

AS/400 RPG 程式設計
AS/400 RPG Interactive Programming Workshop
(91年7月修訂)

時間表

時 間	上 午(9:00~12:00)	下 午(13:30~16:30)
第 一 天	1.RPG卡別介紹 2.結構化程式設計 3.副程式與參數傳輸 4.資料區域	實例研討
第 二 天	5.檔案處理&RPG CYCLE 6.資料結構及Table & Array 介紹	實例研討
第 三 天	7.次檔案(SUBFILE)查詢 8.運用次檔案查詢修改資料檔	實例研討

課程大綱

第一章: RPG/400卡別介紹

第二章: 結構化程式設計

結構化程式設計概念

結構化程式設計的應用

第三章: 副程式與參數傳輸

副程式撰寫與參數傳輸

程式的相互影響

第四章: 資料區域

第五章: 檔案處理與RPG Cycle

基本檔案處理

檔案定義

資料庫檔案處理

RPG Cycle

第六章:資料結構及Table & Array介紹

資料結構概念和定義

特殊資料結構

基本檔案結構

Table & Array介紹

第七章:次檔案(SUBFILE)查詢

次檔案的程式設計

次檔案的查詢程式

單頁次檔案資料輸入

次檔案(SUBFILE)顯示方式控制

第八章:.運用次檔案查詢修改資料檔

運用次檔案查詢修改資料檔

檔案維護程式的一般DDS考量

使用次檔案查詢修改資料檔撰寫技巧

第一章：RPG/400卡別介紹

RPG/400卡別提示

H	Control Specification	JX	Externally Described J
F	File Description	DS	Data Structure
FC,FK	File Continuation	SS	Field Rename
FX	Externally Described F	SV	Initialization Values
U	Auto Report	N	Named Constant
E	Extension	C	Calculation
L	Line Counter	O	Output
I	Input	OD	Disk Output ADD/DEL
IX	Externally Described I	P	Right Side of Output
J	Right Side of Input	*	Comment

備註：有 符號者，係RPG/400常用表

RPG的撰寫格式

多種固定的撰寫格式是RPG程式語言不同於其他程式語言的特色之一。撰寫格式中，不同位置所填寫的字元通常代表不同的意義。RPG程式語言中，有七種撰寫格式，每一種撰寫格式都提供了不同的程式功能。每一種撰寫格式中的每一個項目都有其特定的位置，經常是一或數格(column)為一個項目。但任何一個原始敘述的第七格填入*時，此敘述不再具有任何格式的特性及項目，而是一附註說明(comment)。原始敘述的編輯公用程式SEU檢核原始程式或控制指令crttrpgpgm編譯原始程式時，均以撰寫格式的第6格(column)來辨別每一原始敘述的類別(H格式、F格式、E格式、L格式、I格式、C格式、或O格式)。我們組合這些以撰寫格式所寫成的個別敘述為一RPG程式。這些敘述是描述程式所需要的輸入、計算(或處理)及輸出的各類功能，而且必須遵照下列的順序組成原始程式：

H格式 -- Control(Header)	specification	-- 控制格式
<u>F格式</u> -- File	specifications	-- <u>檔案格式</u>
E格式 -- Extension	specifications	-- 擴充格式
L格式 -- Line counter	specifications	-- 列印格式
<u>I格式</u> -- Input	specifications	-- <u>輸入格式</u>
<u>C格式</u> -- Calulation	specifications	-- <u>計算格式</u>
<u>O格式</u> -- Output	specifications	-- <u>輸出格式</u>

較常用的RPG撰寫格式是 F、E、I、C、O：

F 格式是描述程式中所使用的檔案。

E 格式是描述程式中所使用的陣列(Arrays)或表列(Tables)。

陣列及表列所包含的都是一些屬性相同的資料欄位。當程式需要整批處理時，陣列或表列的運用可簡化程式中，資料欄位的宣告及運用。

I 格式是描述程式中，輸入記錄(Input record)的資料欄位分配及資料組織(Data Structures)。

C 格式是描述程式中，對資料的運算及操作的順序。

O 格式是描述程式中，所需輸出記錄(Output record)的欄位及其排列方式。

```

Columns      . . . :          1      7 1      Edit      T
SEU = =>
*****
FMT  H      . . . . . H . . . . . 1 . . C D Y I . . . . . 1 . F . . . . . 1 . . .
0001.00      H      日期格式←Y/→分格符號<.,*>
FMT  FX      . . . . . F F i l e n a m e I P E A F . . . . . L . . I . . . . . D e v i c e + . . . . . K E x i t + + E
0001.01      F F I L E A      I F      E      K      D I S K
FMT  IX      . . . . . I R c d n a m e + . . . . . I n . . . . .
0002.00      I A R
FMT  JX      . . . . . I . . . . . E x t - f i e l d + . . . . . F i e l d + L 1
0003.00      I      F L D 1
0004.00      I      F L D 2      P G M 1
FMT  DS      . . . . . I D s n a m e . . . . . N O D s E x t - f i l e + + . . . . . O c c r L e n + . . . . .
0005.00      I D S 1      D S
FMT  SS      . . . . . I . . . . . E x t - f i e l d + . . . . . P F r o m T o + + D F i e l d + . .
0006.00      I      1      2 0 0 D S F 1
0007.00      I      2 1      3 0      D S F 2
FMT  N      . . . . . I . . . . . N a m e d c o n s t a n t + + + + + C . . . . . F l d n m e . .

Pmt      S e q N b r      D e b u g      C u r      D a t e F m t      D a t e E d i t      I n v P r t      A l t S e q      l P F o r m s
H      0001.00      Y      /
      F T r a n s      T r a n s L i t      P g m N a m e

```

内部 Debug

Columns . . . : 1 71 Edit TEST/ QRP GS RC
SEU==> TEST 2
***** Beginning of data *****
FMT FX FFi L e n a m e I P E A F L . . I D e v i c e + K E x i t + + E n t r y + A U
0001.00 FFI LEA IF E K DISK A
***** End of data *****

I
U
O
C ← Device I/O
Pmt SeqNbr Filename Typ Desig EOF Seq Fmt Mode RAT Device K
FX 0001.00 Fi LEA I F
Exit Entry A/ U Cond
A
↑
可新增
‘,
↑
只可修改

```
Column s . . . :      1      7 1          Edit          TEST/ QRP GSR C
S E U= =>          TEST 2
***** Beginning of data *****
FMT  FX      . . . . . F F i l e n a m e I P E A F . . . . . L . . I . . . . . D e v i c e + . . . . . K E x i t + + E n t r y + A . . . . U
0 0 0 1 . 0 0      F F I L E A      I F      E      K      D I S K      A
FMT  IX      . . . . . I R c d n a m e + . . . . . I n . . . . .
0 0 0 2 . 0 0      I A R
***** End of data *****
```

```
P m t      S e q N b r      R c d N a m e      R c d l d
I X      0 0 0 2 . 0 0      A R
```

```

Columns . . . :      1    71                      Edit                      TEST/ QRPGR
SEU==>                                     TEST
***** Beginning of data *****
FMT  FX  . . . . FFiLe name IPEAF. . . . . L..I. . . . . De vI c e+. . . . . KE x i t++En t r y+A. . . .
0001.00      FFI LEA      I F      E                      K                      DI SK                      A
FMT  IX  . . . . I Rcd name+. . . . In. . . . .
0002.00      I AR
FMT  JX  . . . . I. . . . . Ext - f i e l d+. . . . . F i e l d+L 1 M1.. P 1 Mn Zr
0003.00      I                      FLD 1
0004.00      I                      FLD 2                      PGM1
***** End of data *****

```

Pmt	Seq Nbr	Ext Fld Name	Fld Name	Ctl Lvl	Match	+ Fld	- Fld	Zero / Blank
JX	0004.00	FLD2	PGM1					

RENAME

Columns . . . : 1 71 Edit TEST/ QRP G SRC

SEU==> TEST2

***** Beginning of data *****

FMT FX F F i L e n a m e I P E A F L . . I D e v i c e + K E x i t + + E n t r y + A U
0001.00 F F I L E A I F E K D I S K A

FMT IX I R c d n a m e + I n
0002.00 I A R

FMT JX I E x t - f i e l d + F i e l d + L 1 M 1 . . P 1 M n Z r .
0003.00 I F L D 1
0004.00 I F L D 2 P G M 1

FMT DS I D s n a m e N O D s E x t - f i l e + + O c c r L e n +
0005.00 I D S 1 D S

***** End of data *****

Pmt	Seq Nbr	Dt a S t r N a m e	Nbr	Opt	DS	E x t F N a m e	O c c u r s	L e n
DS	0005.00	DS1			DS			

Columns . . . : 1 71 Edit TEST/ QRP GS RC
SEU = => TEST 2

***** Beginning of data *****

FMT FX F F i L e n a m e I P E A F L . . I D e v i c e + K E x i t + + E n t r y + A U
0001.00 F F I L E A I F E K D I S K A

FMT IX I R c d n a m e + I n
0002.00 I A R

FMT JX I E x t - f i e l d + F i e l d + L 1 M 1 . . P 1 M n Z r .
0003.00 I F L D 1

0004.00 I F L D 2 P G M 1

FMT DS I D s n a m e N O D s E x t - f i l e + + O c c r L e n +
0005.00 I D S 1 D S

FMT SS I E x t - f i e l d + P F r o m T o + + D F i e l d +
0006.00 I 1 200 D S F 1

0007.00 I 21 30 D S F 2

***** End of data *****

Pmt	Seq Nbr	Ext Fld Name	P/B	From	To	Dec	Fld Name
SS	0006.00			1	20	0	DSF1

```

Columns      . . . :      1      7 1                      Edit                      TEST / QRP
SEU = =>                                           T
          ***** Beginning of data *****
FMT  FX      . . . . . F F i L e n a m e I P E A F . . . . . L . . I . . . . . D e v i c e + . . . . . K E x i t + + E n t r y + A .
0001.00      F F I L E A      I F      E                      K                      D I S K                      A
FMT  IX      . . . . . I R c d n a m e + . . . . . I n . . . . .
0002.00      I A R
FMT  JX      . . . . . I . . . . . E x t - f i e l d + . . . . . F i e l d + L 1 M 1 . . P 1 M
0003.00      I                      F L D 1
0004.00      I                      F L D 2                      P G M 1
FMT  DS      . . . . . I D s n a m e . . . . . N O D s E x t - f i l e + + . . . . . O c c r L e n + . . . . .
0005.00      I D S 1                      D S
FMT  SS      . . . . . I . . . . . E x t - f i e l d + . . . . . P F r o m T o + + D F i e l d + . . . . .
0006.00      I                      1      2 0 0 D S F 1
0007.00      I                      2 1      3 0      D S F 2
FMT  N       . . . . . I . . . . . N a m e d c o n s t a n t + + + + + C . . . . . F l d n m e . . . . .
0008.00      I                      ' W E L C O M E '                      C                      C O N S T
          ***** End of data *****

```

Pmt	Seq Nbr	Constant	Data Type	Fld Name
N	0008.00	' W E L C O M E '	C	C O N S T


```

Columns . . . :      1      71                      Edit                      TEST/ QRP GSRC
SEU==>                      TEST2
FMT  JX   . . . . . I . . . . . Ext - field + . . . . . Field + L1 M1 . . P1 Mn Zr .
0003.00      I                      FLD1
0004.00      I                      FLD2                      PGM1
FMT  DS   . . . . . I Ds name . . . . NODs Ext - file ++ . . . . . Occr Len + . . . . .
0005.00      I DS1                      DS
FMT  SS   . . . . . I . . . . . Ext - field + . . . . . PFromTo ++ DField + . . . . .
0006.00      I                      1      200 DS F1
0007.00      I                      21     30  DS F2
FMT  N    . . . . . I . . . . . Name d constant ++++++ C . . . . . Fl d n me . . . . .
0008.00      I                      ' WELCOME '                      C                      CONST
0009.00      C                      Z - ADD0                      FLD1
0010.00      C                      KEY                      CHAINAR                      40
***** End of data *****

```

Pmt	Seq Nbr	Lvl	N01	N02	N03	Factor 1	Op Code	Factor 2	Result
C	0010.00					KEY	CHAIN	AR	
	Len	Dec	H/ N/ P	Hi	Lo	Eq	Comment		
				40					

第二章：結構化程式設計

2-1 結構化程式設計概念

(STRUCTURED PROGRAMMING CONCEPTS)

為什麼要結構化程式設計？

程式開發較有效
果

程式維護較容易

增進程式的效率

程式開發較有效果

結構化的邏輯(Structured Logic)

功能的分割處理(Functional Pieces)

更容易偵錯(Easier Debugging)

更好的通訊(Butter Communication)

程式設計者更具生產力(Programmer Productivity)

程式維護較容易

可讀性(Readability)

—開發

—維護

有彈性(Flexibility)

