " y j " j u k " p " e c " o v  
 j " x k " o v " v j " j k p " w c p " y j 0 e " v j " m  
 - D c q " i o " u " n p " p j v " x « " p j " p j v " e a  
 - R j p " a p j " s w { " v e " p i j k r " x " j q e " v j  
 p j k ' w " n r " j e " o « " o v " u k p j " x k ' p " e » "  
 v j " e » " v t q p i " o v " n r " j e + 0 "  
 D e " e c " s w c u p " " j p i " " z v a j e " e " v p j j " v j c o " i k c " x  
 - O v " p i ½ k "  
 - Hai ngôi  
 - Ba ngôi  
 - 10 "

S w c p " j " o v " p i ½ k " \* " s w k + " e j " i o "  
 o v " v j e " v j + "

S w c p " j " j c k " p i ½ k 0

S w c p " j " d c " p i ½ k 0

### 5.3. E f E " D E " Z Ź [ " F P I " D K W " " S W C P " J " v

**5.3.1. Các b e " o ½ " j · p j " j » c " f " n k w " n ½ i ¶ e "**  
 3 0 " O ½ " j · p j " f " n k w " p i " e p j "  
 " v j k v " n r " r j o " x k " f " a p "  
 4 0 " O ½ " j · p j " f " n k w " f c " v t ' p " m j q " "  
 N q k " d " e a e " s w c p " j " m j ½ p i " e " v j "  
 V j ' o " e a e " v j e " v j " e » " n k ' p " s w c p "  
 D c q " i o " e a e " m j q " e j ¶ p j "  
 Z a e " p j " e j ¶ p j " z a e " u " { w " v "  
 5 0 " O ½ " j k p w " f k " v j w e " v ¶ p j " { " "  
 V v " e " e a e " v j w e " v ¶ p j " e ¼ p " n k 0  
 E a e " v k ' w " e j w p " p j » o " e q p "



V « k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N r Y t w F i " D  
 6 0 " O ½ " j · p j " f " n k w " e " e j w p " j q " "  
 V j " p « q " n « " o v " o ½ " j · p j " f " n k w " v v A "  
 - p " i k p "  
 E " e " v j w e " v ¶ p j " f " n k w " o ½ " v v d " v " e  
 v j e " h̄oi.j " » " v  
 O k " v j w e " v ¶ p j " e e " c v " jo " v e " j v j " e " » j " k v j p " " e e x  
 - Không d v j c "  
 O k " v j w e " v ¶ p j " f " in q k w .. " " on / j ½ p i " " v r j k 'k "  
 v j 0  
 V · o " e Á p i " o v e' v j y j k k 'e m w v " k p p " " f k " e " e " v  
 - N k p j " f p " i " k x « w " e j p j " e j q " p j ppi i " p j w "  
 lai.

### 5.3.2. V t · p j " v " z ∁ { " f p i " G T F "

Z a e " p j " e a -dowm). j e " v j " \* V q r  
 Z a e " p j " d e " e c " e a e " s w c p " j " i k c " e a e  
 J q « p " v j k p " e a e " s w c p " j " x k " e a e " u " { w  
 Z ∁ { n g mō hình.

#### 5.3.2.1. Z a e " p j " e a e " v j e " v j "

##### Cách 1:

O v " v r " v j e " v j " e » " v j " v j w e " o v " v t q  
 - V j ½ p i " v k p " n k ' p " s w c p " v k " o v " i k c q " f  
 j » c " p " d a p " j « p i " v j w e " x " s w a " v t · p  
 quá trình mua hàng.

- V j ½ p i " v k p " n k ' p " s w c p " v k " v j w e " v ¶ p j  
 m j a e j " j « p i . " p j « " e w p i " e r . " x " v t ¶ " m j  
 - V j ½ p i " v k p " - " e " m j a k " s w a v " f k " f  
 j q e j " j q e " ps iw epj" no " " ep / 2 jp i ". d" n e j " v t e í  
 " p j p " e ' c v j y r " v j k " v e w " j k " i j  
 - E a k " i · " o « " v c " e p " n w " v j ½ p i " v k p " x "  
 - E a k " i · " n « " e v " { w " v t q p i " j " v j p i A "  
 - E a k " i · " o « " v c " p » k " x " p » " v t q p i " j " v j  
 - E a k " i · " e » " v j " f Á p i " " r j ∁ p " d k v " u  
 c c " o v " v r " v j e " v j " m j a e A "

##### Cách 2:

N { " o v " d p " o ½ " v " x " j " v j p i " j k p " v  
 e a e " f c p j " v " e » " v t q p i " » " z g o " e » " r j k "  
 n q k " d " e a e " v " p i " p i j c 0 " N w " " n «  
 n j p i " n k " m j ½ p i " v t " v j « p j " o v " v r " v j  
 v j e " v j " v k o " p p i 0 "  
 X ¶ " f < " e j p i " v t · p j " s w p " n " m j q " j « p i "



- Theo dõi **hàng** v p " v **khó**pp i« "qo" »"" v k " o v " v j k
- V j g q " f i k " e j k " v k v **hàng**hóa.v " p j r " v p "
- K p " e j k " v k v e" jx qv **khách hàng**. r "

X { " e a e " v r " v j e " v j " z a e " p j " e " khách hàng.

### 5.3.2.2. Z a e " p j " o k " s w c p " j "

S w c p " j " i k c " e a e " v r " v j e " v j " v j l  
p j " u "e v c e "e a e p iv "j e " v j " x k " p j c w 0  
s w c p " j " i k c " e a e " v r " v j e " v j . " e p

P w " e pw" rijk k "vnj ½ p i " v k p " x " v r " v j e "  
u " e » " o v " s w c p " j " z w v " j k p " " v q

M j k " s w c p " j " i k k c p j v j v q " v j c " m j ½ p  
o k " s w c p " j " i k c " e j À p i 0 "

X ¶ < f J " v j p i " v j ½ p i " v k p " s w p " n " v p "

Tên d li u	Bao g m
Danh m c t n kho	+ Th giá + H u n'kho + Báo cáo hàng t p " m j q " e " - " F c p j t'hàng bе şun'g + Báo cáo m c t n kho + B n ki m kē t n kho
Danh m c hàng bán	- " J q a " p " d a p " j « p i " + Báo cáo bán hàng
Danh m c nhà cung c p	- " J q a " p p p j « " e w p i " - " t hàng b sung
Danh m c b o hành	- " ophâhlhd

S w c p " j " i k c " F c p j " o e è p j « p è w p j q " - k « r F  
x · < " O k " n q k " u p " r j o " v t q p i " f c p j "  
e w p i " e r " v t q p i " f c p j " o e " p j « " e w p i " e

O k " p j « " e w p i " e r " v t q p i " f c p j " o e " p j <  
o v " n q k " u p " r j o 0 "

E j À p i c v c " v s " k F c p j " v j e " e » v s w j « p i j " "  
x k " e " j c k " v r " v j e " v j " d c-ipthành 2 w 0 " X  
s w c p - h. T " p3i " v . " e óp "" si w k c p c "" jf c " p pj "" o e "  
o e " v p " m j qc 0 " tEc j " Ávp E r " k v c j v ke " w " j " v " j « p i

Chúng v c " - " v j w " v j r " w e " f c p j " u a e j " o  
p j p i " v j e " v j " e ¼ p " v j k w 0 " D v " p i " w "  
e c " j q a " p " d a p " o ½ " v " o v " m j a φ ji " j «  
o « " f " n k w " v r " F c p r j " x o áchéhàng jō « F q " w " v  
v j e " v j 0 "

P j p " z ² v " t p i " s w c p " j " i k c " f c p j " o  
s w c p - h v j: " p

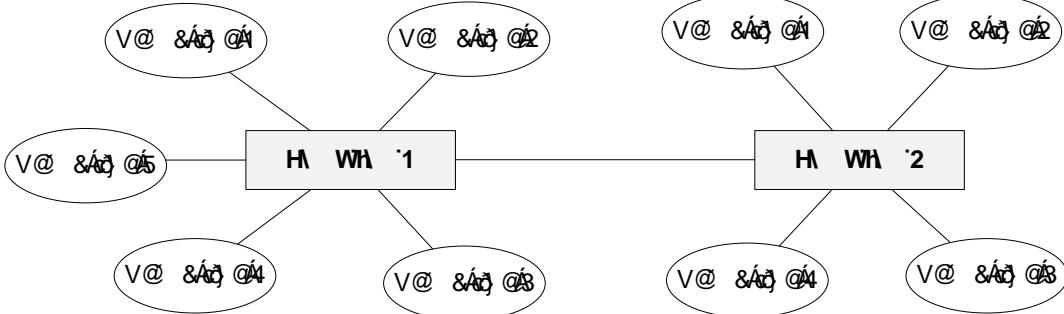


V « k " n k w " n w " j V k p j " p i k E d q '0 -Z F l P N t Y t W F i " D  
 O v " m j a e j " j « p i " e » " v j " o w c " p j k w " n q k "  
 O v " n q k " u p "er"jd a op ""ee»j "qv"jp j "k w " m j a e j " j « p  
 X k " e a e " v j w e " v ¶ m j k " w ¼ pd "a F "c kp "j p' to q pe i" "d f a p  
**hàng**, v " » " e j A p i "p v "c i" ke » c" s F w c pp j "j o "ep" d a p " j  
 o e " v p " m j q " x · < "  
 O v " i k c q " f e j " d a p " e » " v j " e » " p j k w " j p  
 O v " n q k " j « p i " e » " v j " e » " v t q p i " p j k w " i  
 F q " x {c." "tvcc" "v or "kvEjjn ke""vvkj v " d a p " j « p i "