—增加新功能

增進程式的效率

降低程式佔用的空間

降低系統在 資料傳輸的次數負擔

節省處理時間

多功能的結構化程式

用來

- 減少檔案開啟的數目

- 降低所佔的空間

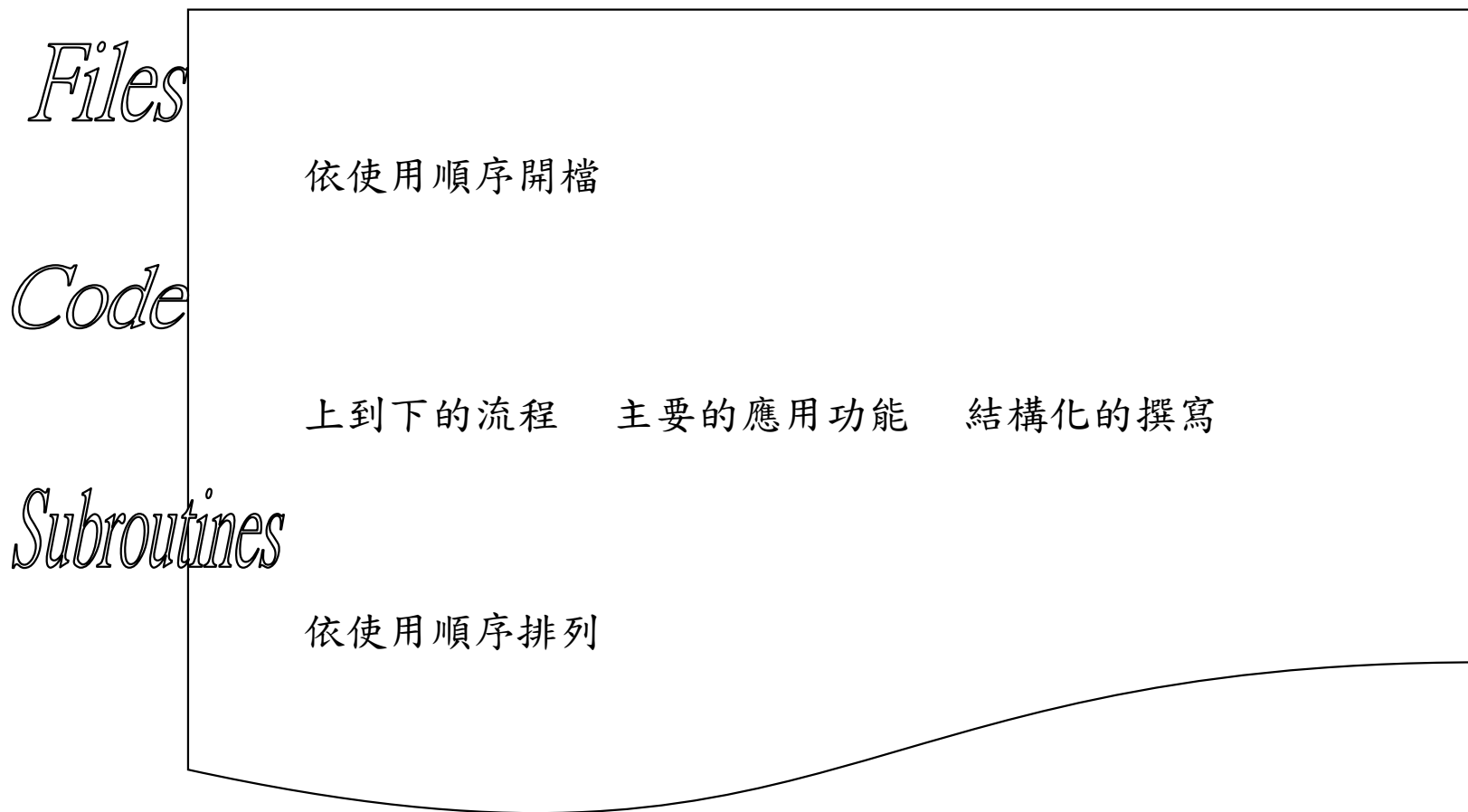
- 節省處理時間

好的方法但需考慮

- 必需是適當的結構化

- 相同功能可能要分成數支程式來撰寫與維護

多重功能結構化程式撰寫



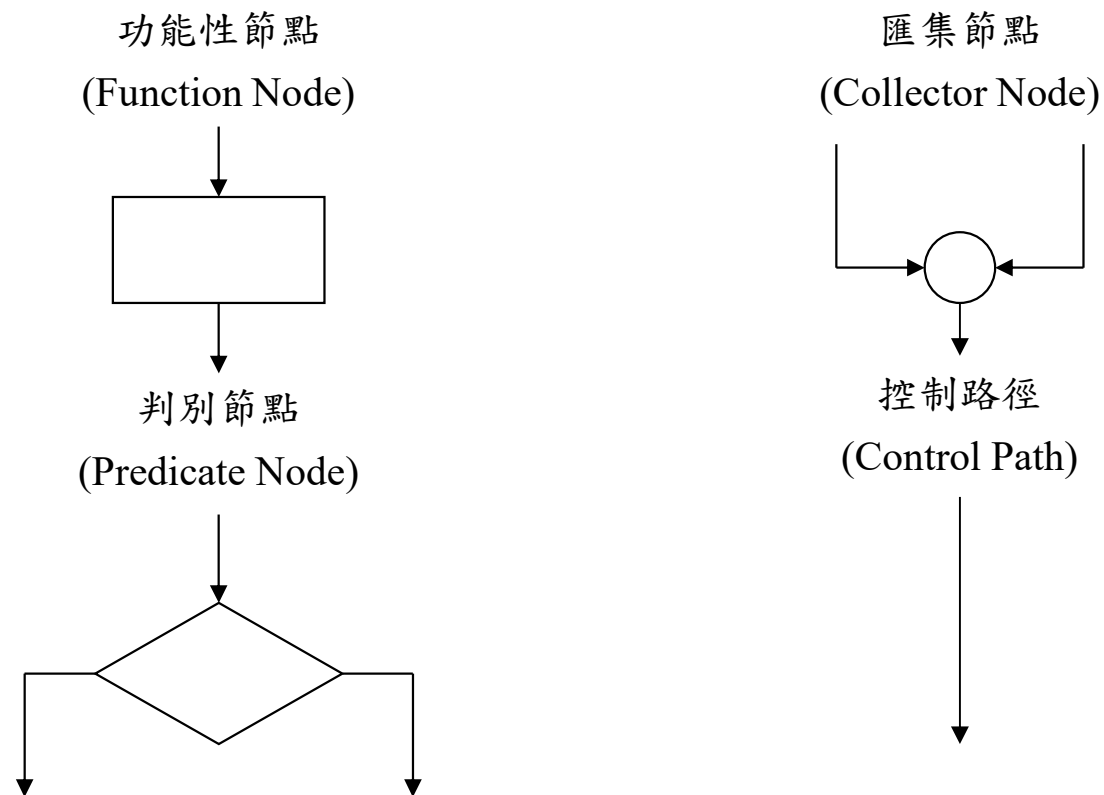
控制流程的結構化

Sequence—程式功能的簡化順序

Selection — 程式功能的挑選

Iteration — 迴圈的控制

流程的基本元素



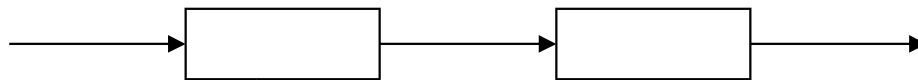
2-2結構化程式設計的應用

(IMPLEMENTING STRUCTURED PROGRAMMING)

RPG/400 結構化運用示意圖

CONTROL LOGIC STRUCTURES	STRUCTURED PROGRAMMING FIGURES	----->	RPG/400 OPERATION CODES
SEQUENCE --->	SEQUENCE	----->	ADD, MULT, EXSR,....
SELECTION --->	IF THEN	----->	IFXX, ENDIF, END
	IFTHENELESE	----->	IFXX, ELSE, ENDIF, END
	CASE	----->	CASXX, CAS, ENDCS, END
	SELECT	----->	SELEC, WHXX, OTHER, ENDSL, END
ITERATION --->	DOWHILE	----->	DOWXX, ENDDO, END
	DOUTIL	----->	DOUXX, ENDDO, END
	DO	----->	DO, ENDDO, END
	LEAVE	----->	LEAVE
	ITER	----->	ITER

SEQUENCE

[illegible]

ENDyy

END End a CASE,DO,IF,or SELEC group.

ENDCS End a CASE group.

ENDDO End a DO,DOUxx,or DOWxx group.

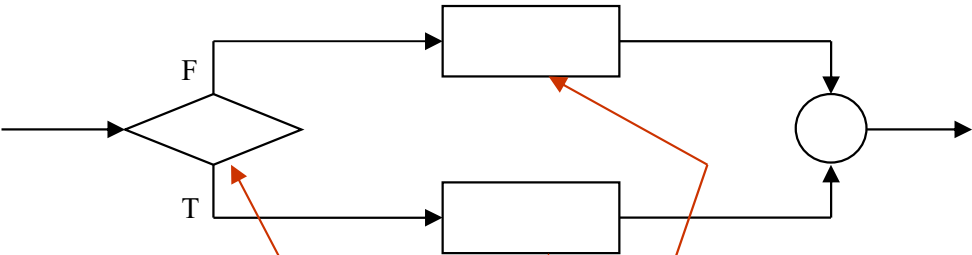
ENDIF End an IF group.

ENDSL End a SELEC group.



V2R1

IF THEN ELSE



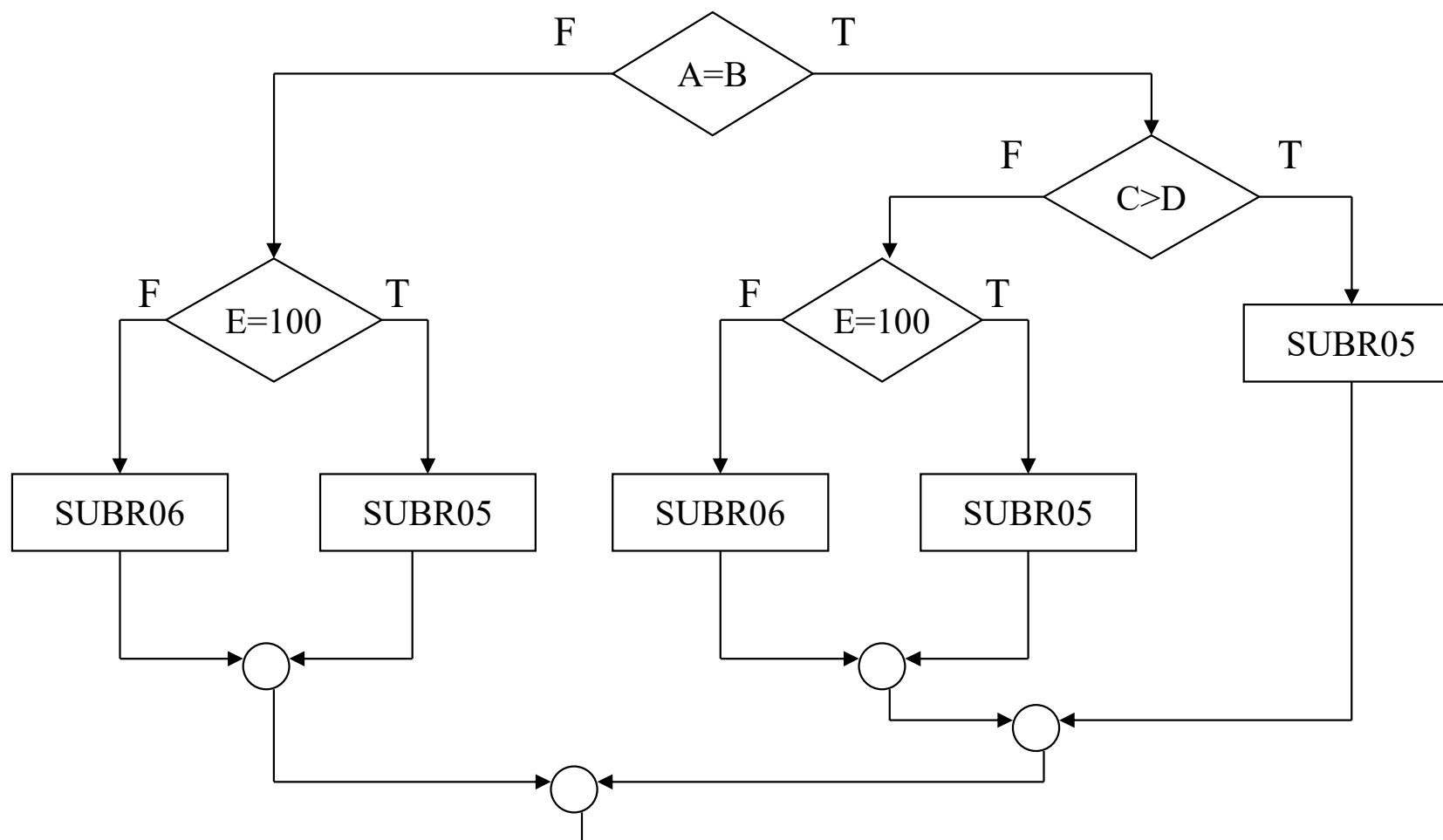
Form Type	Control Level(L0-L9,LR,SR,AN/OR)		Indicators															Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust(H)	Arithmetic																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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XX = GT,LT,EQ,NE,GE,LE

IF THEN ELSE

[illegible]

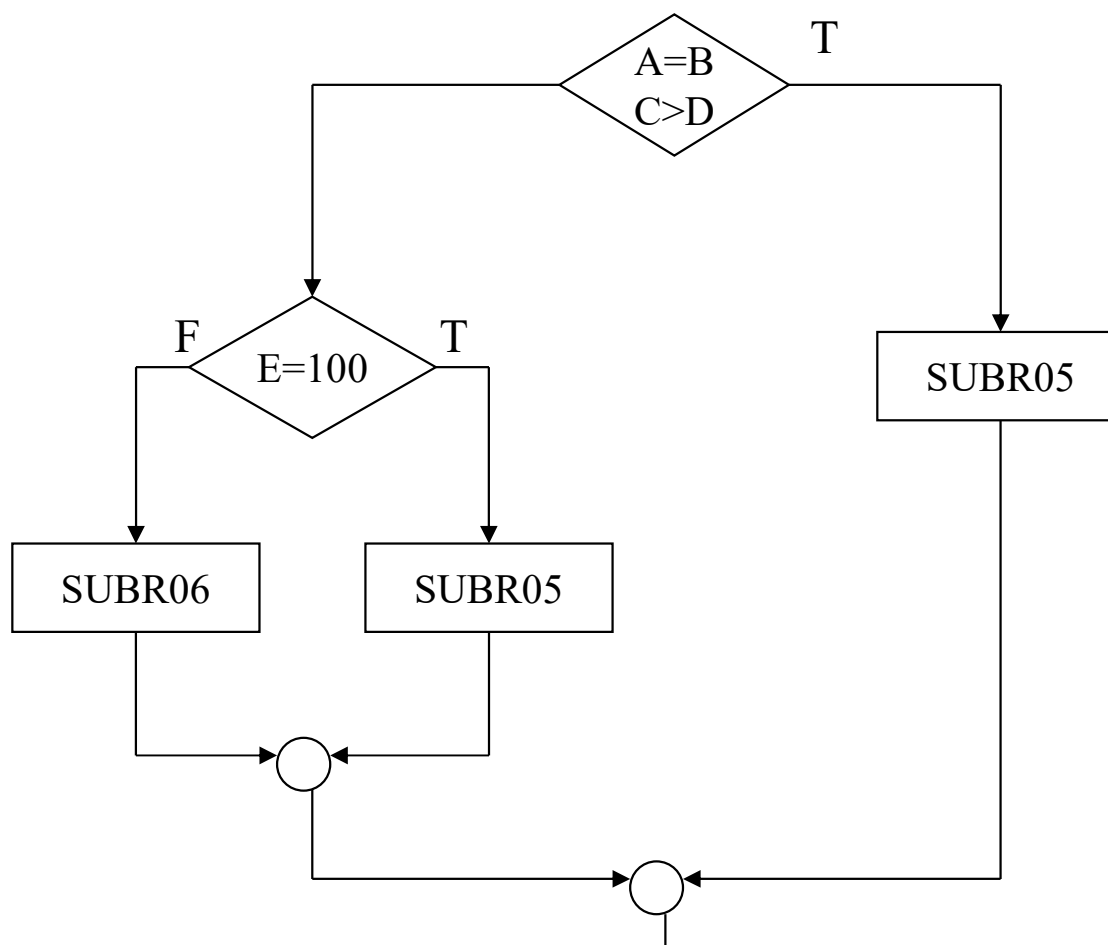
Complex Selection



COMPLEX SELECTION

C		Form Type	Control Level(L0-L9,L,R,SR,A,N/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust(H)	Arithmetic		
Line	And							And							Name	Length	Plus				Minus	Zero							
																	Compare												
																	1>2				1<2	1=2							
																	Look Up(Factor 2) is												
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58	
1		C														F L D A	I F E Q	F L D B											
2		C														F L D C	I F G T	F L D D											
3		C															E X S R	S U B R 0 5											
4		C															E L S E												
5		C														F L D E	I F E Q	1 0 0											
6		C															E X S R	S U B R 0 5											
7		C															E L S E												
8		C															E L S R	S U B R 0 6											
9		C															E N D I F												
0		C															E N D I F												
1		C															E L S E												
2		C														F L D E	I F E Q	1 0 0											
3		C															E X S R	S U B R 0 5											
4		C															E L S E												
5		C															E X S R	S U B R 0 6											
6		C															E N D I F												
7		C															E N D I F												
8		C																											
9		C																											
0		C																											

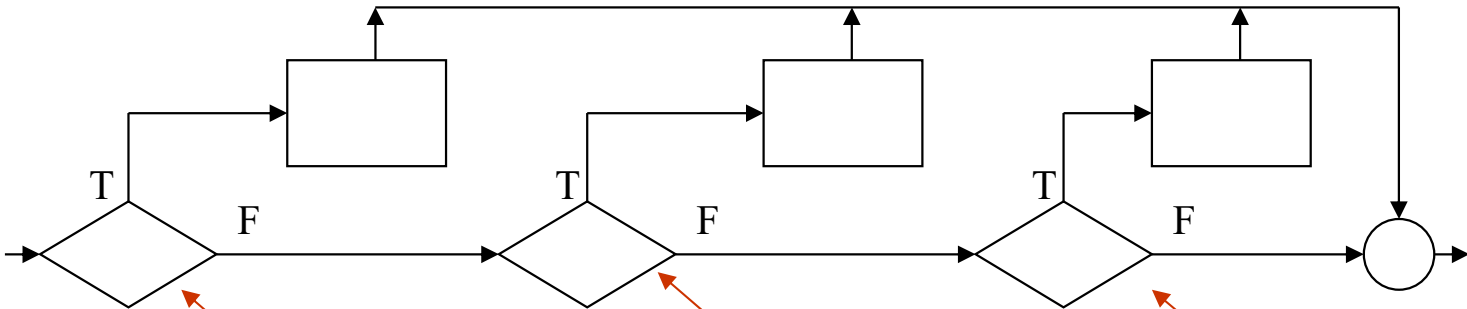
Use Of ANDxx/ORxx



Use Of ANDxx/ORxx

Form Type	Control Level(L0-L9,LR,SR,AN/OR)	Indicators										Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust(H)	Arithmetic								
		And					And								Name	Length			Plus	Minus	Zero						
		Not			Not		Not									Compare			1>2	1<2	1=2						
																Look Up(Factor 2) is											
																High			Low	Equal							
C	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58
C	*																										
C	*																										
C	*																										
C													F L D A	I F E Q	F L D B												
C	*												F L D C	A N D G T	F L D D												
C	*												F L D E	O R E Q	1 0 0												
C														E X S R	S U B R 0 5												
C														E L S E													
C														E L S R	S U B R 0 6												
C														E N D I F													
C																											
C																											
C																											
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C																											
C																											

SELEC-WHxx-OTHER

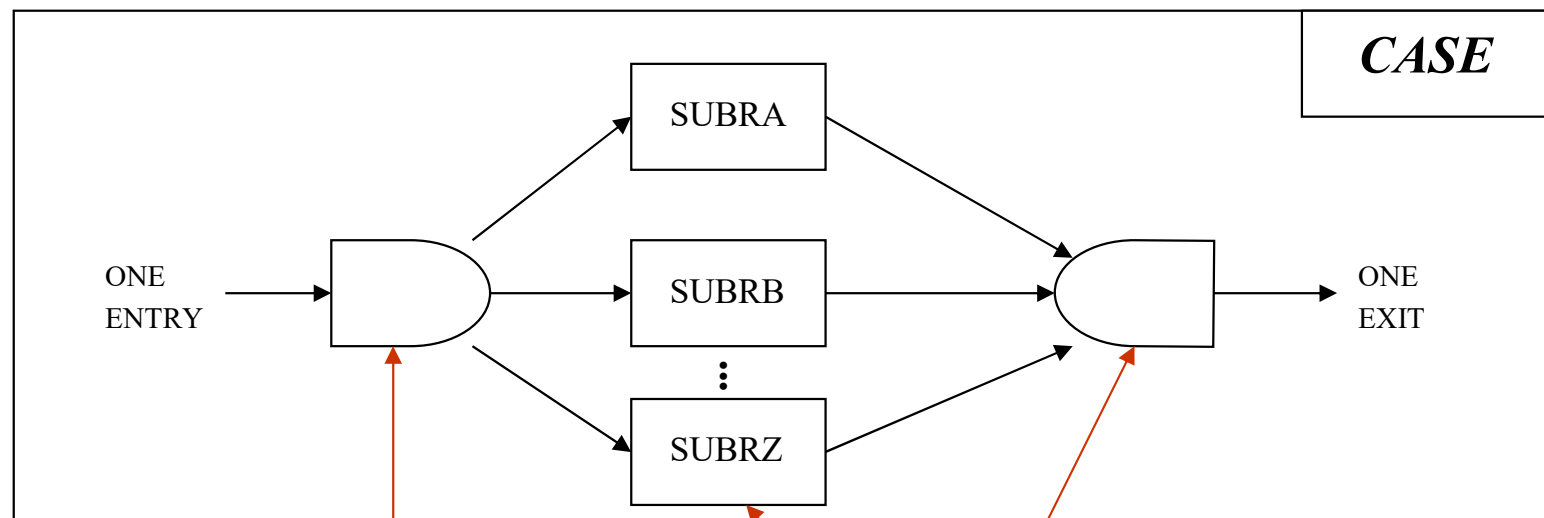


Form Type	Control Level(L0-L9,L,R,SR,AN/OR)			Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust(H)	Arithmetic		
				And							And										Name		Length	Plus			Minus	Zero	
				Not							Not										Not		Compare				Look Up(Factor 2) is		
				Not							Not										Not		1>2				1<2	1=2	
				Not							Not										Not		High				Low	Equal	
6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58			
C															S E L E C														
C													F A C T 1		W H X X		F A C T 2												
C																													
C													F A C T 1		W H X X		F A C T 3												
C																													
C															O T H E R														
C																													
C															E N D S L														
C																													

在執行條件判別時，WHxx的數種選擇狀態下，只有一種會被執行，OTHER可選擇使用或不使用。

SELEC

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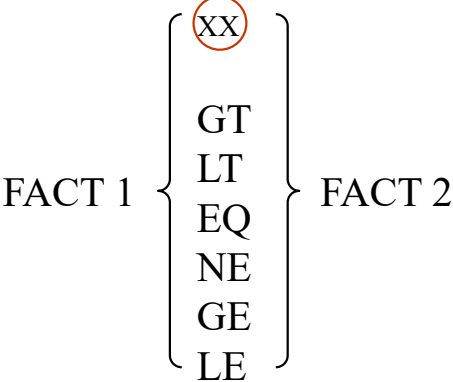
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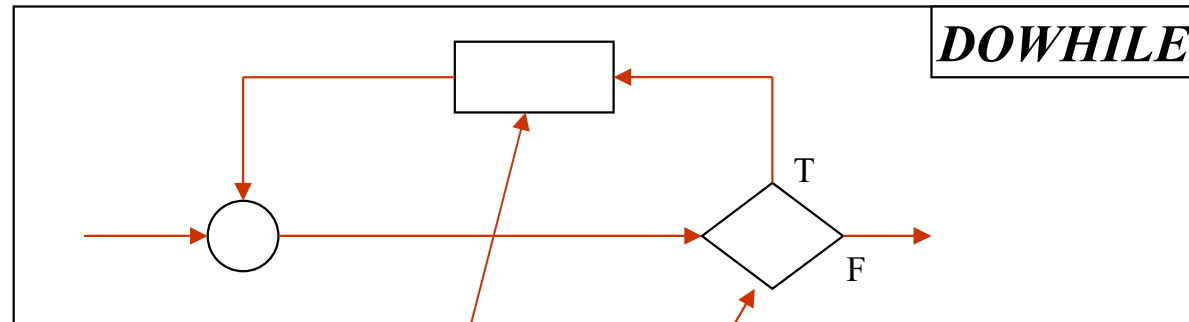
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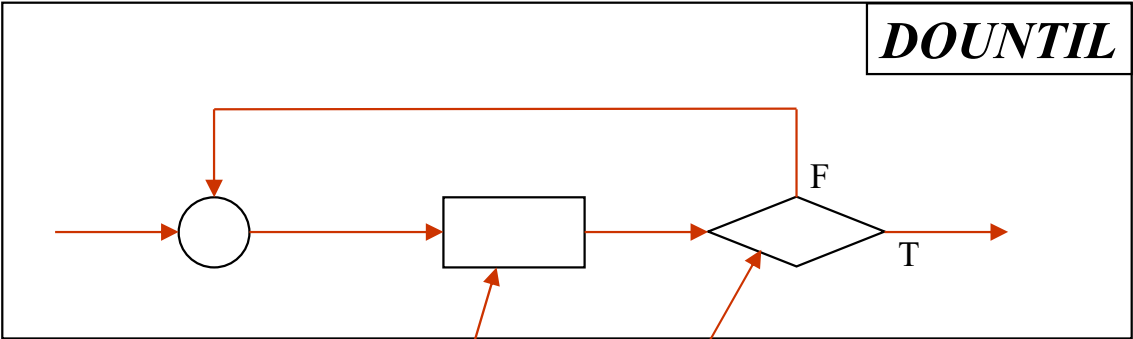
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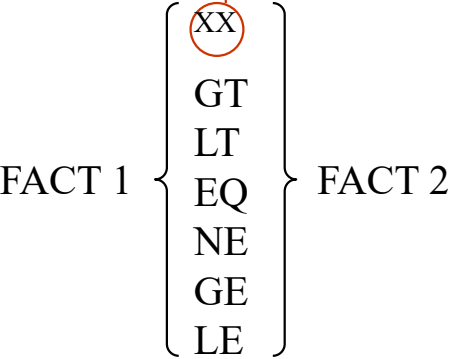
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2-30

PAN PACIFIC

將控制移轉到迴圈結束(END)的下一行指令,跳出迴圈。

2-31

PAN PACIFIC

2-32

PAN PACIFIC

將控制移轉到END的指令行，再繼續下一個迴圈。

ITER

Form Type	Control Level(L0-L9,LR,SR,AN/OR)			Indicators								Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust(H)	Arithmetic														
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第三章：副程式與參數傳輸

單元內容

本單元以探討何時使用副程式較佳起頭，接下來我們將回顧詳細的撰寫需求和一些較佳的撰寫技巧，以上將藉由依循主程式和副程式之間內部傳輸的討論而得，而且將影響您如何技巧的選擇開關檔案時機以達提高效益的目的。

單元目標

判別在應用系統中何時是使用副程式最佳時機。

撰寫 C 卡有關主程式傳遞參數到副程式的所有需求。

撰寫 C 卡有關接收參數到副程式的所有需求。

比較多種可以用來將控制權轉回主程式的方法。

解釋使用 FREE 操作指令開關副程式的方法。

副程式撰寫和參數傳輸

(SUB - PROGRAM CODING AND PARAMETER PASSING)

副程式決策點

功能被多個應用程式所分享

維護容易

可以從事副功能測試

可以用其他程式語言簡單的撰寫

資料傳遞

主程式 PGMA



主程式 PGMB

Define ITEM

Define QTY

CALL PGMB

PARM ITEM

PARM QTY

User QTY

*ENTRY PLIST

PARM ITEMNO

PARM QNTY

Use ITEM

Determine QTY

RETRN



撰寫技巧

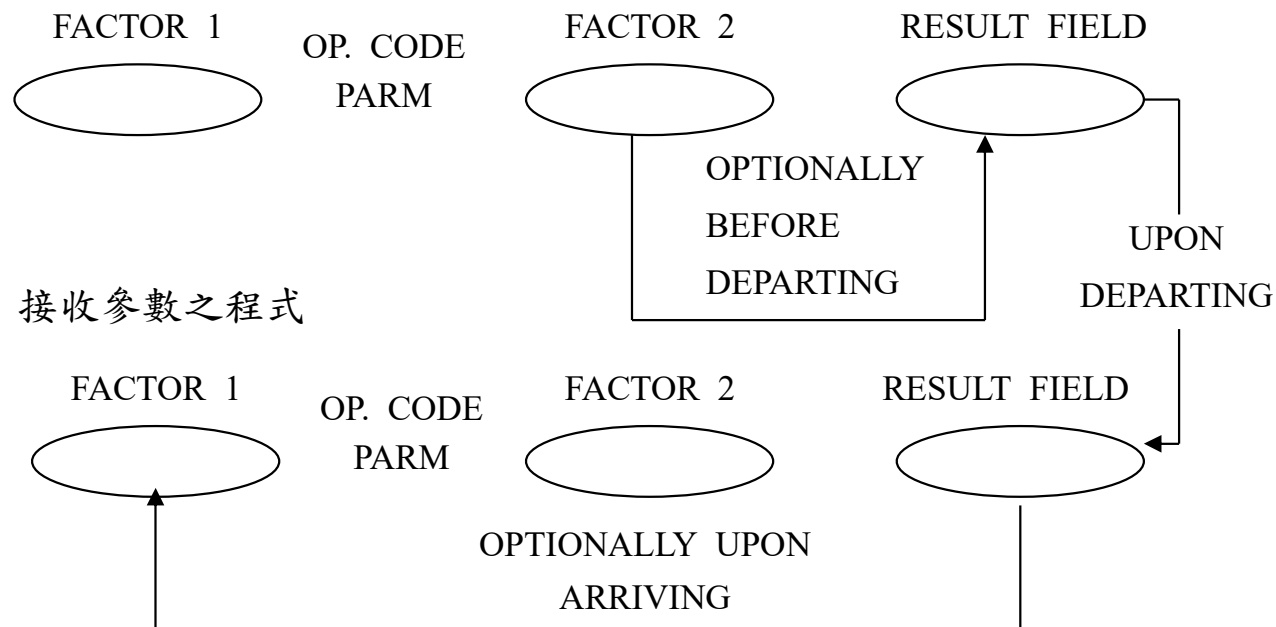
程式內部參數複製

參數組合 (PARAMETER LIST)

使用程式名稱呼叫

PARM PASSING

傳出參數之程式



1. 在主程式中 FACTOR 2 欄位的每個參數值都會複製到 RESULT FIELD 欄位。
2. 在副程式內，當它接收到控制權而且程式起始設定完成後 RESULT FIELD 欄位的每一個參數值都會複製到 FACTOR 1 欄位。
3. 當副程式將控制交回給主程式時，FACTOR 2 的每一個參數值都會複製到 RESULT FIELD 欄位中。
4. 當回到主程式時 RESULT FIELD 的每一參數值都會複製到 FACTOR 1 欄位。

主程式

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副程式

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參數組合 *ENTRY 在程式起始設定時會接收外部傳入的參數

執行一個 CL 命令 QCMDEXC

[illegible]

從副程式回轉控制權回主程式

[illegible]

離開程式

LR

將檔案記錄暫存區的資料釋放掉

關閉程式使用之所有檔案

控制權轉回前一支程式

下次被呼叫時會重新設定變數值及重新開檔

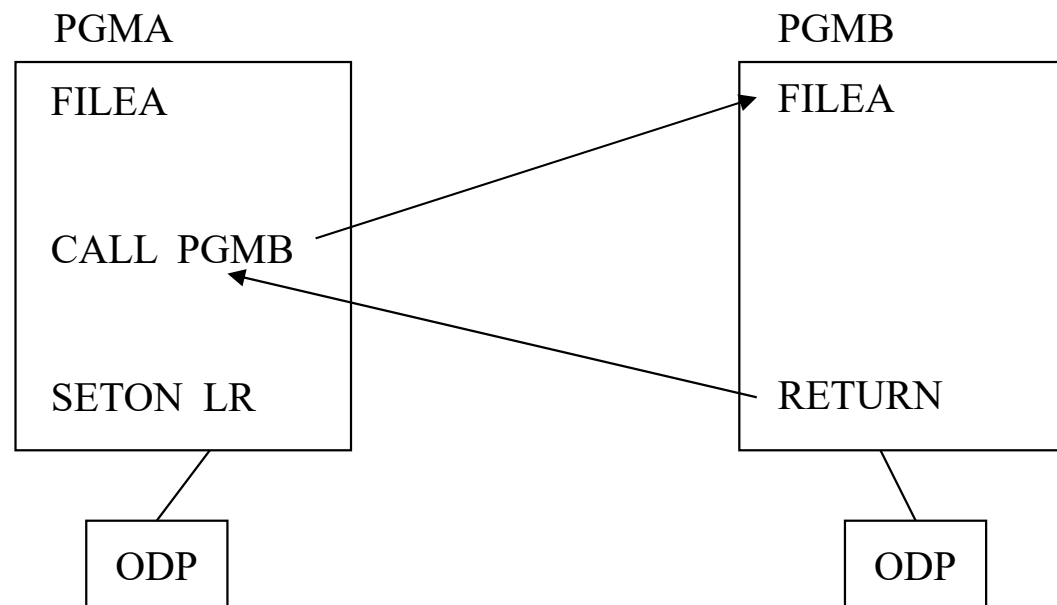
V.S.