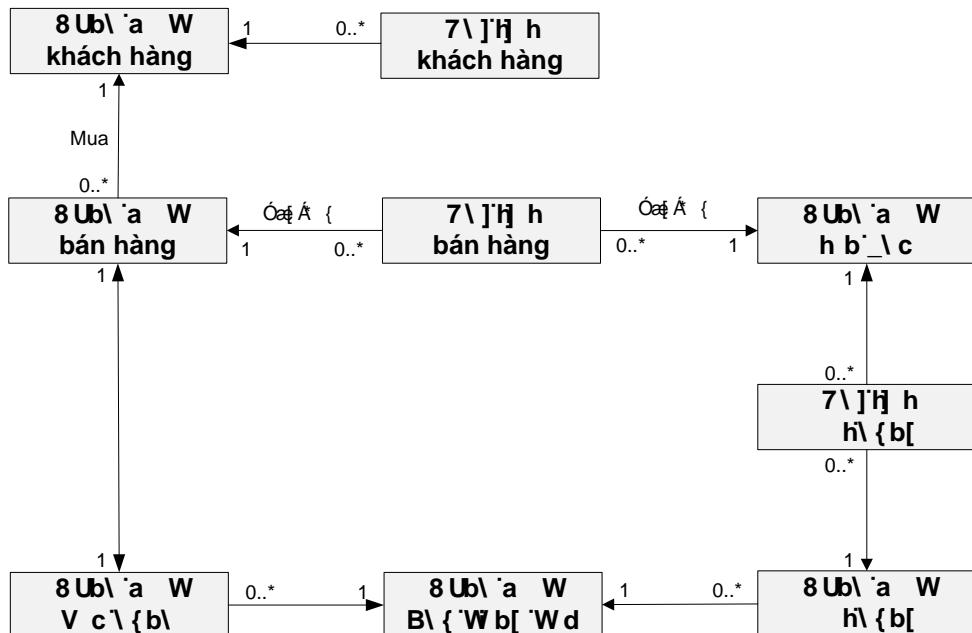
### 5.3.3. S w k " v e " z - { " f p i " G T F

O k " v j e " v j " r j k " e » " v ' p 0  
 O k " v j e " v j " r j k " e » " p j f c p j 0  
 O k " v j " j k p " m j ½ p i " v j " n « " o v " v j e " v j  
 O k " s w c p " j " r j k " e » " v ' p \* e » " v j " o c p i "  
 U " { w " v " r j k " j . r " n " \* t i " t « p i " p i " e

### 5.3.4. Các m k w " m " j k w " G T F " m j a e



Hình 5.7. X ¶ " f " e a e " m " j k w " v t q p i " d k



Hình 5.8. D k w " " s w c p " j " v j e " v j " j " v



#### 5.4. Z Ž [ " F P I " D K W" " F " N K W" S W C P " J " \* ]

O ½ " j · p j " f " n k ó RelationalData Mode h \* T h Q " e ½ p i " v j g q " u c w " G T F " e " f Á p i " v t q p i " x k e " z a e " p j " f c p j " u a e j " e a e " v j w e " v ¶ e j T F O " d c q " i o " e a e " d e < " - Z a e " p j " e a e " v j w e " v ¶ p j " e p " v j k - E j w p " j » c " e a e " v j e " v j 0 " - Z a e " e a φ " j o k " s w c p " j " i k c " e a e " v j w

##### 5.4.1. Z a e " p j " v j w e " v ¶ p j "

" z a e " p j " e a e " v j w e " v ¶ p j " e c " e a e " - U " j k w " d k v " x " j " v j p i " c p i " r j - S w a " v t · p j " r j p i " x p . " v t c q " k " x - Các b a q " e a q . " d k w " o w " e " f Á p i " v t q V " p j p i " v j ½ p i " v k p " v j w " v j r " e . " v v j e " v j " - " e " z a e " p j " v t q p i " G T e a e j " i e j " f k 0 "

##### 5.4.2. R j - p " v ¶ e j " x « " e j w p " j » c " f " n k w

Phân v ¶ e j " f " n k w " n « " o v " s w a " v t · p j " e j w v " v j « p j " o v " e " u " f " n k w " p i k p i 0 " M " v j w v " e " v j " e " i k " n « " u E j w p " j » c " n « " o v " m " v j w v " vo chung j e " e " p j » o " v j « p j " e a e " v j e " v j " m j ½ p v j ¶ e j " p i < " - M j ½ p i " e » " u " n r " n k " e a e " v j w e " v ¶ m j » c " x « " v j w e " v ¶ p j " m v " p k " - M j ½ p i " e j c " e a e " v j w e " v ¶ p j " e j w i k " v ¶ p j " m j a e 0 " X ¶ " f . " v j w e " v ¶ p j " i k a " p j - p " x k " v j w e " v ¶ p j " p i k a " p p " e - Không có vai t t ¼ " i k p i " p j c w " i k c " e a e " v j e M j a k " p k o " r : j " v j w e " j « o

- R j " v j w e " j v " 3 " ipk " v tvptk " " de pci ".m" jv»cc " p j " e " 3 " i k a " v t " e j q " e a e " v j w e e j " e » " f w { " p j v " o k v p i k j q v k . " J c v é - R j " v j w e " 3 " « i ok " a " cv " t v t " e < c " m j » c " v t q p i k a " v t " e c " e e 0 a " e X " ¶ v " j fw < e " v p ¶ i p " j x " nk j " a o " v p j k w " o ½ p " j e " m j a e " p j c w " x " o v " j - P j " x { . " p w " e » " v j w e " v ¶ p j " m j ½ p i p o " v t q p i " o v " v j e " v j " m j a e 0 " S w a trên khá k " p k o " r j " v j w e " j « o " p w " v t " p 0

**5.4.2.1. E j w p " j » c " f p i " 3 < "**

- [ ' w " E " w < v j w e " v ¶ p j " p < q " e » " v j " z w v " j  
v j " v j · " n q k " d " t c 0 "
- E ^ e " v j w e " v ¶ p j " d " n q k " t c u " e Á p i " x  
v q " v j < p j " o v " v r " v j e " v j " o k 0 "

**5.4.2.2. E j w p " j » c " f p i " 4 < "**

- [ ' w " V " w < e " e " e " v j w e " v ¶ p j " v t q p i " v j e  
d " m j » c 0
- k " x k " e ^ e " v j e " v j " e j " e » " o v " v t  
f p i " e j w p " 4 0
- k " x k " e ^ e " v j e " v j " e » " m j w " c v t d q p i " i  
p j p i " v j w e " v ¶ p j " r j " v j w e " j < o " p  
v ^ e j " e ^ e " v j w e " v ¶ p j " » " t c " v j < p j " 3 " v  
e c " v j e " v j " d c p " w " o < " p » " r j " v j w e

**5.4.2.3. E j w p " j » c " f p i " 5 < "**

- [ ' w " V " w < e " e " e " v j w " v f w ¶ p j " r j " k t " x < q  
r j " v j w e " j < o " p " v t " x < q " d v " m " v j w  
v j e " v j 0
- V ^ e j " p j p i " v j w e " v ¶ p j " r j " v j w e " j < o " m j » c . " c " e j Á p i " x < q " v j e " w j " " p o " kr " j e " " v j w e " j < o 0

**X ¶** Két  $\ll$  w ^ " v t · p j " z { " f p i " e ^ e " v j w e " v ¶ p  
o w " j » c " p " d ^ a p " j < p i " e c " o v " e \frac{1}{2} p i " v {

**Số HD:****HÓA ĐƠN BÁN**

Ngày.....

Họ tên khách hàng:..... Mã số khách

hàng:.....

Địa chỉ:.....

Mã số mặt hàng	Tên hàng	Số lượng	Đơn giá	Thành tiền

S w ^ " v t · p j " e j w saúp " j » c " f k p " t c " p j

Thu c tính nguyên b n e j c h hóá v	Chu n hóa d ng 1 <b>1NF</b>	Chu n hóa d ng 2 <b>2NF</b>	Chu n hóa d ng 3 <b>3NF</b>



<u>S hi w "</u> p	<u>S hi w "</u> p	<u>S hi w "</u> p	<u>S hi w "</u> p
Mã s khách hàng	Mã s khách hàng	Mã s khách hàng	Mã s khách hàng
P i « t hàng	P i « t hàng	P i « t hàng	P i « t hàng
Tên khách hàng	Tên khách hàng	Tên khách hàng	<u>Mã s khách hàng</u>
a ch	a ch	a ch	Tên khách hàng
Mã s m t hàng	<u>S hi w "</u> p	<u>S hi w "</u> p	a ch
Tên m t hàng	<u>Mã s m t hàng</u>	<u>Mã s m t hàng</u>	<u>S hi w "</u> p
S n ng	Tên m t hàng	S n ng	Mã s m t hàng
p " i k a "	S n ng	p " i k a "	Tên m t hàng
	p " i k a "		

U c w " m j k " e j w p " j » c . " v j w " e " e a e " v j

p " j « pUi ""dj a kp "wO - " up " m j a e j " j « p i . " P i

**Khách hàng** (O - " u " m j. a" & j' p j" mpj r e j " j « p i . "

F ¼ p i Tàng (p " " j k, O w " u p o. " U" j" np i p i . "

O v " jQ p i u " o. " W" jp « po i v " j « p i + "

**M v " j r " e a e " v r " v j e " v j " e j w p i 0 "**

F q " x k e " e j w p " j » c " z w v " r j a v " v " p j k  
e j w p " j » c " u " z w v " j k p j e k e j v j " p j v y  
v j « p j " o v " v j e " v j " o « e j c " " e a e "