RT or RETRN

控制權轉回前一支程式

下次被呼叫時變數值和檔案狀態不會被改變

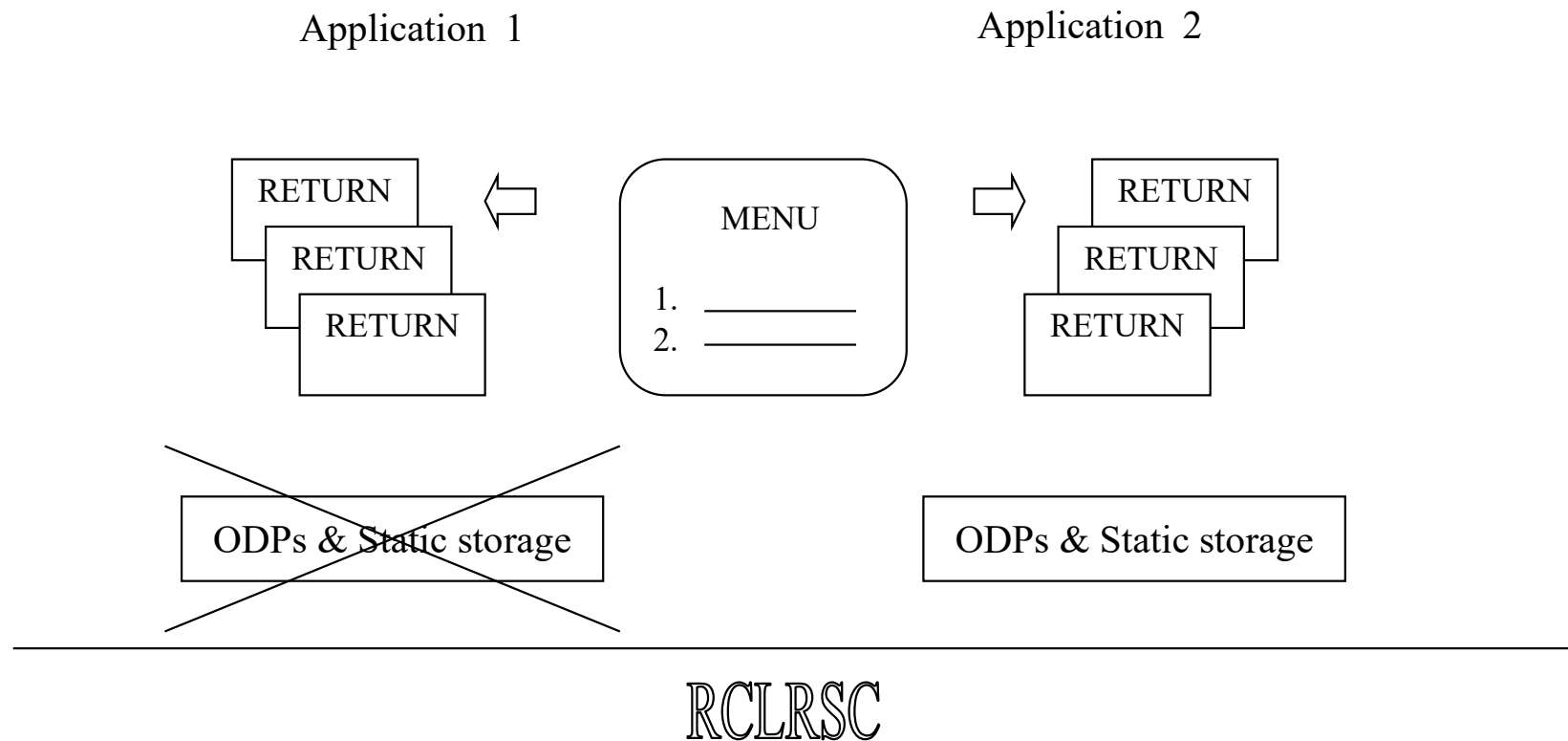
副程式結束執行



當PGMA打亮燈號時，PGMB的ODP仍留在暫存器中直到：

- 呼叫PGMB且打亮LR燈號
- 作業結束(END - OF - JOB)
- 下CL命令RCLRSC

使用CL命令還原資源 (RESOURCES)



檔案描述暫存區(STATIC STORAGE)釋放出來並終止使用ODP。

使用QCMDEXC命令

DE - ACTIVATING A SUB - PROGRAM

在主程式中，使用 ‘FREE’ 操作命令
將副程式從執行中程式的列示名單中移除
釋放副程式的檔案描述暫存區(STATIC STORAGES)變數
和ODP鏈結資料
減少PAG的大小
當副程式再被呼叫時需再重新執行起始動作
不關檔或解開資料區(DATA AREA)鎖定

PAG

PROCESS ACCESS GROUP

程式的相互影響(PROGRAM INTERACTION)

程式間相互影響的控制

RPG 400允許你去控制：

程式間運作速度的影響

一個JOB使用的空間

適當的使用下列功能可以達到控制程式的目的：

- ODP SHARING
- SETON LR
- RETRN/SETON RT
- FREE

副程式使用考慮因素

將工作分割成幾個有意義的部份

避免過度使用

減少程式使用負荷

- PLIST是參數的組合
- 程式內參數的複製利用
- 使用文字化程式名稱呼叫
- 檔案資源共享(SHARE ODP'S)

假如沒設定成分享資源檔案，則副程式最好用打亮LR，

或是用RETRN命令加上主程式用FREE命令來清除殘留的
ODP。

第四章：資料區域

單元內容

本單元將解釋何謂資料區(DATA AREA)並比較OS/400上多種不同類型的資料區(DATA AREA)，接下來繼續討論如何在各位的應用系統中考量使用資料區的適當時機。最後，我們再來看一下RPG/400程式中如何定義，讀取和修改資料區內的資料。

單元目標

解釋應用系統中資料區撰寫的規則。

比較一般的資料區和內部資料區(Local data area)的差異。

在C卡撰寫資料區的定義程式。

在C卡撰寫資料區的讀取和寫入的程式。

資料區(DATA AREA)

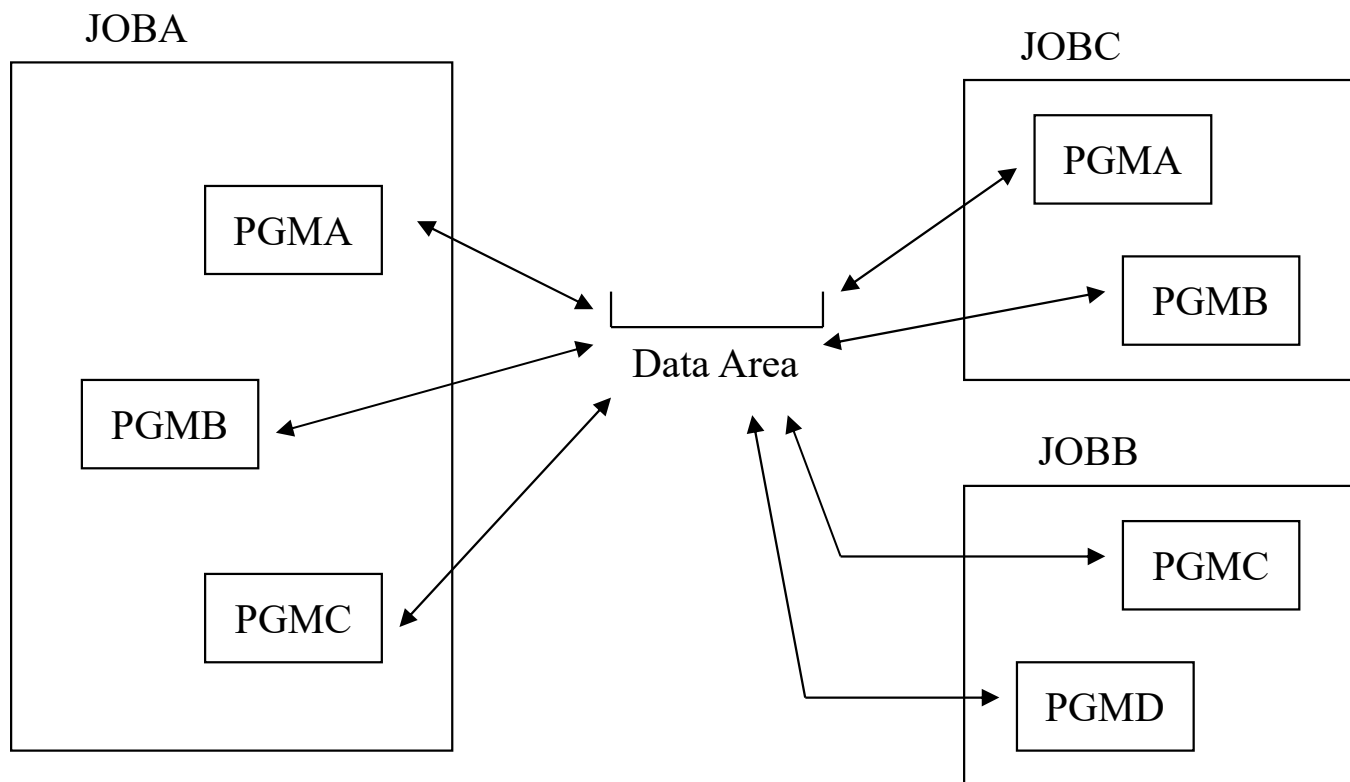
資料區類型

一般資料區(Data Area)

內部資料區(Local Data Area)

資料區群體(Group Data Area)

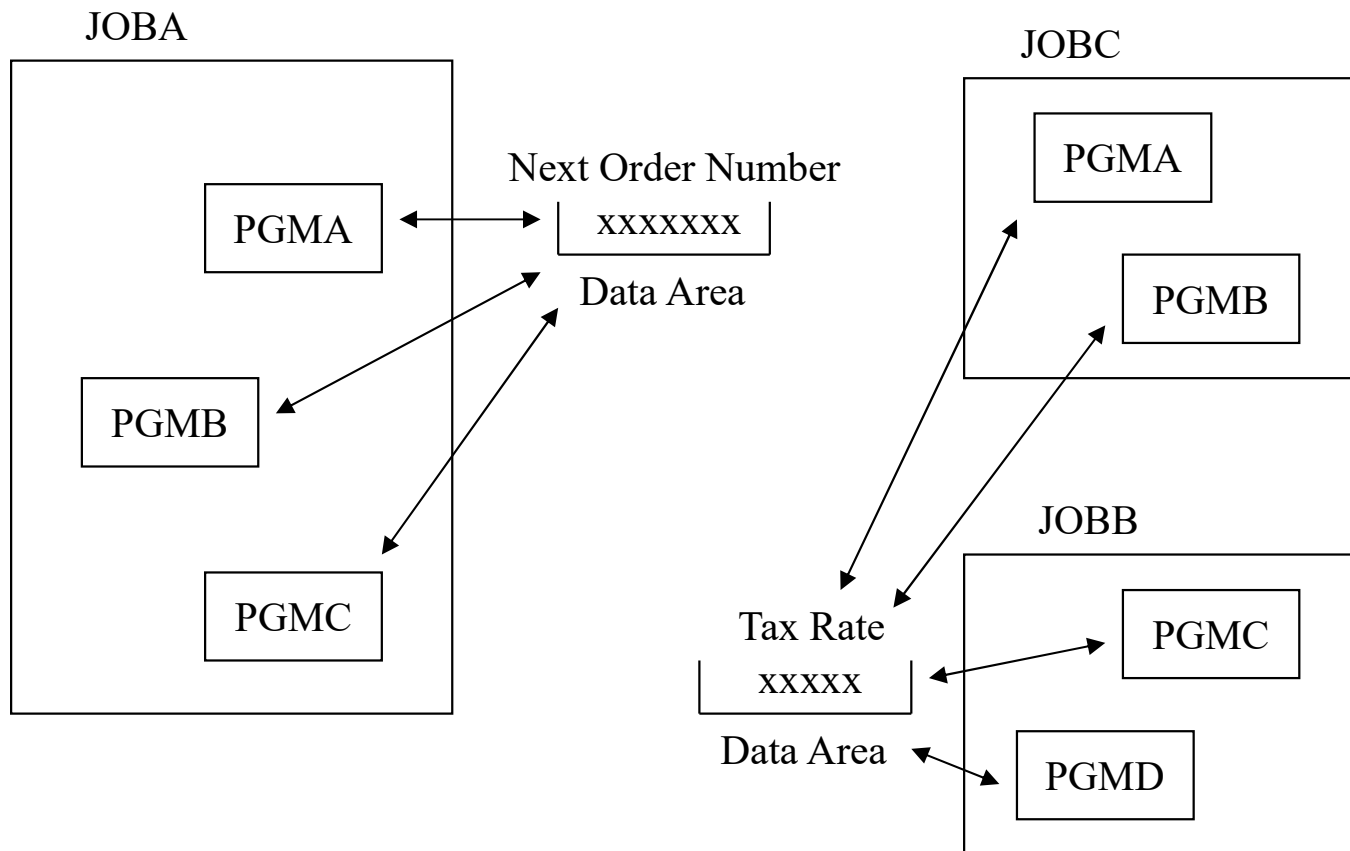
資料區(DATA AREA)



一個資料區：

- TYPE是 *DTAARA的一個OBJECT
- 是一個輔助儲存區
- 在OS/400中視為單一欄位

資料區的使用



資料區的操作指令

定義(DEFN)

輸入/輸出(IN/OUT)

釋放(UNLCK)

資料區之定義

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					Not		Not		Not						Compare													
					1>2	1<2	1=2	Look Up (Factor 2) is	High	Low	Equal																	
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58
1		C	*																									
2		C	*		PROGRAM NAME IS SAME AS EXTERNAL NAME												程式內使用之名稱和外部宣告名稱相同											
3		C	*																									
4		C																										
5		C	*																									
6		C	*																									
7		C	*																									
8		C	*																									
9		C	*																									
0		C	*																									
1		C	*		PROGRAM NAME IS DIFFERENT FROM EXTERNAL NAME												程式內使用之名稱和外部宣告名稱不同											
2		C	*																									
3		C																										
4		C																										
5		C																										
6		C																										
7		C																										
8		C																										
9		C																										
0		C																										

資料區
專用名稱

外部宣告的
資料區名稱

程式使用
的名稱

程式內使用之名稱和外部宣告名稱相同

程式內使用之名稱和外部宣告名稱不同

* NAMVAR

DEFN

PONBR

60

PROGRAM NAME IS SAME AS EXTERNAL NAME

* NAMVAR

DEFN

PONBR

PCHNBR

60

PROGRAM NAME IS DIFFERENT FROM EXTERNAL NAME

資料區輸入、輸出、鎖定和釋放

C		Form Type	Control Level (10-L9 LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust (H)	Arithmetic					
Line	And							And							Name	Length	Plus				Minus	Zero								
	Not			Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not											Not	Not	Not	Not	Not	Not
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58		
1	C															I N	P O N B R													
2	C																													
3	C															O U T	P O N B R													
6	C														* L O C K	I N	P O N B R													
7	C																													
8	C															O U T	P O N B R													
1	C														* L O C K	I N	P O N B R													
2	C																													
3	C														* L O C K	O U T	P O N B R													
4	C																													
5	C															U N L C K	P O N B R													
6	C																													
7	C																													
8	C																													
9	C																													
0	C																													

用 *NAMVAR輸出和輸入

C		Form Type	Control Level(LO-L9, LR.SR.AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust (H)	Arithmetic		
																					Plus	Minus	Zero						
Line															Factor 1	Operation	Factor 2				Name	Length	Compare						
																							1>2	1<2			1=2		
																							Look Up(Factor 2) is						
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58	
1		C	*																										
2		C																											
3		C																											
4		C																											
5		C																											
6		C																											
7		C																											
8		C																											
9		C																											
0		C																											
1		C																											
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3		C																											
4		C																											
5		C																											
6		C																											
7		C																											
8		C																											
9		C																											
0		C																											

內部資料區(系統提供) (Local Data Area)