T v " e » " v j " u c w " i k c k " q p " p « { " v j . " v  
e j w p " 5 " p ' p " e p " r j k " v j e " j k p " e j w

**X ¶ E » < 4 " v r " v j e " v j " p 4 " v & k " j nk kp i w**  
v " j « p i " x « v « k " n k w " i k c q " j « p i " p j

p " j\*Up i " j k w " p . " O - " u " m j a e j " j « p i  
p " v U j " p k " w " p . " V · p j " v t p i "

U c w " m j k " m v " j r " e » <

p " j\*Up i " " j k w " p . " O - " u « p m j a v j p j « p i  
j « p i . " c " e j " i k c q " j « p i +

#### 5.4.3. Z a e " p j " e a e " o k " s w c p " j

Theo 4 " x ¶ " f i c w v m j k " e j w e p " e j a e c " v " j v j e w " v j " u  
p " j « pUi ""dj a kp "w . " O p " j « p m j a et h à n g) j « p i . " P

**Khách hàng** (O - " u " m j. a" & j' p j" mpj i a e jkh á ch k à p g) i . " c "

F ¼ p i " (p " j s k i w, "O - " pu" j" op i wU" j" np f á) p " i k

O v " jQ p i u " o. " W" t j p a g p o i

I k c q "(p j " p k w, "O k "kh á ch k à p g, Ngày giao)

**Dòng giao hàng** (U " j k w, "U k "c j k p w j . " p O p " j « p o v " j  
l ng giao)



#### 5.4.3.1. O c " v t p " v j e " v j I m j » c 0 "

" z <sup>a</sup> e " p j " e <sup>a</sup> e " o k " s w c p " j " i k c " e <sup>a</sup> e "  
 v j 1 m j » c 0 " V t q p i " » . " e <sup>a</sup> e " e v " n k v " m "  
 v j w e " v ¶ p j " m j . » c " e c " e <sup>a</sup> e " v j e " v j  
 p i " x k " o k " ½ " i k c ¶ " v j w c e " j ¶ p i j " x m j " e c v e "  
 v c " <sup>a</sup> p j " f w " Z . " p w " m j p/2 ip " i e' » z w n j v " c j " k e p  
 » " v j · " <sup>a</sup> p j " f w " Q 0 "

X ¶ " f <

Th c th hàng	p	Khách hàng	Dòng hàng	p	M t hàng	Giao nh n	Dòng giao hàng
S hi w " p	X		X				X
Mã s khách hàng	O	X				X	
Mã s m t hàng			X		X		X
S hi u giao nh n						X	X

#### 5.4.3.2. V j k v " n r " e <sup>a</sup> e " o k " s w c p " j <

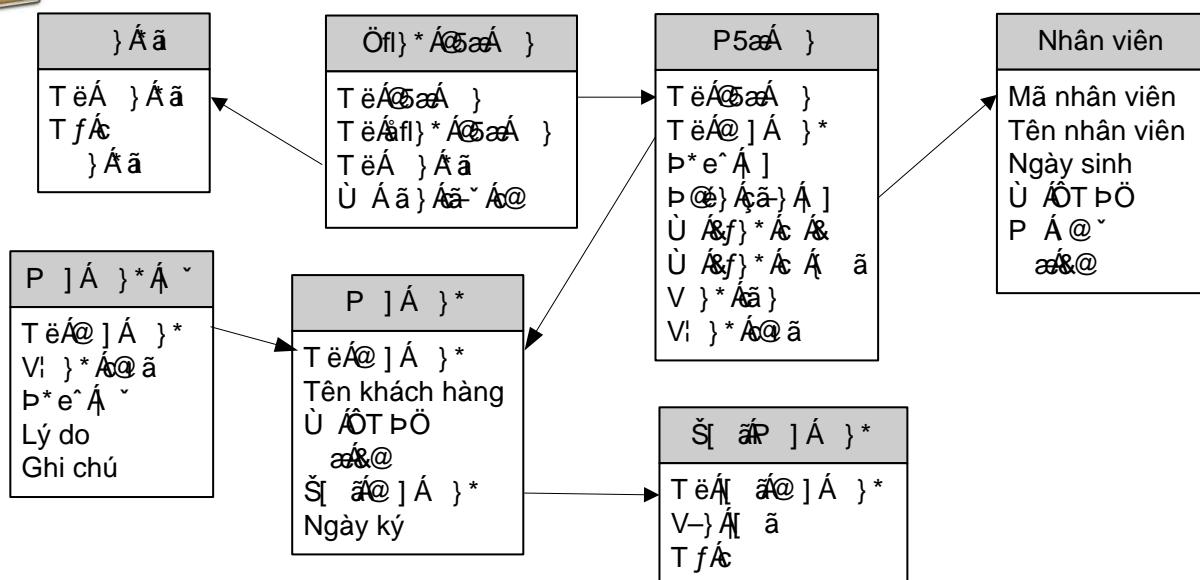
F c " v j g q " d p i " o c " v t p " v j e " v j 1 m j » c . "  
 d v " w " v " e v " v j " p j v . " v " ½ k e j " c " n  
 v t ' p " e Á p i " o v " j « p i " " z g o " p w " ½ " p « q "  
 n k ' p " m v " i k c " v j e " v j " c p i " z 2 v " x k "

#### 5.4.4. Z ¬ { " f p i " o ½ " j · p j " T F O

U c w " m j k " " v j ee " " v j tk' pp. " " z v q c p " in " 5 r " " do ½ " j · p j " s  
 V k r " v j g ¶ j " p j ¶ " e k e ¶ " j · p j " f " n k w " j q « p  
 - U q " u <sup>a</sup> p j " G T F { " f p i " d c p " w " x k " T F O "  
 m j <sup>a</sup> e " d k v " u c q " e j q " j c k " o ½ " j · p j " r j k " r  
 - V t q p i " o p y i " u j " n t p j « " x j " x p " q v ¶ j e e' » n " q v j k "  
 qua p " j " r j " n « o " v t q p i " u <sup>a</sup> p i " o ½ " j · p j (



## Giáo trình R j ∉ p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"



Hình 5.9. D k w " " s w c p " j " f " n k w " e c

### CÂU HÌNH THOLUN

7 0 3 0 " R j ∉ p " d k v " v j w e " v ¶ p j " m j » c " x « " v  
 7 0 4 0 " S w 3 c " p z " w j v " 3 j " k p " v t q p i " e ^ a e " v t p i  
 7 0 5 0 " S w c - pp " j j k " w p " j k we " " z " n " p j " v j " p  
 7 0 6 0 " S w p p K j w " 3 j p i " z w v " j k p " v t q p i  
 e j q " x ¶ " f 0 "  
 7 0 7 0 " R j ∉ p " d k v " r j " v j w e " j « o " p " v t  
 7 0 8 0 " R j ∉ p " v ¶ e j " o ek " " vs jw c " p v " t j q p " i i " k G T c F " e e ^ e  
 n " m j q " " j · p j " 7 0 : 0 "  
 7 0 9 0 " R j ∉ p " v ¶ e j " T F O " e c " j " v j p i " s w  
 7 0 : 0 " Z ∉ { " f p i " T F O " e c " j " v j p i " s w p





## BÀI 6. V J K V " M " J " V J E

6.1. V P I " S W C P " X " V J K V " M " J " V J P I

6.1.1. E <sup>a</sup> e " j p i " v k r " e p " v j k v " m " j " v j p

**6.1.1.1. CÁC V K R " E P " J P I " O ½ " J · P J "**

V j k v " m " j p i f " tok/2x" g j p + p " j n " \* " Ooq fvg " ne <sup>a</sup> e j " v k  
v j p i " p j p " o p j " x " q " x k e " x " e <sup>a</sup> e " o ½ "  
m j ¶ c " e p j " e " k " v " x " m " v j w v " e c " o

E <sup>a</sup> e " o ½ " j · p j " v j k v " m " e v j " o p ½ i " j · p j e " h ½ i p  
v t k p " v t e " " v j g q " e <sup>a</sup> e j " r j " p " v ¶ e j "  
j · p j " v j k v " m " j " v j p i " u " v t " v j " p j  
f p i " x " e " k " v " j " v j p i " o k 0

V t q p i " v k r " e p " j p i " on ½ " " j j · p j p " i e " » e " 5w " " mv t  
v j w v " v j ½ p i " v k p " x " v j k v " m " j p i "  
o ½ " j · p j " v j p i " e " e p i " e " p j " x " q "  
j " c 0 " E <sup>a</sup> e " e ½ p i " e " v j p i " f Á p i <"

- E ½ p i " e " k " m <sup>3</sup> ah " Oracle Designperi " e " n r " v t ·

- CÁC e ½ p i " e " p " i k p < " O U O Y q t f . " O U O X k u

- E <sup>a</sup> e " e ½ p i " e " e j w { " p " f p i < " T c v k q p c n " T

**V j k v " m " j p i (Modern Structured Design) p " k "**

- N " m " v j w v " r j " p " t " e j e " p p i " j " v j  
r j p " n k " e " v j k v " m " e j k " v k v " j p "  
e ¼ p " e " i k " n " v j k v " m " e j - p i " v t  
down).