1024個字元資料

由系統建立及刪除

參考值 *LDA

提供給你的工作使用

SBMJOB傳輸給批次工作

*LDA的資料修改

C		Form Type	Control Level(LO-L9, LR,SR,AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust (H)	Arithmetic												
				And							And										Name	Length	Plus	Minus			Zero												
Not					Not			Not			Not				Compare	1>2	1<2						1=2																
																								Look Up(Factor 2) is															
																								High			Low	Equal											
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58											
1		C	*		TO EXPLICITLY UPDATE POSITION 1 TO 5														修改 *LDA 資料區的前5碼																				
2		C	*		O F * L D A																	修改 *LDA 資料區的前5碼																	
3		C	*																																				
4		C														* N A M V A R	D E F N	* L D A		L O C A L	5																		
5		C															I N	L O C A L																					
6		C															M O V E	' 1 2 3 4 5 '		L O C A L																			
7		C															O U T	L O C A L																					
8		C																																					
9		C																																					
0		C																																					
1		C																																					
2		C																																					
3		C																																					
4		C																																					
5		C																																					
6		C																																					
7		C																																					
8		C																																					
9		C																																					
0		C																																					

總結

	General Data Area	Local Data Area	Group Data Area
Creat	User	System	
Size	Variable	Fixed	Only
Type	*CHAR,*DEC,*LGL	*CHAR	Accessed
Referenced	W/I Or Between jobs	W/I Job	by CL
Number Per Job	Variable	One	
Delete By	User	System	

第五章：檔案處理

單元內容

本單元將討論RPG/400常用的定義、處理和控制資料檔以及報表檔的技術。

單元目標

使用外部宣告檔案(externally described file)的方式在程式中定義資料庫檔案。

或 選擇適當的檔案處理操作指令(operation codes)來讀取或寫入資料於資料庫檔或報表檔中。

於計算處理卡別(簡稱C卡)中撰寫上述所需的操作程式。

於計算處理卡別中撰寫開啟和關閉檔案所需的程式。

5.1 基本檔案處理(BASIC FILE PROCESSING)

RPG/400檔案管理

檔案的定義

檔案的處理

EXCPT CHAIN READ
SETLL READE SETGT
READP REDPE
WRITE UPDAT DELET

檔案控制

OPEN CLOSE FEOP

在程式中兩種檔案管理的方式

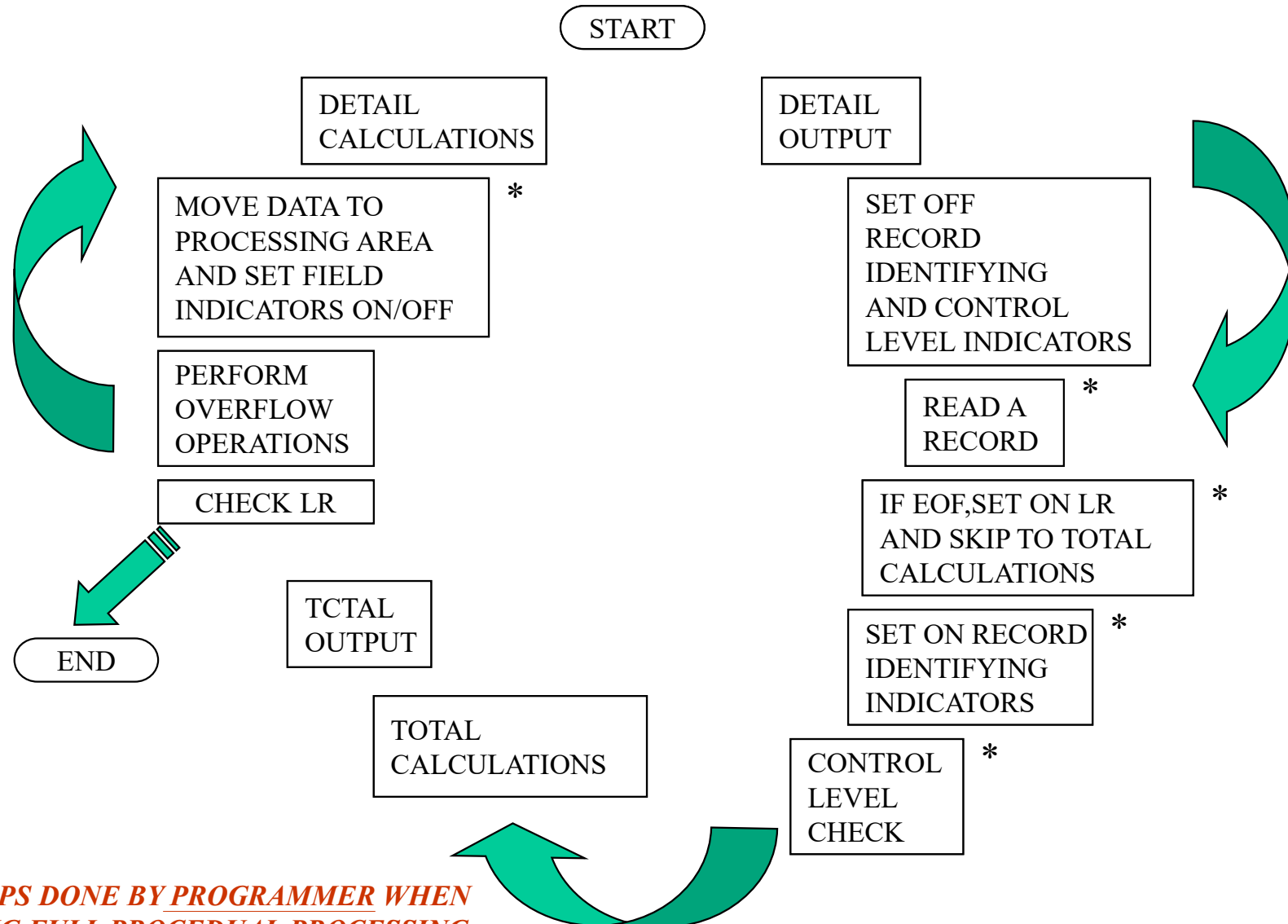
1.USING THE READ LOGIC IN THE RPG CYCLE.
(PRIMARY/SECONDARY)

2.USING FULL PROCEDURAL PROGRAMMING TO BYPASS
THE READ LOGIC.(I/O DONE IN CALCULATIONS)

EITHER PROGRAM DESCRIBED OR EXTERNALLY
DESCRIBED FILES.

SEPARATE DECISION MADE EACH DATABASE FILE.

WHAT IS FULL PROCEDURAL PROCESSING?



****STEPS DONE BY PROGRAMMER WHEN USING FULL PROCEDUAL PROCESSING.***

5.2檔案定義(FILE DEFINITION)

在RPG中使用F卡宣告檔案之常用範例

FILE 種類	位置 6	7~14	15	16	19	31	33~34	40~46	66	備註
DSPF	F	FILE NAME 檔案名稱	C (I/O動作皆有) 開檔方式	F 讀檔方式	E 外建檔案 格式			WORKSTN 輸出入之週邊		
PRTF	F	FILE NAME	O		E		*IN 01~99 控制跳頁	PRINTER		
DBF	F	FILE NAME	O		E	K		DISK		有WRITE動作
DBF	F	FILE NAME	I	F	E	K		DISK		READ,CHAIN 的動作
DBF	F	FILE NAME	U	F	E	K 有key		DISK		READ UPDATE + CHAIN DELETE
DBF	F	FILE NAME	U I/O皆有	F	E	K		DISK	A 一定要有	READ UPDATE + CHAIN DELETE + WRITE

For RPG:

	H I	LO	EQ	
•CHAIN	40		40	:not found
•SETLL	41	42	41	:not found 42:equal
•SETGT	43		43	:not found
•READE		44	44	:end of file
•READC		57	57	:end of subfile
•READ		46	46	:end of file
•READP		47	47	:begin of file
•WRITE		53	53	:subfile full

欄位更名(RENAMING FIELDS)

[illegible]

更改檔案於程式中使用的欄位名稱

NAME IN PROGRAM

固定字元欄位命名 (NAMED CONSTANTS)

可以定義於輸入(INPUT)的任何地方

固定字元欄位最大長度

文字 256

數字 30.9

使用於計算處理卡別的

第一因素(FACTOR 1)和第二因素(FACTOR 2)欄位

使用於輸出卡別的

“固定字元或編輯字元”

NAMED CONSTANTS-EXAMPLE

[illegible]

5.3 資料庫檔案處理(DATA BASE FILE PROCESSING)

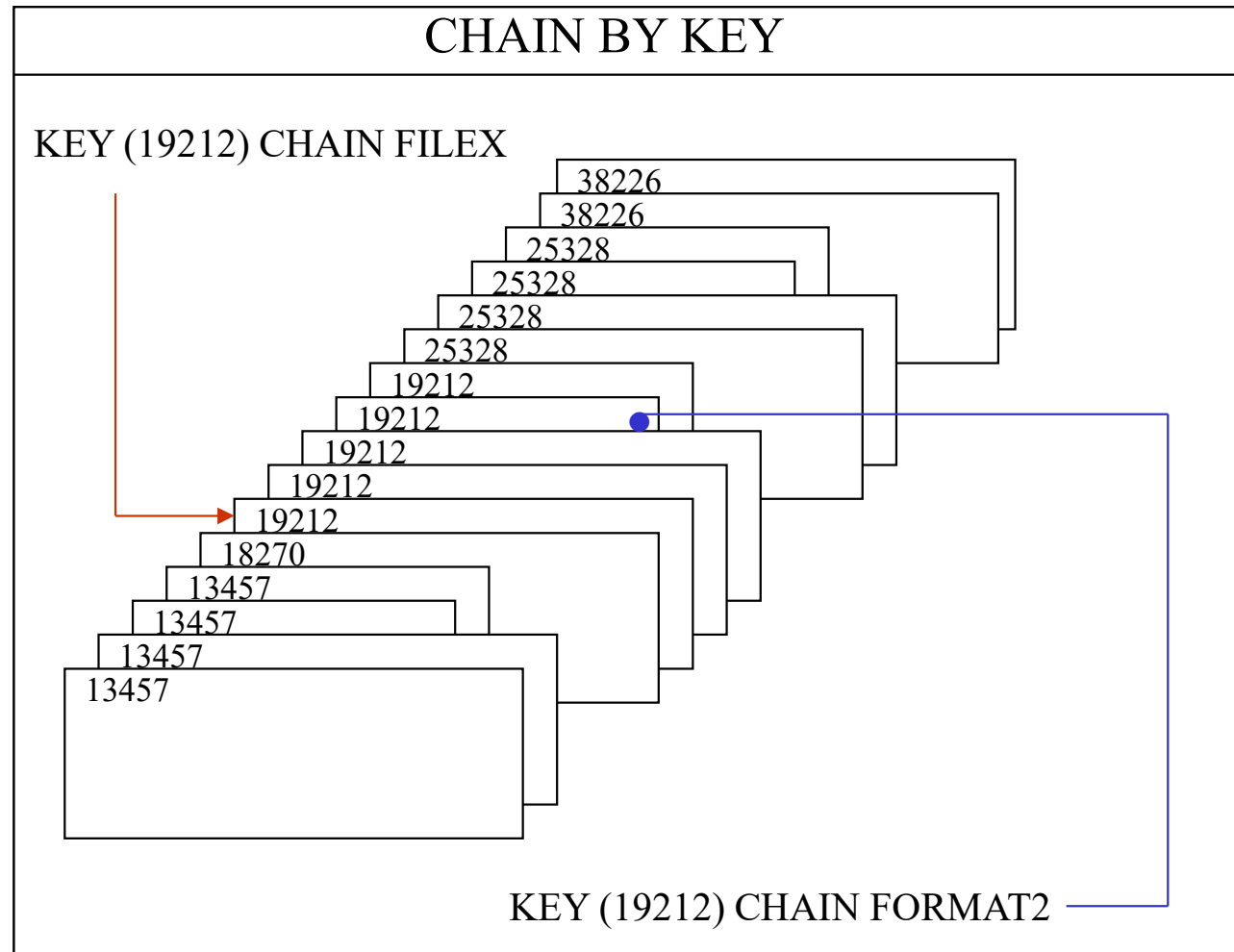
接受資料的方式

檔案名稱

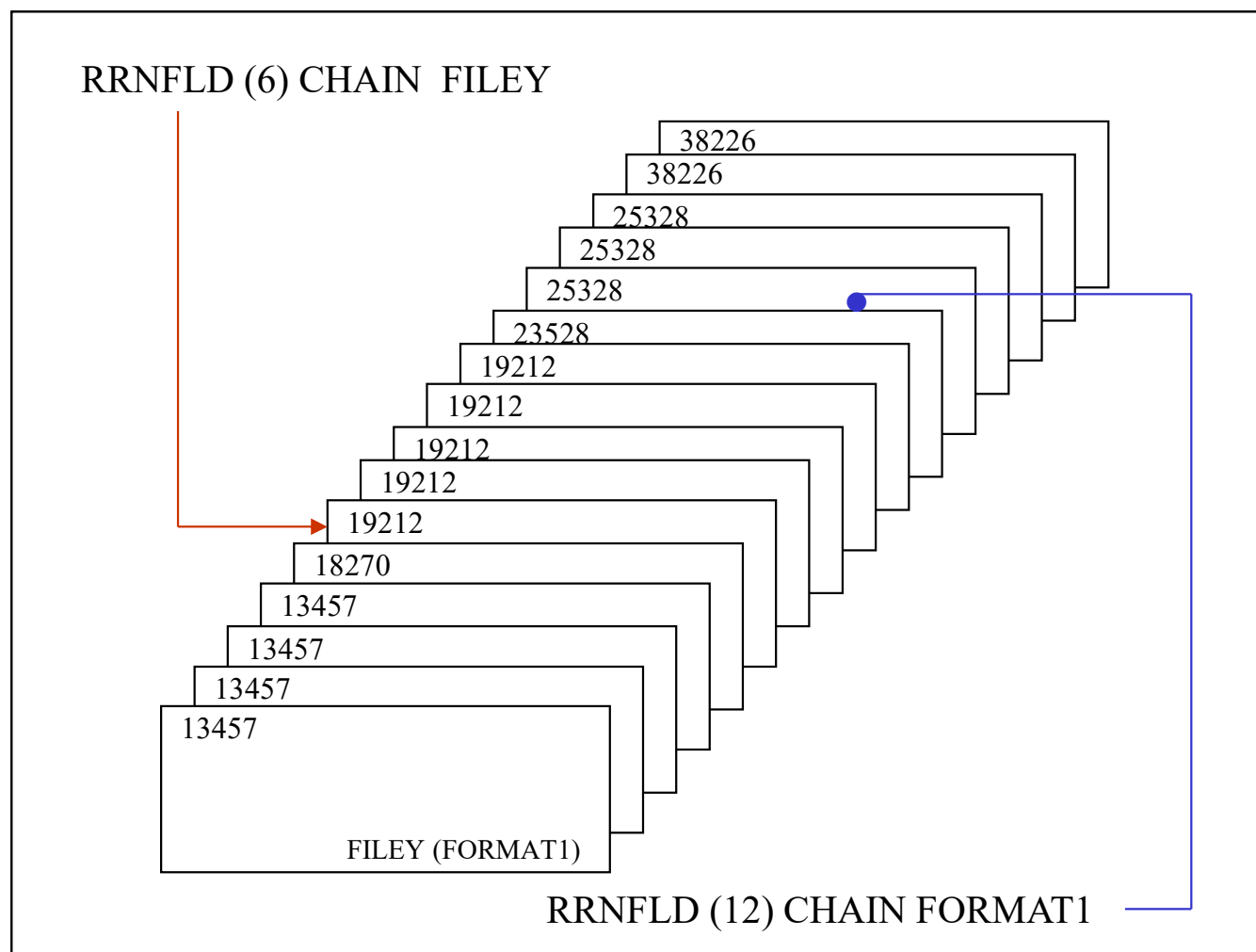
- 程式外宣告之資料
- 程式內描述之資料

記錄格式名稱號(RECORD FORMAT)