- O k " o q f w p " " o e " v j r " p j v " e j " v j e " j  
s w c p " p " e ½ p m o i d u h k h c. e " e c " e <sup>a</sup> e

- V j p i " e " u " f p i " x " p " i k p . " f  
p " p i " e r 0 "

- O ½ " j · p j " r j p " o o " e " f p " z w v " v " v j  
d k w " e w " v t Á e " \* u v t w e v w t g " e j c t v + 0  
f " nt kq pwi " ve j p i " v t · p j 0 " V j k v " m " j p  
i k c k " q p " r j " p " v ¶ e j " j " v j p i 0 " V w { " p  
e p j " e c " x k e " v j k v " m . " p j " v j k v " m  
m " j k w " v t q p i " d k w " e w " v t Á e <"

- O ½ w p < " w " fek " dpk " d p i " j · p j " e j " p j v " e » "

- F " n k w " e " e j w { p " i k c q " i k c " e <sup>a</sup> e " o ½  
v t ¼ p " t p i 0 "

- V j ½ p i " v k p " k w " m j k p < " d k w " f k p " d p i

**M " v j w v (Information Engineering):**



## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

- Là c ª e j " v k r " e p " j p i " o ½ " j · p j " x « " n v t p i " p " x k e " v " e j e " e ª e " v j ½ p i " v j « p j " r j p " v j ½ p i " v k p 0 "
- E ½ p i " e " e j " { w " n « " u " " o ½ " j · p j " f e " u " f p i " m j k " v j k p v ö h " j e p j " p i " s w c p " j 0 "

### N « o " d p " o w " \* R t q v q v { r k p i + "

- D p " o w " n « " o v " e j p i " v t · p j " p j . " e z g o " j · p j " f w p i " x " e j e " p p i . " j q v " d p " x "
- N « o " d p " o w " n « " r j p i " irwj ª pr "" eo j ½ " jm · jp ½ j d p " x "
- V j w p " v k p " " n « o " d p " f g o q " e j q " p i j k w " p j p i " p i ½ p " p i " o ½ " j · p j " j q ª + "
- U o " r j ª v " j k p " p j p i " u c k " m j ª e " x " p i
- E j " r j Á " j r " x k " e ª e " f " ª p " p j . " ¶ v "

### V j k v " m " j p ict' Oriented Design): p i " \* Q d l g

- U " f p i " e ª e j " v k r " e p -" rv jj - g p q "" dvk " vf " wt { ¤ { w " v < " f " n k w " \* v j w e " v ¶ p j + " e j e m k p + "
- N « " d e " v k r " v j g q " e c " R j - p " v ¶ e j " j p j p i " m v " s w " v " d e " v t e < " p j " p m k p 0 0 0 "

### 6.1.1.2. R j ª v " v t k p " p i " f p i " p j c p j "

M " v j w v " z - { " f p i " p i " f p i " p j c p j " e j m " v j w v < "

- V " j r " v j ½ p i " v k p

- N « o " d p " o w "

- M " v j w v " r j ª v m " w t " k j pr "" \* pLiq "k fp vp" iC "r r n k e r j ª v " v t k p " p i " f p i " d p i " e ª e j " i r m 0 " P j p " o p j " u " v j c o " i k c " p i " v j f Á p i " e w k . " e j w { ' p " i k c " j " v j p i " v t dù p i " r j ª v " v t k p " e ª e " p i " f p i " p j " v t

### 6.1.2. E ª e " e ½ p i " x k e " e " v j " v t q p i " i k c k "

- V j k v " m " m k p " v t Á e " p i " f p i < " N c " e t c " o ½ " j · p j " x v " n " e c " j " v j p i 0

- V j k v " m " e " u " f " n k w "

- c " t c " o ½ " j · p j " f " n k w

- N c " e j p " j " s w p " v t " E U F N " x « " v k v t " " n c " e j p "

- V j k v " m " i k c q " f k p " j " v j kp " i f < Á p i . w 0 " 0 t 0



V « k " n k w " n w " j v p j " p i k E d q '0 -Z F ( P N T Y t w F i " D  
- c " t c " e ^ a e " e " v " j " v j p i " e j q " n r " v

### Câu *hi there*

8 0 3 0 " e " mk "oj" e pc i "vej kw "vv t A e " j k p " k " r  
8 0 4 0 " P ' w " p i j c " e c " x k e " n < o " d p " o w  
8 0 5 0 " P ' w " e ^ a e " e ½ p i " x k e " e " v j " v t q p i " i

## 6.2. MK P " V T—E " P I " F P I " X i " X K E " O " J , P J " J C

### 6.2.1. M k p " v t A e " p i " f p i "

M k p " v t A e " j " v j p i " v j ½ p i " v k pj" \*MeV JcV"+ "  
o v " j " v j p i " v j ½ p i " v k p 0 "

KTHT dùng làm ph p i " v k p " < " V t c q " k " x "  
v t w p i " j c { " r j - p " v ^ a p . " E U F N . " v ¶ p j " v ¶ e j "

M V J V " n < " e " u " v t k p " m j c k " j " v j p i "  
v t · " j au h à y. j p i " u

### 6.2.2. D k w " " n w p i " f " n k w " x v " n

D k w " " n w p i " f " n k w " x v PDEd) là mô R j { u k e  
j · p j " e j e " p p i " f Á p i " o ½ " j · p j " j q ^ a " m

R F H F " d k w " f k p " e ^ a e " v j w e " v ¶ p j " e c " v  
o ½ " v " o k " ps w " c w " ej " i. k" v c " e ^ a e " v j < p j " r j p

D k " - { " u " i k k " v j k w " ¶ i e j " t R F H F M V H V p

### 6.2.2.1. E j e " p p i " x v " n "

E j e " p p i " x v " n " n < " p k " v j e " j k p " e ^ a  
con ng k . " o ^ a { " v ¶ p j " e ^ a p j - p . " u g t x g t . " o ^ a {

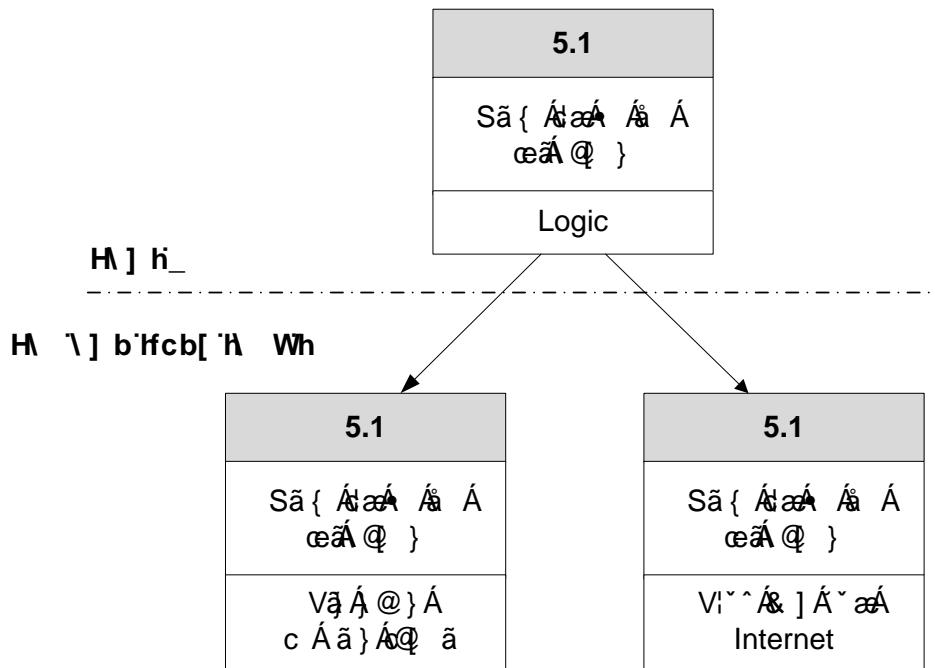
O k " j " v j p i " e p " o v t l y j q e " o v " u " e j e "

R F H F " i k A r " e j A p i " v c e v j { " h t " dk " k j j " e p " p o " a p k i  
o » e . " v j ½ p i " z v k p " d k e ½ p i " p i j " p < q 0 0 0

M " j k w <



X ¶ " f " R F H F " d k w " f k p " o v " e j e " p p i " x



### **6.2.2.2. *N w i p' f " n k w " x v " n "***

N w p i " f " n k w " x v " n < "

- *O* ½ " *v* " *e* " *a* *e* " *n* *w* *p* *i* " *f* " *n* *k* *w*

-  $E^a e^n pp_{ij}''' w^a e^x k^EUFN < "$

*csdl*

- P j r l z w v " e ^ a e " r j p " v " f

" j k w <

V. 1

**ANSWER** The answer is  $\frac{1}{2}$ .

$\leq c \cdot W$

Ú@ } \* Á@ & Ä@ } Á @ æ@ & Å : V-} Á } \* Å@ Á@ ^

### **6.2.2.3. $M j \ q \ " f \ " n \ k \ w \ " x \ v \ " n \ "$**

E a e " m j q " f " n k w " x v " n " f Á p i " " o ½ " v

- O v " e " u " f " n k w "

- O - y " d - p i " y t q p i " e " u " f

- O v " h k n g " o ^ { " v \P p i " }

$\vdash H \# n \# g \quad " \quad v \quad \rho \quad "$

$$\partial_{\nu} u''(x^i) = -p_i u''(x^k) + p''_i n_i w''(x^i)$$

*θ* *V* *f* *j* *p* *t* *V* *k* *p* *n* *w* *V* *t*  
*θ* *v* *f* *n* *i* *v* *n* *m* *v* *t* *v* *f* *v* *n* *k* *v*

$$M = \frac{n}{2} + 1$$

ID Ú@ } \* Á@ & Áä } Á @ë  
V-} Á@ Áä Áä ^



### 6.2.3. M k p " v t À e " e ½ p i " p i j " v j ½ p i " v k p "

M k p " v t À e " e ½ p i " p i j " v j ½ p i " v k p " \* K p h q t  
 e j " " r j e " v r 0 " V t q p i " o e " p < { . " e j À  
 e ½ p i " p i j " v j ½ p i " v v a k e p " j k p i p " v k k " e a e " s w {  
 q p " v j k v " m 0

#### 6.2.3.1. Ki p " v t À e " j " v j p i <

- J " r j - p F k u a w p t " k d w v g f " u { u v g o + < " n < " j " v j  
 r j - p " v a p " i k c " p j p i " c " k o . " o p i . "  
 (grid-e q o r w v k p i . " o n e n i P C .. o. { " v ¶ p j " f c " v
- J " v r (Centralized system): k " n r " x . k " " J j " " v r j r " p v " t v v  
 n < " j " v j p i " v t q p i " " e a e " v j < p j " r j p .  
 (Mainframe).