- 程式外部宣告資料



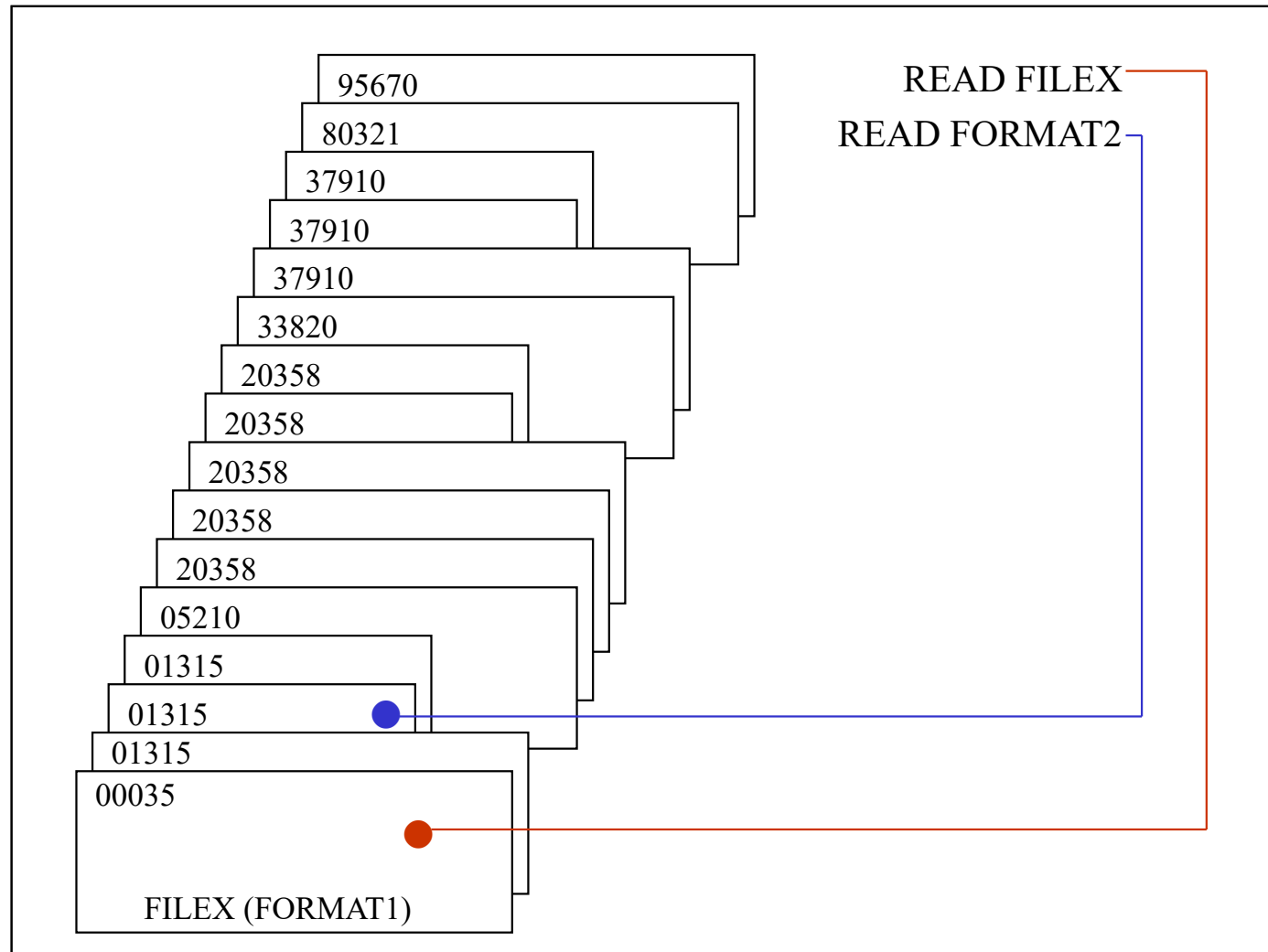
依相關記錄序號擷取資料



[illegible]

PAN PACIFIC

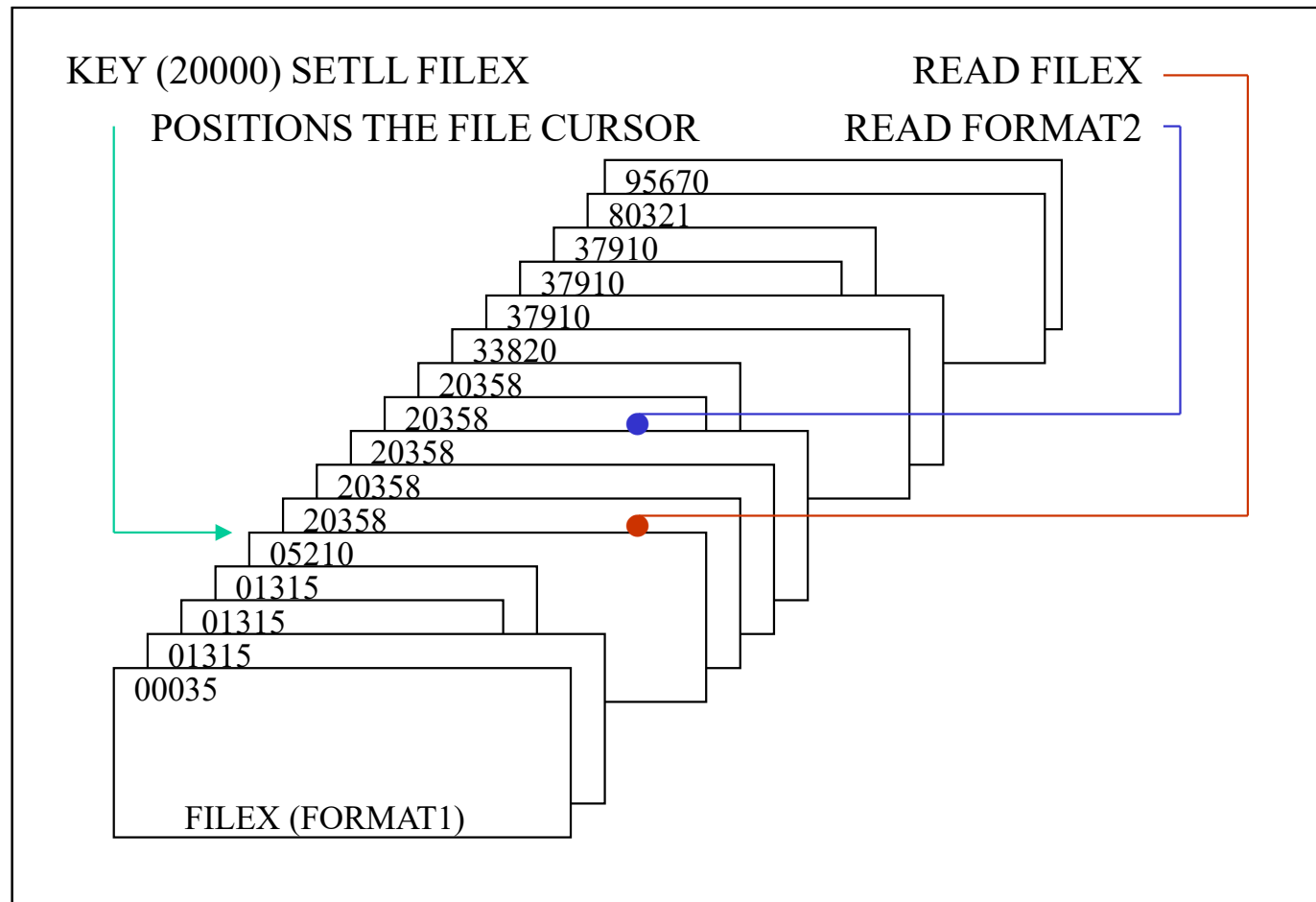
READ



READ

[illegible][illegible]

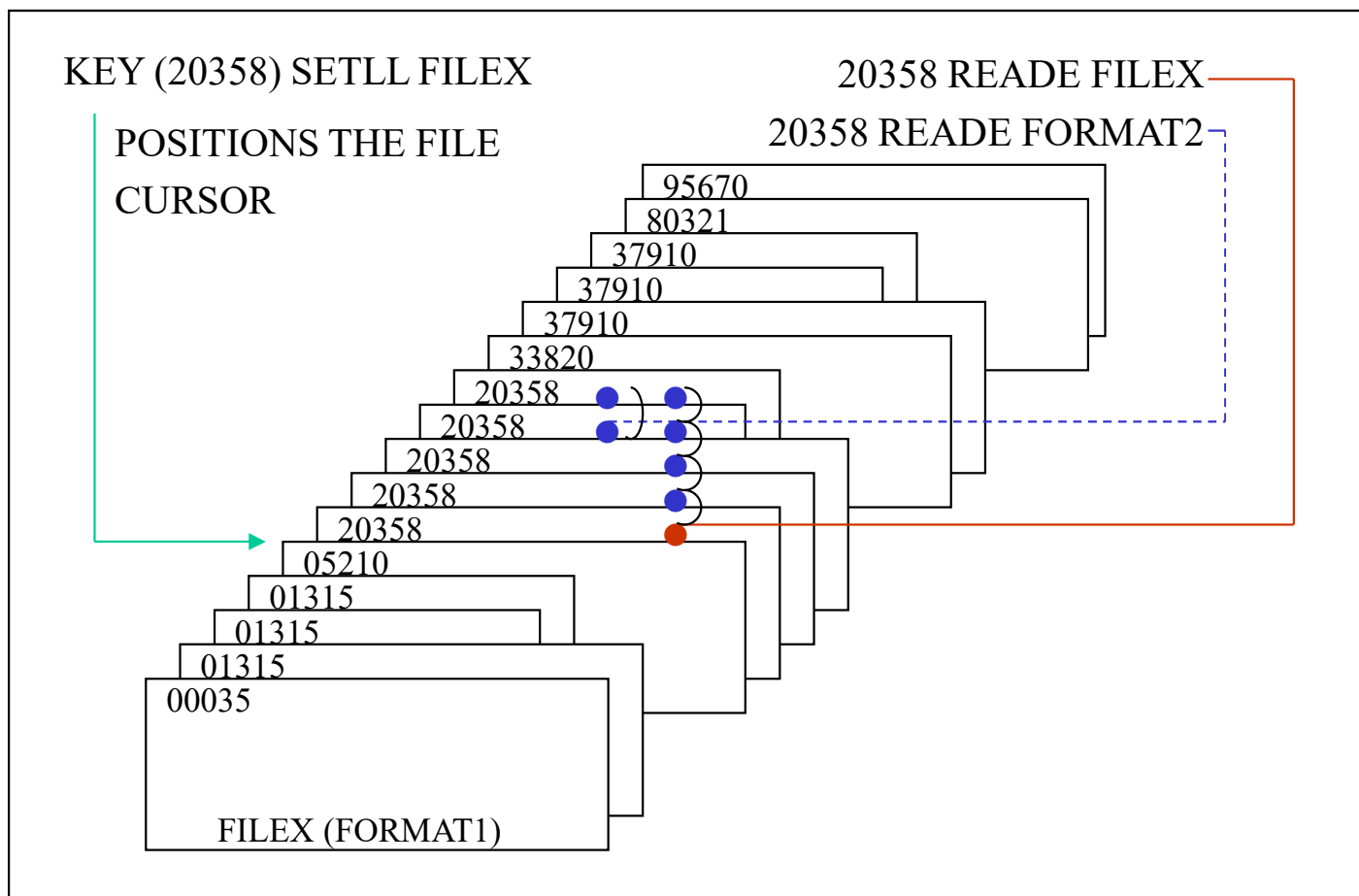
SETLL



[illegible]

58,59欄=找到與KEY值相等的資料時會ON(值=1)

READE



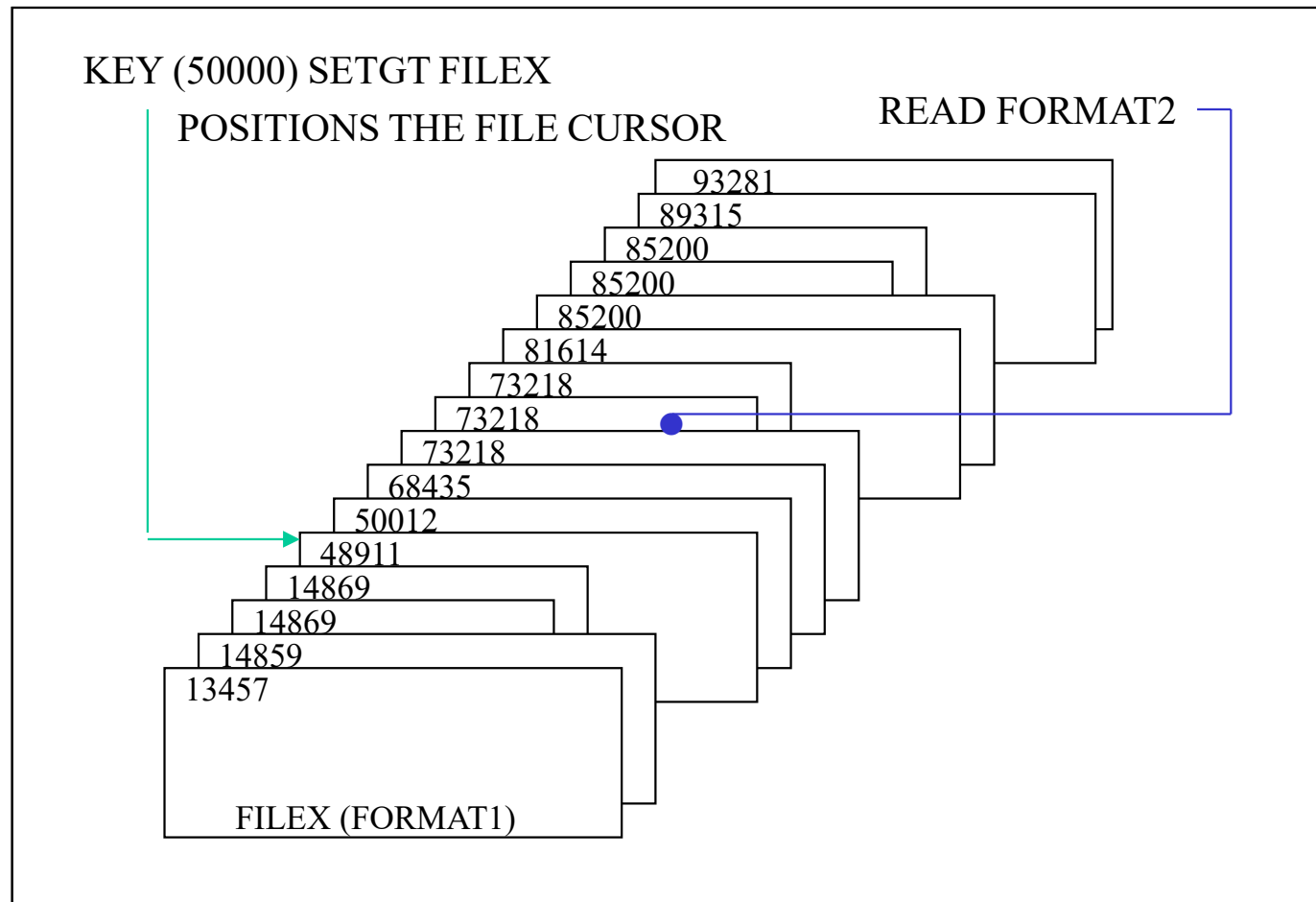
READE

[illegible][illegible]

使用READE(讀取與設定之值KEY相等之資料的指令)命令時如果FACTOR 1的欄位留空時，那麼READE會用最近一次讀取的資料當FULL KEY來往下讀。

FULL KEY：檔案所設定的所有KEY欄位。

SETGT



SETGT

[illegible]