E a e " j " v j p i " j k p " k " n < " e a e " j " r j - p  
 f j e' x " p " i p " p i k " f Á p i " e w k " j p . " e  
 v . " d q " v t . 0 " E » " 5 " n q k " m k p " v t À e " j "

#### M k p " v t À e "(File server architecture) r "

- N < " o v " o p i " e e " d " \* N C P + " v t q p i " " o v " j " ½ p j i " p v i k " p v 0 j " O p i " N C P " n < " o p i " p v ¶ p j \* R E . " U g t x g t . " x R k F " C j 0 0 r 0 "+ " x v t p q " p r i j " ½ p i v . " O p i " N C P " i k À r " v p i " j r " p p i " n e " e a e j q " r j 2 r " d v " m " o a { " p < q " e p i " e » " v j e » " v j " n < " o a { " m j a e j 0 "
- M k p " v t À e " p < { " e j q " r j 2 r " p j k w " o a { " v p k " f e " j n k k c " w u " x < " i k c q " v k r " x k " p j c w

#### M k p " v t À e (Client/Server architecture): N < " m k p " v t À e " v t q

o v " j c { " p j k w " o a { " v ¶ p p i " e p i r " e c k " v t k a n k w " e j q " o v " j O { " v p j u k " w o a { e " j m j " a e k j p " j .

- O a { " e j " e " u " f " n k w " \* F c v c d c u g " u g j c { " p j k w " e " u " f " n k w " p i " v j k " e j q " r j 2 r " v j c q u " v a f e " " x n k k " w p " j p > p k i " " v e t " p 0 "

- O a { " e j " p i " f p i " \* C r r n k e c v k q p " u g t x z " n " n q i k e " e c " o v " j c { " p j k w " p i " p j r " x < q " " v j e " v j k " p i " f p i 0 "

- O a { " e j " p j p " v k p " j q e " r j p " o o " p j u g t x g t + < " n < " o a { " e j " n q i k e " e w p i " e r e a e " e j e " p p i " j " v t " n < o " x k e " p j » o 0

- O a { " e j " y g d " \* Y g d u g t x g t + < " n < " o a { " e j y g d u k v g " v t " p o p i " k p v g t p g v " j q e " k p v

#### M k p " v t À e " v ¶ p j " v q t (Internet-Based computing) K p v g t architecture)

- N < " o v " f p i " m j a e " e c " m k p " v t À e " r j - v p i " v j k v " m " e c " e a e " p j < " r j - p " v ¶ e



## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

- O v " j " v j p i " v ¶ p j " v q a p " o p i " n < " j  
v k p " w " e j { " v t p " v t · p j " f w { v " \* x ¶  
n " p j - p " u í + . " n { " f " n k w " v " o a {

### 6.2.3.2. M k p " v t Á e " f " n k w "

E " u " f " n k w " s w c p " j " n w " v t " f " n  
p j k w " e v " \* i k p i " e a e f' vct" v tp ip "vh lkq pg +  
e a e " f ¼ p i " x < " e v " n < " e a e " d p " i j k " \* v  
n k w " h k n g + 0 " E " u " f " n k w " s w c p " j "  
f Á p i " n < o " e " u " f " n k w " e c " j w " j v  
E " u " f " n k - pw " v s a w c p n " < j " e " r " ju " f " n k w "  
p j k w " d p i " e " p j - p " t p i " x < " r j - p "  
" e a e " p k " m j a e " p j c w 0 "  
J " s w p " v t " e " u " f " n k w " \* JSVEUFN +  
x p . " r j - p " s w { p " v e w { ü p f f r " a k v W Ø ð § S  
v a p " n < " o v " JSVEUFN " n < o " v j o " e j e " p  
v t w { " p j r " k " x k " e a e " d p i " f " n k w "  
E » " 4 " m " v j w v <"  
- F c v c " r c t v k v k q p k p i < " r j - p " o p j " x <  
i k c " e a e " u g t x " g j tq " œ < " em j ¼ p iv " " ¶ v " u " v t  
- F c v c " T g r n k e c v k q p < " m j ½ p i " r j - p " o p  
t k " r j - p " v a p " i k c " e a e " u g t x g t 0 "

### 6.2.3.3. M k p " v t Á e " i k c q " f k p "

N < " e a e " m ' p j " i k c q " v k r " i k c " e a e " v t w p  
j " v j p i " o a { E a ve ¶ pmj k " xw "ki" kpcj qc "wv0k r < " f  
v j g q " d » . " p j r " n k w " m j ½ p i " e p " d < p " r  
d p i " d Á v " e o " p i . " f " n k w " GFK . " f "  
tay, scan...), thông qua middleware...

## 6.3. V J K V " M " E " U " F " N K W

### 6.3.1. C a e " r j p i " v j e " n w " v t " f " n k w "

E » " j c k " r j p i " v j e " n w " v t " f " n k w "  
- File  
- E " u " f " n k w "

#### 6.3.1.1. File

N < " o v " v r " j r " e c " e a e " d p " i j k " v l  
x k " p j c w " v t " m j k " e " n k p " m v " v t q  
w "m: k

- F " f < p i " v jj k " f Á p i " " φ j φ " œ v " p i " f p i  
- V k " w " xi " " p j kw " we " j p " pf Á p i " e j q " o v " p

#### P j e " k o <

- M j » " v j ¶ e j " f Á p i i " j eq j we p " m " j i » k c " p j k w "



- J c { " d " f " v j c " f " n k w " v \* te Á" p v i t " ' o p " v p " j v file khác nhau).

### 6.3.1.2. E " u " f " n k w "

N < " o v " v r " j r " e c " p j k w " h k n g u " \* d p i + h k n g " \* j c { " d p i + " e » " v j " e » " o k " s w c p " j e ^ e " h k n g " \* j c { " d p i + " m j ^ a e 0 "

w " k o <

- V ^ e j " d k v " f " n k wf " qm " j » k " v n q p i i k " ev " ¶ e p j j " v p j e j w { p " e c " e j p i " v t . p j 0 "
- M k o " u q ^ a v " e " s w { " o ½ . " " n p " e c "
- V k " w " v t q p i " x k e " e j k c " u " f Á p i " e j w "
- I k o " v j k w " f " v j c " f " n k w "

P j e " k o <

- R j e " v r " j p " e ½ p i " p i j " h k n g " t v " p j
- " m j ¶ p c j " " e p " q " " v t w { " z w v " e " u " f " v t w { ".z w v " h k n g
- q " E p " v w ^ p " v j " p j k w " p i w { ' p " v e " m j k ¶ e j " e c " e " u " f " n k w " s w c p " j "
- q " E p " e » " e j w { ' p " i k c " u " f p i " j " s w p

### 6.3.2. M k p " v t Á e " f " n k w "

#### 6.3.2.1. M k p " v t Á e " f " n k w " o ½ " v " e ^ e j " v j e <"

- U " f p i " h k n g 1 e " u " f " n k w " " n w " v t
- E ½ p i " p i j " h k n g 1 e " u " f " n k w " e " n
- E " e w " s w p " n " e " v j k v " n r " " s w f " n k w " e " n w " v t v j " e .p " ir " j v j p k i " " d v k k " p p

- Các files,

- E " u " f " n k w " e ^ " p j ^ p . " e " u " f " n k w f e j . "
- P j < " m j q " f " n k w " \* v p i " j r " e ^ e " p i w p +

#### 6.3.2.2. J " s w p " v t " E U F N <"

- N < " o v " r j p " o o " f Á p i " " s w p " n " x k e e ^ e k " v p i " f " n k w " e c " o v " j c { " p j k w
- R j p " p p " v p i " e c " o v " J S u t a E h g i e N " n < " o v
- P i ½ p " p i " p j " p i j c " f " n F F N + \* F e v o " F r j p " e c " d " o ^ { " f Á p i " " p j " p i j c " e
- Ng ½ p " p i " v j c q " v ^ e " f " n k w F O \* N F + c " v f c Á " p O i c " p k r v j ^ o . " u c . " z q ^ " x < " f k " e j w { p " i k c " e ^ e



### 6.3.3. V t k p " m j c k " o ½ " j · p j " f " n k w " n q i k e "

#### 6.3.3.1. E " u " f " n k w " s w c p " j "

N « " e " u " f " n k w 'k n w w " v v t q p 'i x p 'j s w i p 'd n  
d p i " p « { " e » " v j " e » " s w c p p 'j " m j k q k 0' p j c  
e " v j Á " e c " e " u " f " n k w " s w c p " j <"  
- O ½ " j · p j " f " n k w " x v " n " \* U e j g o c + " q "  
p i " U S N "

- V t k i i g t u " n « " e a e " e j p i p 'e " v t u · p 'jf " " n k e v  
v j e " v j k " m j k " e " u " f " n k w " e " e
- V j " v e " v j p i " v t Á " \* U v q t g f " r t q e g f w  
u " f " n k w " x « " v j e " v j k " v " e - w " n p j