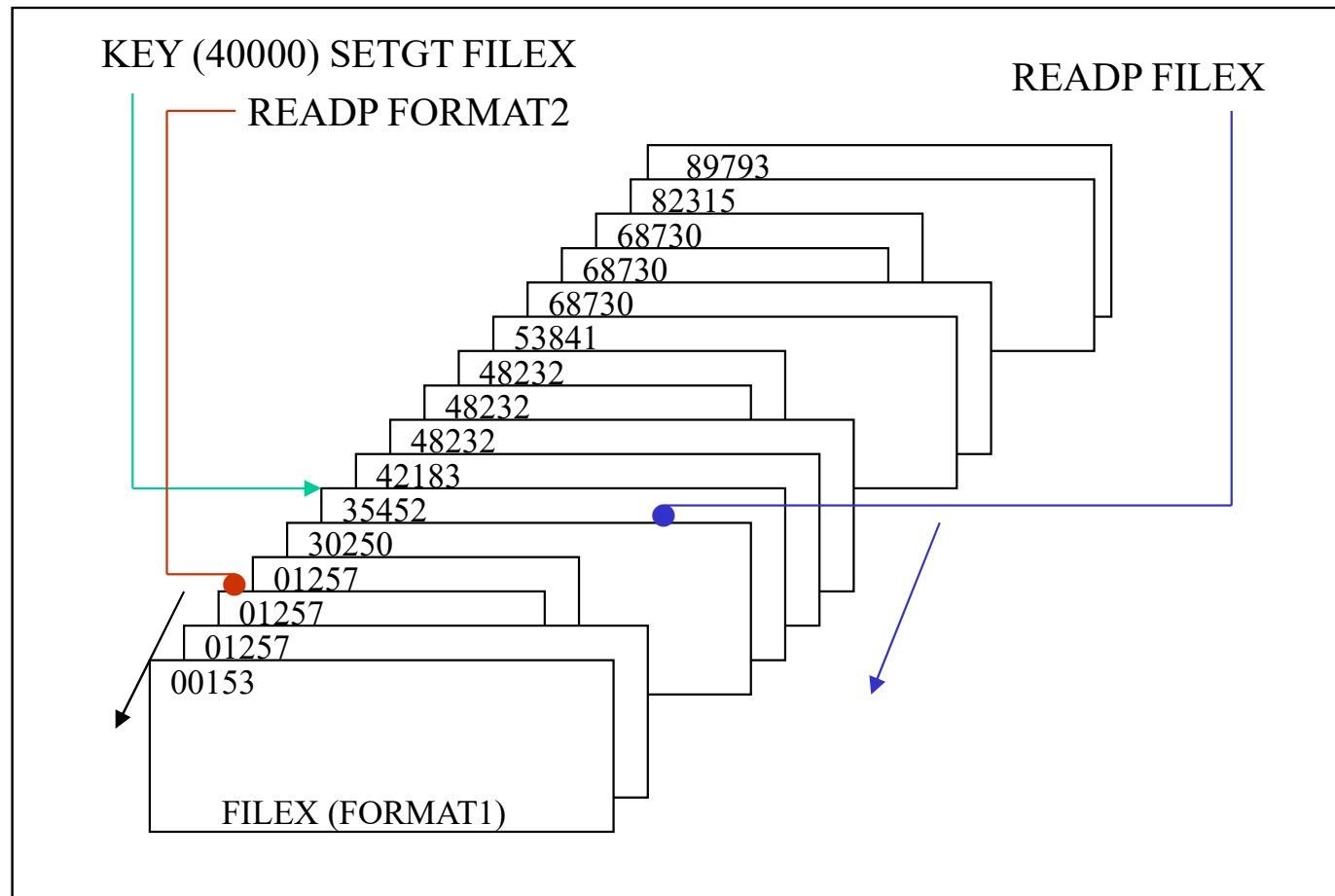
Form Type	Control Level(L0-L9,I,R,SR,AN/OR)	Indicators										Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust(H)	Arithmetic								
		And					And								Name	Length	Plus	Minus			Zero								
		Not		Not		Not		Not		Compare																			
										1>2	1<2						1=2												
										Look Up(Factor 2) is																			
High	Low	Equal																											
6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58			
C	*																												
C	*					SET 'GREATER THEN' POINTER WITH FILE NAME																							
C	*											K E Y					S E T G T	F I L E X								5	0		
C	*					READ RECORD WITH FORMAT NAME																							
C	*											* I N 5 0					I F E Q	' 0 '											
C																	R E A D	F O R M A T 2										4	0
C					-	-	-	-	-	-	-	- - - - - P R O C					E S S R	E C O R D - - - - -											
C																	E N D												

SETGT指令使用燈號如下：

54，55欄=到檔案尾，資料沒找到

56, 57欄=檔案讀取時有錯誤發生

READP

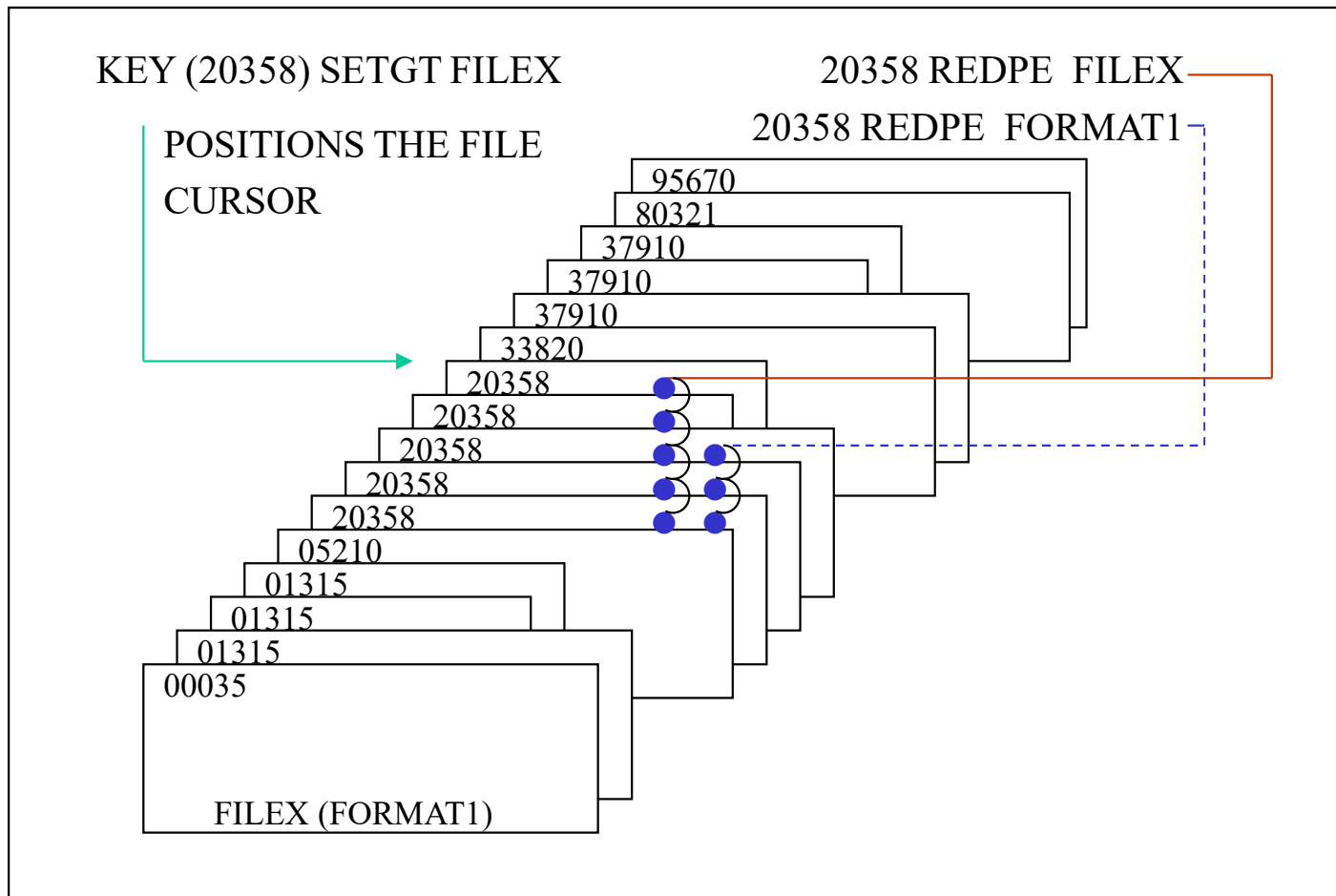


READP

[illegible][illegible]

- 1.檔案指標定位
- 2.依記錄格式名稱(FORMAT NAME)往前讀取檔案資料

REDPE



REDPE

[illegible][illegible]

使用REDPE命令時也可將FACTOR 1的欄位留空，如此則程式會以最近一筆資料所有的KEY欄位值為KEY值，繼續向前讀取相同KEY值之檔案資料。

描述式常數

[illegible]

*HIVAL和*LOVAL的意義依它們的使用而定：

*HIVAL

*LOVAL

數值欄位=+9999.....

數值欄位=-9999.....

文數字欄位=(16進位碼)Hex FFFF..... 文數字欄位=(16進位碼)Hex 0000.....

描述式常數

C		Form Type	Control Level(L0-L9,LR,SR,AN/OR	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust(H)	Arithmetic							
Line	5																				Name	Length					Plus	Minus	Zero					
																											Compare							
																											1>2	1<2	1=2					
																											Look Up(Factor 2) is							
		9	10	11	Not	12	13	And	14	Not	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58						
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58						
1		C	*																															
2		C	*					ZERO-FILL																										
3		C	*																															
4		C															M O V E	* Z E R O		F L D 1		5	0											
5		C	*																															
6		C	*					FLD1 CONTAINS				00000																						
7		C	*	-----																												*		
8		C	*																															
9		C	*				BLANK-FILL																											
0		C	*																															
1		C															M O V E	* B L A N K S		F L D A		1	0											
2		C	*																															
3		C	*				FLDA IS FILLED				WITH BLANKS																							
4		C	*	-----																												*		
5		C	*																															
6		C	*				FILL WITH				REPEATING PATTERN																							
7		C	*																															
8		C															M O V E	* A L L ' X Y Z '		F L D A														
9		C	*																															
0		C	*				FLDA CONTAINS				XYZXYZXYZX																							

不論是數字或文數字欄位*ALL 'XYZ'的意思是:

字串 'XYZ'會重複循環填入結果欄(RESULT FIELD)直到欄位長度全部填滿為止。

描述式常數

C		Form Type	Control Level(L0-L9,LR,SR,AN/OR	Indicators														Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust(H)	Arithmetic				
Line				And							And										Name	Length			Plus	Minus	Zero		
				Not							Not														Compare				
				Not							Not														1>2	1<2	1=		
				Look Up(Factor 2)							Look Up(Factor 2)														High	Low	Equal		
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58	
1		C	*																										
2		C	*																										
3		C	*																										
4		C																											
5		C																											
6		C																											
7		C																											
8		C	*																										
9		C	*																										
0		C	*																										
1		C																											
2		C																											
3		C																											
4		C																											
5		C	*																										
6		C	*																										
7		C	*																										
8		C	*																										
9		C	*																										
0		C	*																										

*ON，*OFF只能用在文數字欄位

描述式常數

C		Form Type	Control Level(L0-L9,LR,SR,AN/OR	Indicators														Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust(H)	Arithmetic																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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*ON會重覆 '1' 到文數字欄位，直到填滿該欄位。

*OFF會重覆 '0' 到文數字欄位，直到填滿該欄位。

[illegible]

PAN PACIFIC

外部宣告檔案用KEY值新增資料

Form Type	Filename														File Type				Mode of Processing										Device												Symbolic Device												Labels S/N/E/M	Name of Label Exit												Extent Exit for DAM												File Addition /Unordered												Number of Tracks for Cylinder Overflow												Number of Extents																																															
															File Designation				Length of key field or of Record Address Field						Record Address Type																																																																																									Type of file Organization or Additional Area						Overflow Indicator		Key Field Starting Location		Extension Code E/L																									
																																																																																																																														End of File				Sequence				File Format															
																																																																																																																																										Block Length				Record Length							
																																																																																																																																																		File Format			
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[illegible]

注意：若有新增資料時，檔案描述表格 F SPEC 第66欄一定要打上 'A'。

外部宣告檔案用相關記錄序號方式新增資料(循序方法)

[illegible][illegible]

在檔案描述表格上，當第31欄位留空白時，表示依相關紀錄序號處理。在接續行(CONTINUATION LINE)中RECNO用來定相關記錄序號的欄位名稱(程式中使用)，而且定義的相關記錄序號值必須對應到新增資料的序號值。

5.4 檔案控制

檔案控制

內含	VS	直接定義
RPG程式		程式設計者
自動開關檔案	VS	使用者控制

下列狀況採取直接由程式設計者在程式中控制檔案開關較有利：

1. 檔案只用一次
2. 檔案數量多時--可降低程式啟動時間
3. 查詢用的程式只使用許多檔案中的某一個檔案時

OPEN-CLOSE

Form Type		Filename														File Type				Mode of Processing										Device										Symbolic Device										Labels S/N/N/E/M	Name of Label Exit										Extent Exit for DAM										File Addition 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5-4 RPG CYCLE