#### 6.3.3.2. O ½ " j · p j " j q " f " n k w "

O v " o ½ " j · p j " f " n k w < v v " n « " o ½ " j · p j "  
- O k " v j w e " v ¶ p j " o ½ " v " o v " x « " e j "  
- O k " v j w e " v ¶ p j " e j " v p " v k " " f w {  
p i q k + "

" e » " e " o v " o ½ " j · p j " f " n k (xam" v v  
v j ' o " r j p " r j - p " v ¶ e j " j " v j p i + "  
E j w p " j q O " f " v j k e w v j " n q i k e " j c { " o v "  
- " f p i " e j w p " v j " p j v " p w " m j ½ p i "  
v t " v t q p i " e Á p i " o v " v j " j k p "  
- " f p i " e j w p " v j " j c k " p w " p » " - "  
v t p i " m j ½ p i p 'j r " j j q " p " v q p " r " j e j ¶ v j w  
- " f p i " e j w p " v j " d c " p w " p » " - "  
v t p i " m j ½ p i " r j k " m j q a " e j ¶ p j " m j ½ ]  
khoa chinh khac

E a e " d e " v q " o ½ " j · p j " f " n k w " x v " n  
- Z g o " n k " o ½ ögiç · p j " f " n k w " n  
- V q " d p i " e j q " o k " v j e " v j "  
- V q " v t p i " e j q " o k " v j w e " v ¶ p j "  
- V q " e j " o e " \* k p f g z + " e j q " o k " m j q a  
- V j k v " m " m j q a " p i q k " e j q " e a e " s w c p  
- p j " p i j c " m ¶ e j " v j e l m k w " f " n k  
- a p j " i k a " x « " v j k v " n r " e a e " t « p i " d  
- E j Á " e a e " e ½ p i " p i j " m j a e " p j c w " e j

V q " e - w " n p j " U S N "

- V w " x « q " v p i " j " s w p " v t " E U F N . " v  
DDL.



## 6.4. V J K V " M " W " X i Q

**6.4.1. V p i " s w c p " x " v j k v " m " w " x < q "**

#### **6.4.1.1. E " e " m j " a k " p k o "**

E » " v j " r j ∨ p " n q k " ew<sup>a</sup>" ev "j rg jq " j p e ik<sup>"</sup>" ev<sup>a</sup> j e ej e<sup>"</sup>" wp ej j p  
f " n k w " e " v j w " v r j j r . p " i " rc j<sup>"</sup> x r<sup>"</sup> " q x " « x " « e<sup>"</sup> / z p  
e " f Á p i " " v j w " v j r " x « " p j r " f " n k  
V j w " v j r " f " n kp j w " p<sup>\*</sup> ff c w p ci " ex c<sup>"</sup> r<sup>"</sup> ww tq g<sup>"</sup> + f < " n k  
tin.

P j r " n k w "e\*jfwc{v cp"wgfpvv"th{**k+i<w**" p " v q " v k p " x << o  
Z " n " f " n k w 'h \*f cs w c<sup>a</sup> " n tt q φ gj u' ud k kp ip+< " k " v  
v t e " m j k " c " p » " x " f p i " o<sup>a</sup> { " v ¶ p j " e »  
m j k " n p i " f " n k w " x << " z " n " p i " v j  
p i c { " n r " v e " f " n k w " x c " v j w " v j r "

#### 6.4.1.2. $E^a e'' r j \quad p i'' v j \quad e'' p j \quad r'' n k \quad w''$

- Bàn phím

- E j w v "

- O « p " j · p j " e o " p i " \* o « p " j · p j " v p i " v ^ e .

- P j p " f p i "  $\neg$  o " v j c p j . " v k p i " p » k "

- V " p i " p j r " n k w < " o - " x e j . " p j p " f  
v j ½ p i " o k p jj . e" 0u 0k 0p "j " v t e

**6.4.1.3. *E " e " p i w { ' p " v e " v j k v " m " w " x < q "***

P ' p " v w  $\neg$  p " v j g q " p j p i " p i w { ' p " v e " f k "  
n k w < "

- M j ½ p i " p ' p " p j r " p j p i " f " n k w " e » " v j  
khác.

*X ¶ " f < " U " n p i " z " p " i k " ? " V j < p j " v*

- M j  $\frac{1}{2}$  p i " p j r" "n p k j w p" i e" » f" v j " n w " v t q p i " o  
u 0 "

- U " f p i " o - " n { " v " e " u " f " n k w "

- U " f p i " e <sup>a</sup> e " e j " f p " p j r " n k w " m j k "

- I k o " v J kp iw" mu " vn " i q " x < q c { " x w q " p j ". r -  
i p i " f Á p i " e a e " j r " e j g e m " e j p " e < p i " p

- F " n k w " p j r " x < q " v j gkq . " vvt t . " pkj " svw c " vr j "

#### **6.4.1.4. *M k o " u q " v " p j r " n k w "***

X k e " m k o " u q <sup>a</sup> v " f " n k w " w " x < q " t v " e  
f p i " v t <sup>á</sup> p " o <sup>a</sup> w <sup>"</sup> m v j <sup>||</sup> kp j p0 <sup>"</sup> E <sup>a</sup> we <sup>"</sup> x < k q " o " d q "

n « " e j ¶ p j " z " e " x « " j " v j p i " e " d q " x



- N w " o " u " i k c q " f e ju' theo þáq " d » " e a e " f  
 - I j k " e a e " n q i " h k n g " e j q " e a e " f " n k w  
 R j k " m k o " u q a v " v ¶ p j " À p i " p " e c " f  
 v t Á p i " n r " v j e " v j . " m k w " f " n k w . "  
 khác.

X ¶ " f < " M j k " p r j r " x k s w " e j " à p k j c " e j q " o v  
 e j p " v p j " n " m " N m " v j . " e j " e j q "  
 O c " V j w v . " G c M c t " j q e " e a e " j w { p " x " e j  
 e j " m j ½ p i " e j q " r j ² r " e j p " v j " p j " r j "  
 Hòa e j p i " j p 0

#### 6.4.2. E a e " k w " m j k p " i k c q " f k p " e j q " v j k

##### 6.4.2.1. O v " u " k w " m j k p " r j " d k p "

- J r " x p V g l z p " d q z + < " e j c " o v " j r " j · p  
 r j ² r " p j r " f " n k w " x " q 0 "  
 - P À v " e j p \* " T h q f k k q " v d t w v v q p + < " e j c " o v " j  
 q p " x p " d p p " o þ i v x " k " i k a " v t " n c "  
 p À v " p " { v j . " e j " e j q " r j ² r " e j p " o v "  
 - J r " e j p \* " n E k j g o e 'm v ' t d q " z + < " e j c " o v " j r "  
 x p " d p " q þ i " v f " w n t k kw " f x Á p q i . " " u p i " e j . p " i  
 V t q p i " o v " p j » o " e a e " j r " e j p " v j . " e "  
 - J r " f c p \* " j N ' k u u a v e " j d ' q z + < " n " o v " j · p j " e j "  
 f " n k w 0 "  
 - F c p j " u \* " e F j t " q v r j " f " q y p " n k u v + < " e j c " j r " e  
 d " p " e p j 0 " M j k " p j p j " x u k q " p À v " z w " p j 0 "  
 - J r " v j \* " n E q v o 'd k p r " v k q p " d q z + < " e n g p c h o " n "  
 phép ng k " f Á p i " p j r " v j o " f " n k w " p i q "  
 - P À v " n D p j " v q p + < " e a e " p À v " n p j " m j ½ p i "  
 m j ½ p i " f " p j " h e þ q " e j k p " f " n k w " x " q 0 " O  
 phép ng k " f z Á p e i " p j p " t p i " v v " e " e a e " f  
 d " o v " i k c q " f e j " j q e " e p " i k " e j  
 » p i " x c k " v t ¼ " i k " v k " o v " e j e " p p i

##### 6.4.2.2. O v " u " k e w 'r m 'j k p " e c q

- J r " n \* " e F j t " q v r j " f " q y p " e c n g p f c t + < " n " o v "  
 v " p 0 " M j k " p j p " e j w v " x " q " » " v j . " j r  
 - k w " m j k p " j k \* " U w n 'k e f j g t p " j g " f k t w " e w q " p v t q n +  
 v t " d p i " e a e j " v t v " e q p " v t 0 "  
 - k w " m j k p " j k \* " W 'c e j n g p j " g f k v " p q p v t q n +  
 t c " p j " f p i " " d w e " f " n k w " p j r "  
 - J r " f c p j " u E g j " e n j n p u v " d q z + < " k w " m j  
 j r " p j k w " j r " e j p " m k o " v t c 0 "



## V « k " n k w " n w " j v p j " p i k E d q '0 - Z F l P N t Y t w F i " D

- J r " e ~ {Check jree p q' z + < " k ³ w " m j k p " p « { " e  
e a e " n c " e j p " f " n k w " f k " f p i " e ~ { " r

### 6.4.3. S w { " v t · p j " v j k v " m " w " x « q

- Z a e " p j " e a e " f " n k w " w " x « q " e c " j "

- N c " e j p " e a e " k w " m j k p " v j ¶ e j " j r 0 "

- V j k v " m .k" no "ru"qe a v"epj j "m" n k w . " n w " x v "

- P w " e p " v j k v . " n r " j " u " e " v " w "

## 6.5. V J K V " M " W " T C

### 6.5.1. V p i " s w c p " x " v j k v " m " w " t c "

#### 6.5.1.1. R j ~ p " n q k " w " t c "

O v " e a e j " " r j ~ p " n q k " w " t c " n « " f c "  
j c { " p i q « k " v " e j e " x « " f k p iv " e jp Á p ip 0 i " J k  
w " t c " e j " { w " n « " f k " f p i " e a e " d a q "

D a q " e a q " h p " k e " d " d a q " e a q " e " e w p i " e r "  
v t q p i " v " e j e "

- D a q " e a q " e j k " v k v < " v j ½ p i " v k p " v t e " v  
danh sách khách hàng.

- Báo e a q " v » o " n e < " v j ½ p i " v k p " u c w " m j k "  
v " v j w p " v k p " e j q " p i k " f Á p i " s w c p "  
f k " f p i " " j q . " x ¶ " f < " m j a e j " j « p i  
- D a q " e a q " p i q k " n < " v j ½ p i " v k pk " ex p " j " d  
e j v " n p i . " k w " m k p " e c " j " v j p i 0

**Báo cáo bên ngoài:** n « " e a e " d a q " e a q " e w p i " e r " e j q "  
e " s w c " r j a r " n w v 0 0 0 "

**Báo cáo quay vòng:** n « " e a e " n q k " d a q " e a q " d ' p " p i q «  
p j " n « " o v " r j p i " v g i e j v g w d v g " r k f w "  
p 0 0 0 "

#### 6.5.1.2. E a e " r j p i " v j e " e « k " v " w " t c "

- K p " t c " v t ' p " i k { "

- J k p " v j " v t ' p " o « p " j · p j . " v t ' p " v t c p i " y

- Z w v " f k " f p i " c " r j p i " v k p "

- I k " v j " v t e " v k r "

- V q " e a e " p i " n k ' p " m v "

### 6.5.2. E a e j " v j e " v j k v " m " w " t c

#### 6.5.2.1. E a e " p i w { ' p " v w ' e t ' e ' j k v " m

D a q " e a q " r j k " p " i, k c φ ".: i" f o " j k w . " f " i k

- Tiêu rõ ràng.

- I j k " t ' p i « { " i k " r j a v " j « p j "

- E » " e a e " r j p " i j k " v j ½ p i " v k p " e j w p i "



## Giáo trình R j - p " v ¶ e j " v j k v " m " M j "q v c j" Mpj iq "c v" jj½ pe i"

V j ½ p i " v k p " r j k " e " v j " j k p " f p  
v w " u c " e j c 0 "

V j ½ p i " v k p "k j "k j «pk ""v j j q «"r i j k c " e a e " v t c p i "

E w p i " e r " e a e j " f k " e j w { p " i k c " e a e " ½ "

V j k " i k c p " z w v " d a q " e a q " r j k " e " m k

O v " u " j · p j " v j e " d a q " e a q " r j k " e "

### 6.5.2.2. S w { " v t · p j " v j k v " m " w " t c "

- Z g o " z ² v " v v " e " e a e " { ' w w "et cw "en qci "kje 0 " "v

- N « o " t ð " e " v " \* x v " n + " e c " e a e " { ' w

- V j k v " m " e a e " d p " o w " v t e " \* p w " e

- V j k v " m . " m k o " v j " x « " m k o " v t c " w

## 6.6. V J K V " M " I K C Q " F K P " P I K " F ' P I

### 6.6.1. V p i " s w c p " x " i k c q " f k p " p i k " f Á p i

I k c q " f k p " p i r k " f Á p j Á j k w " x w k " v t · p  
e c " p i k " f Á p i 0 " P j p i " p i w { ' p " p j - p  
f p i " u c k " j c { " e o " v j { " p j « o " e j a p . "  
e j k " d " r j p " o o <"

- U " f p i " p j o " n p " e a e " v j w v " p i . " n

- I k c q " f k " p t m ½ p w c p "

- E a e j " v k r " e p " i k k " s w { v " x p " "

- V j k v " m " i k c q " f k p " t e " t k "

E a e " p i w { ' p " v e " p ' p " a r " f p i " m j k " v j k

- R j k " j k w " t ð " v t · p j " " p i k " u " f j .

- N ½ k " m ² q " p i ek " vfj Á kp iv " x m q " i x k k c q " f k p "

- M k o " v t c " x « " v j " p i j k o " x k e " v j k

- f r " f p i " e a e " s w { " e . " v j » k " s w g p " v  
e j w p i " e j q " v q « p " e j p i " v t · p j 0 "

- P i k " f Á p i " e p " i " x k e j " j f " p o. p j k

E j " e j q " p i k " f Á p i " j " v j p i " c p i " o q

E j " e j q " p i k " f Á p i " f " n k w " j " p j r "

I k k " v j ¶ e j " e j q " p i k " f Á p i " j " v j p i "  
n " e j " m j ½ p i " v t g q "

M j p i " p j " x k " p i k " f Á p i " j v " e ½ j p i p " ix T  
p « q " » "

- P ' p " p j " j · p j " i k c q " f k p " u c q " e j q "  
v k " e Á p i " o v " x " v t ¶ "

- p j " j · p j " e a e " v j ½ p i " k r " x « " e j "  
e . " " p i p " " j " e » " v j " j k w "



- E <sup>a</sup> e " i k <sup>a</sup> " v t " o p e " " v j p " j " e p " e " j k  
 - N p i " v t e " p j p i " u c k " u » v " p i k " f Á  
 - M j ½ p i " e j q " r j <sup>2</sup> r " z " n " v k r " p w " n k "

### 6.6.2. M " v j w v " i k c q " f k p " p i k " f Á p i "

#### 6.6.2.1. J " k w " j « p j " x « " v t · p j " f w { v " y g d "

P j p i " j " k w " j « p j " j c " n rnájy là" d k p "  
 Y k p f q y u . " O c e k p v q u j . " W p k z . " N k p w z " x « " e  
 Y k p f q y u " E G 0 " V w { " p j k ' p . " j " k w " j « p j  
 e j ¶ p j " v t q p i " v j k v " m " i k c q " f k p " p i k  
 K p v t c p g v " e j { " v t ' p w " ej <sup>a</sup> ev " " v e t <sup>a</sup> · ep " j v " t f · wp { j " v f " w y  
 v t ' p " p j k w " j " k w " j « p j 0 " k w " p « { " e j  
 ¶ v " r j " v j w e " x « q " j " k w " j « p j 0 " V ¶ p j "  
 \* r n c v h q t o " k p f g r g p f g p e g + 0 " V j c { " x · " x k  
 hàn j " v j · " e j " e p " x k v " i k c q " f k p " e j q " o  
 v t · p j " f w { v " r j " d k p " p j Firefox p 'j O k p á t' q u q  
 x p " e ¼ p " v p " v k " o v " m j » " m j p " m j <sup>a</sup> e "  
 f w { v 0 "

#### 6.6.2.2. O « p " j · p j " j k p " v j "

M ¶ e j " v Ájp i " ej " k x p " v j " n « " x p " " v j g p " e j  
 r j k " o « p " j · p j " j k p " v j " p « q " e p i " n « "  
 t v " p j k w " v j k v " d " j k p " v j " m j ½ p i " r j  
 k " x k " o « p " j · p j " o <sup>a</sup> { " v ¶ p j " en <sup>a</sup> « " p j " " pr . j " " ep j  
 i k k " " j c 0 " " r j " p " i k k " " j c "  
 r j " d k v " e " j k p " v j " v t ' p " o « p " j · p  
 : 2 2 0 2 2 2 " r k z g n " v j g q " e j k w " p i c p i " x « " 8 2  
 o « p " j · p j " 3 9 m ¶ k e p j e " j w j " P j e " p j i k p " v j " n p " j  
 j p = " v w { " p j k ' p . " p i k " v j k v " m " p ' p " v  
 " r j " p " i k k " r j " d k p " p j v 0 "

T ð " t « p i . " e <sup>a</sup> e " o <sup>a</sup> { " v ¶ p j " e o " v c { " x « " o v "  
 o « p " j · p j " o <sup>a</sup> { " p t i Á " v C " V v O k + " p j " v v " t " o « p " j · p j  
 p j k w " e p i " r j k " e " z g o " z <sup>2</sup> v " m j k " v j k

E <sup>a</sup> e j " v j e " v j " j k p " x Á p i " j k p " v j " k "  
 m j " p p i " m " v j w v " e c " o « p " j · p j " x « " m  
 v k r " e k p p " r p j " v d " n « " r Raging p j ik " p « " v y e t " q n n k "  
 j · p j " j q « p " e j p j " e <sup>a</sup> e " m " v " x « q " e Á p i " "  
 i k " n « " o v " v t c p i " \* j c { " o « p " j · p j + 0 " E <sup>a</sup> e  
 p i k " f Á p i " d p i " e <sup>a</sup> e j " p j <sup>a</sup> ep " v p t Á c v p " i n " v p t j q . p "  
 e w p " Scrolling f 0 " e j " e j w { p " r j p " v j ½ p i " v k p "  
 v t ' p " o « p " j · p j . " v j p i " n « " o k " n p " 3 " f  
 e ¼ p " e j q " r j <sup>2</sup> r " p j k w " v Á { " e j p " r c i k p i " x



### 6.6.2.3. D « p " r j ¶ o " x « " e " e " v j k v " d " v t "

J w " j v m " j \* / p p j i " p r i j " k " v v " e + " e " e " v j k v  
 v ¶ e j " j r " x k " d « p " r j ¶ o 0 " P j p i " v ¶ p j "  
 v " x « " e " e " m j » c " e j e " p p i 0 "  
 V r " m " v " e c " j w " j v " e " e " o { " v ¶ p j "  
 » " e » " v j " x k e t p t o p o " " j " v t "  
 v p i 0 " E " e " m j » c " e j e " p p i " p " p "  
 n « . " d v " m " e j p i " v t · p j " p « q " e p i "  
 p p i " e j q " e Á p i " o e " ¶ e j 0 " X ¶ " f . " H 3  
 v t i k Á r " v t q p i " e " j " k w " j « p j " x « " e " e  
 J w " j v " e " e " i k c q " f k p " \* d c q " i o " e " e  
 f p i " v j k v " d " v t " p j " e j w v . " d Á v " x  
 v t " r j " d k p " p j v " x p " n « " e j w v 0 "  
 D Á v " c p i " v t " p i " p e " a s e w " c p p " i v " t f p p i i " " v e t j q p { " v  
 v c { 0 " D k " n " f q " n « " p j p i " v j k v " d "  
 f k p " e » " v j " e p " e " v j k v " m " "  
 j k p " v j " v t " p " o « p " j · p j " j q e " u e " f p  
 Jot.

### 6.6.3. E " r j q p i " e " e j " v j k v " m " i k c q " f k p

#### 6.6.3.1. I k c q " f k p " f c " v t " p " e c " u " x « " h t c

R j p " e " d p " p j v " e c " o v " i k c q " f k p  
 n p " j p " x Á p i " o « p " j · p j " j k p " v j 0 " P x  
 i » e " v t " p " d j p p r j v k " p y j w " p j " j c { " » p  
 R j p " f " n k w " j k p " v j " d " p " v t q p i " e  
 e c " u 0 " V t q p i " v t p i " j r " n p " j p  
 e j w { p 0 "  
 O v " e c " u " e » " v j " e " e j k c " v j « p j " e  
 j q v " p i " e " n r " x k " e " e " e " h t c  
 h t c o g " e » " v j " e " z " e " p j " " r j e  
 V t q p i " o v " e c " u . " e j Á p i " v c " e » " v j " u  
 i k k " v j k m w e " w a 6 0 5 p i " e " e

#### 6.6.3.2. Giao f k p " f c " v t " p " o g p w "

E j k p " n e " k " v j q k " r j " d k p " p j v  
 o g p w " p j p i " v " v p i " e j w p i " w " n « "  
 p i " v " o g p w < "  
 - O g p w " m ² q " v j . " o g p w " z r " v p i "  
 - Menu pop-up  
 - V j c p j " e ½ p i " e " x « " o g p w " k e q p  
 - Menu u k " w " n k " p " m v < " v j c p j " o g p w " d c t .



### 6.6.3.3. I k c q " f k p " f c " v t ' p " f ¼ p i " n p j "

V j c { " e j q " o g p w " j q e " e p i " e » " v j " d " u w p  
 e " v j k v " m " u " f p i " k " v j q k " f c "  
 p i ½ p " p (command language interface). Tuy nhiên, ng k " u " f p i  
 r j k " j e " e A " r j a r " v r " n r " p p " p i e j " v k  
 ng k " f A p i " e j w { ' p " i k c 0 " E » " 5 " n q k " e A " r  
 x « q " e ½ p i " p i j " e » " v j " f A p i <"  
 E A " r j a r " f c " v tn h pSQLp i ½ p " p i " \* x ¶ " f "  
 Cú pháp mnemonic: ng k " u " fe " p ei w p i " e r " o v " o < p " j  
 v t q p i " » " j " e » " v j " p j r " e a e " n p j " i k  
 e » " p i j c k " x u k " f p i p i 0 "  
 E A " r j a r " p i ½ p " p i " v k " p A p i p p j e j q e f j e p  
 b p i " p i ½ p " p i " v " p j k p 0 " J " v j p i " v j ½  
 d k v " x « " e » " v k j f A { p i w " p e j wr " p n i k " t i " t < p i "  
 e " " o w p k " e f A c p " ip 0 i "

E a e j " v j k v " m " i k c q " f k p " f c " v t ' p " f ¼ p i  
 máy tín j " n p " x « " e a e " p i " f p i " o a e { " v ¶ { p 0 j "  
 Nh ng phong cách t p i " v a e " p e { ü x " p " p i " v t q p i " o  
 f p i " j k p " p Q k Q t K u q hf v " p e j e g u u " e » " r j p "  
 v t w { " x p 0 "

V j k v " m " i k c q A p k " p k p k v k j q e " k " i e k " v u c " " p u f i " p i  
 ch p i " v t p j " x « " o a { " v ¶ p p i j " 0 e " j U q " " m v k " " s w j q " r  
 w " x « q " x « " v j ½ p i " v k p " w " t c 0 " E » " o v  
 ng k " f A p e 0 " V t . " p j p i " ej " p g d " v n j « e n q » k "  
 nh ng ngày nay, chúng c p i " r j c " v t p " n p " p j c w 0 " O  
 s w c p " o v " u " r j q p a " e a e f A p x " e j k v j p k " v " m  
 ng k " f A p i " x « " e a ee j " h m v j v " ej " er j " A p x iq " e a e " p i

### 6.6.3.4. k " v j áq " kr " " j k "

J · p j " v j e " k " ev " j f q A p k i " " j e j k " e j a q r w " " k " y j q v k  
 v t ' p " o g p w " j q e " f k " f A p e p " i e - k w " n " d p j p 0 i " " P e  
 o < " j " e p " e j q " e - w " v t " n k 0 " E - w e " " j k "  
 p « { " { ' w " e w " e j A p i " v c " r j k " z 2 v " o k " e -  
 o k " j « p j " p p i " " p - w " v t w " v n j k " u c k 0 " T i " t <  
 i k c q " f k p " m j » " v j k v " m 0 " V w { " p j k p . "  
 f p i " v t p " y g d 0

### 6.6.3.5. O v " u " v ¶ p j " p p i " e " d k v "

Z a e " v j e " x « " r j - p " s w { " p "  
 V t q p i " j w " j v " e a e " j " v j p i . " p i k " u  
 j " e " r j 2 r " u " f p i " j " v j p i 0 " P » k "  
 p i " p j r " x « q " j " v j p i 0 " J w " j v " x k  
 f A p i " \* w u g t p c o g + " x « " o v " m j w " \* r c u u y q



s w { p " j p " u " f p i " o v " uk "" feÁjp ie "" ep " e c q " p j v " v j p i " n « " p i k " s w p " v t V t " i k Ár "

- V q q n v k r < " z w v " j k p " m j k " p i k " f Áp k " v p i + " v t ' p " o « p " j · p j 0 " V q q n v k e j e " p p i " v j " j k p " d k " k " v p i " - J g n r " Yk | c t f < " j p i " f p " p i k " u " v r " d p i " e ª e j " c " t c " o v " e j w k " e r j k " c " t c " w " x « " x « " v t " x " r j p - V ª e " v " \* C i g p v u + < " n « " e ª e " kn" v p j k w " p i " f p i " r j p " o o " x « " v j o " e v " v t " i k Ár " e c " O k e t q u q h v " \* e » " v j e j w p i " v t q p i " e ª e " p i " f p i " Q h h k e g 0 d p i " o v " q p " p i ½ p " p i " v " p j k j p d k " v ª e " v " c " t c " a r " p i " r j Áe j p " o v " v t q p i " e ª e " a r " p i " " e j

#### 6.6.4. E ª e j " v j e " v j k v " m " i k c q " f k p " p i

##### 6.6.4.1. E ª e " e ½ p i " e " v q " i k c q " f k p "

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CASE Tools

Visual Basic

X k u k q . í "

##### 6.6.4.2. S w { " v t · p j " v j k v " m " i k c q " f k p " p i

- D :eN" 3r " u " " r j - p " e r " i k c q " v k r " d k p " k " v t p i " v j ª k " - D :eN" 4r " d p " o w " k " v j q k " x « " i k c q - D c 3: V j c o " m j q " x « " v p " j " k j w " c " p k p e p " v j k v " s w c { " v t " n k " d e " 3 " x « "

## CÂU HÌNH OLUN

8 0 3 0 " e " k o p ie " e " w " j v k t Áe e " m j k " j p " k " n  
 8 0 4 0 " P ' w " p i j c " e c " x k e " n « o " d p " o  
 8 0 5 0 " P ' w " e ª e " e ½ p i " x k e " e " v j " v t q p i  
 6.4 0 " p i j c " e c " d k w " n w p i " f " n k  
 6.5 0 " P ' w " m j ª k " p k à n h o . e ' t j k p o " v e g " j " v j p  
 6.6. Nêu u nh e " k o " p e i " c v w j r " j v e t " n f " n k w " f p



## V < k " n k w " n w " j v k p j " p i k E d q '0 - Z p l P N r Y t w p i " D

- 6.7. Nêu u nh e " k o " p e i " c v'wjr" j v e t" n f " n k w " u " f  
n k w 0
- 6.8 0 " P ' w " v » o " p v i " v v " j e ^ e e " " p r j j r " n k w 0 "
- 6.9 0 " P ' w " e ^ e " p i w { ' p " v e " v j k v " m " p j r " m
- 6.10. Nêu các ph p i " v j e " e < k " v " w " t c 0 "
- 6.11 0 " P ' w " e ^ e " p i w { ' p " v e " v j k v " m " w " t
- 6.12 0 " P ' w " e ^ e " p i w { ' p " v e " v t q p i " v j k v " m
- 6.13 0 " P ' w " e ^ i e k " c m q " " f v k j w p 0 v "
- 6.14 0 " U q " u ^ p j " e ^ e " r j q p i " e ^ e j " i k c q " f k p 0





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