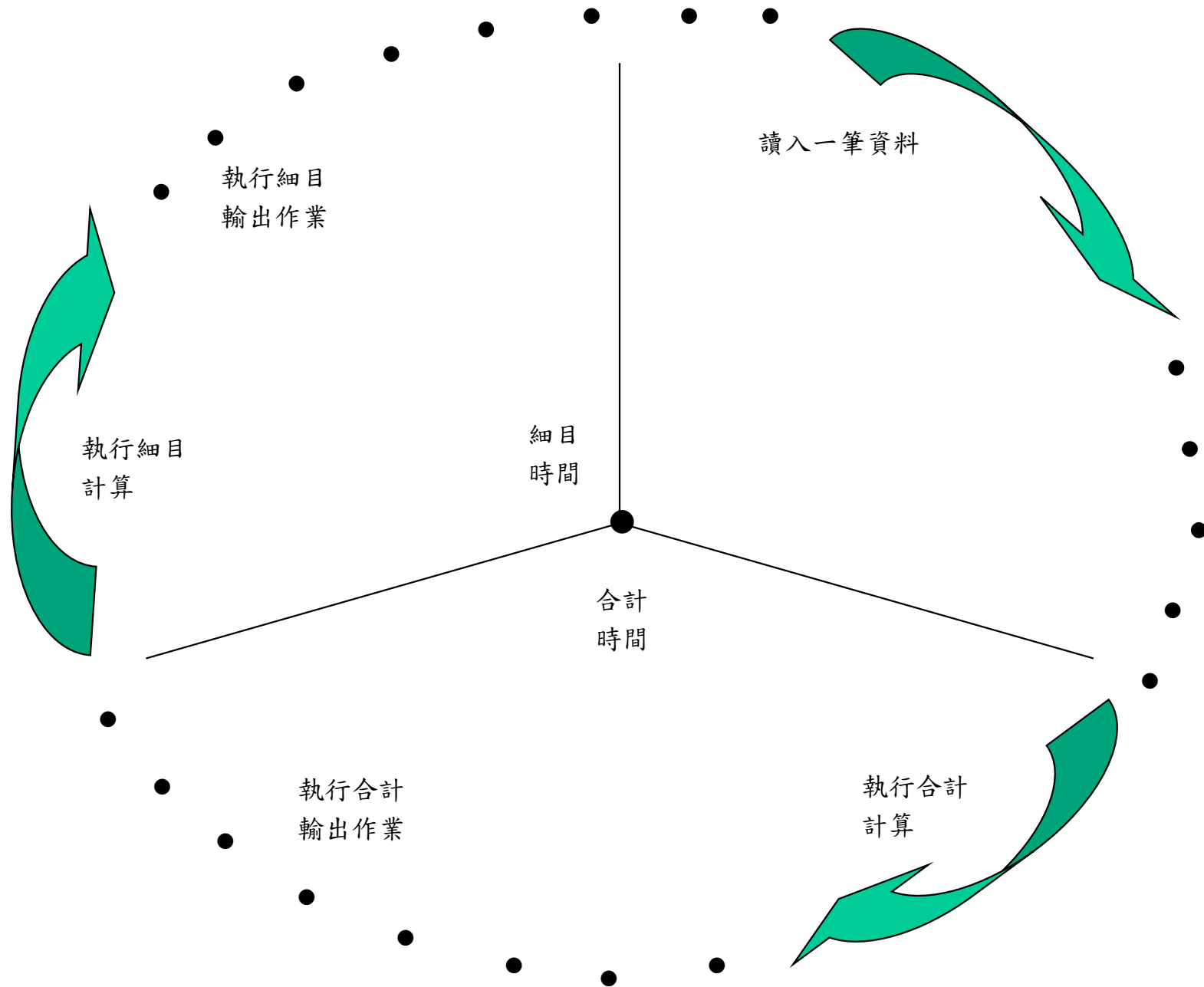


圖1-4 RPG II的基本邏輯

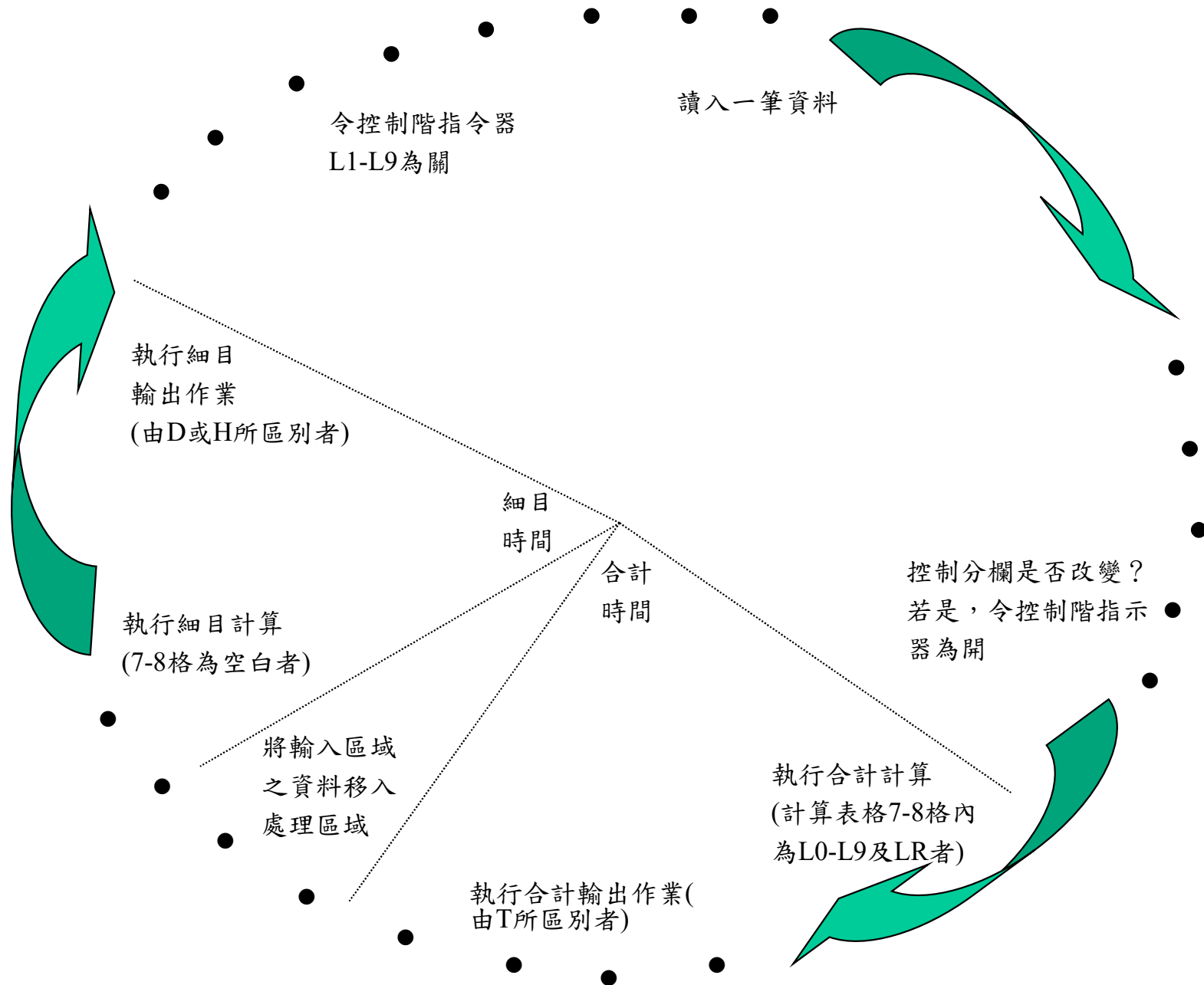


圖1-8在 RPG II 合計及細目時間邏輯裡的各個步驟

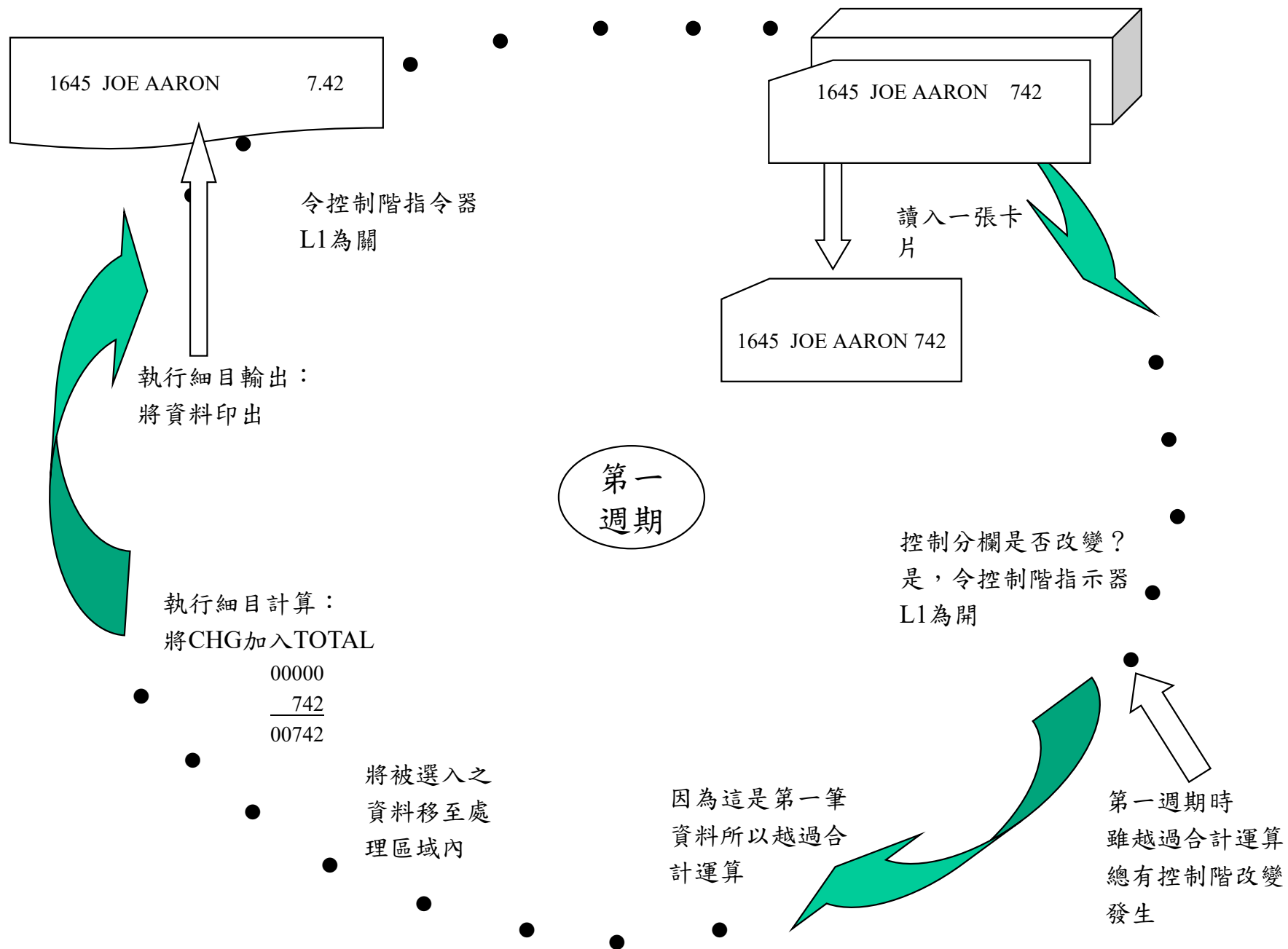


圖1-7(5之2) 細目及合計時間之說明

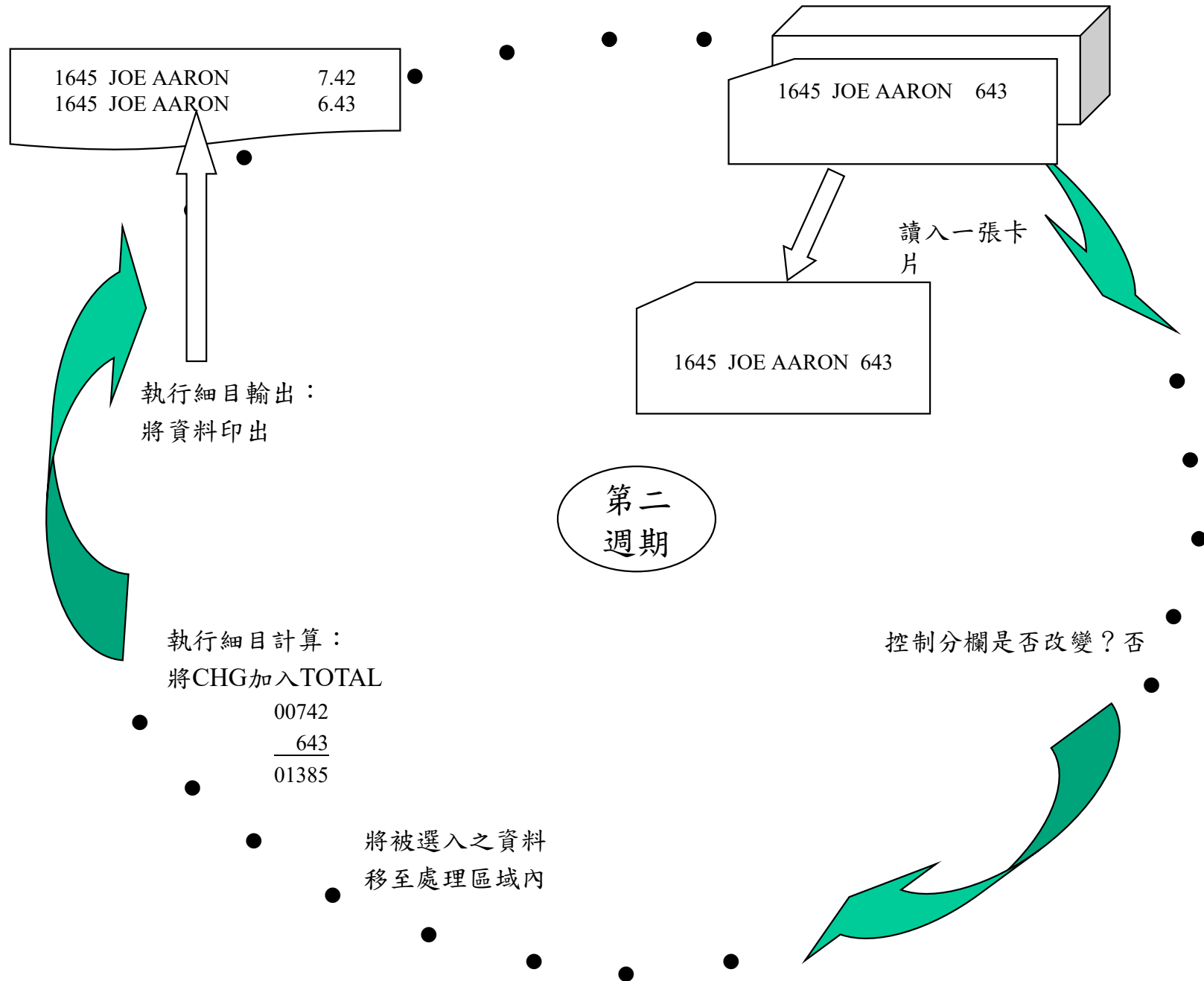


圖1-7(5之3) 細目及合計時間之說明

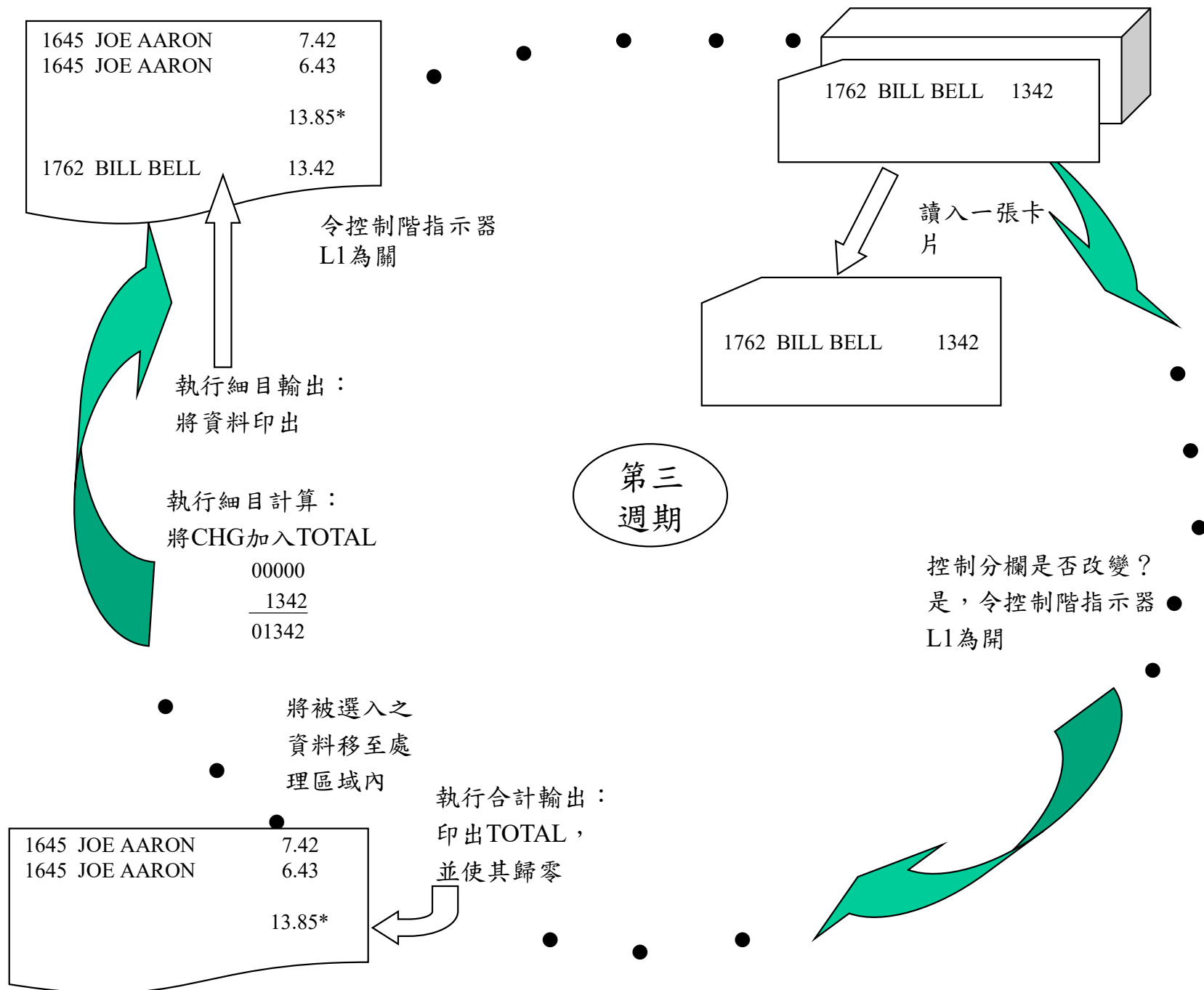
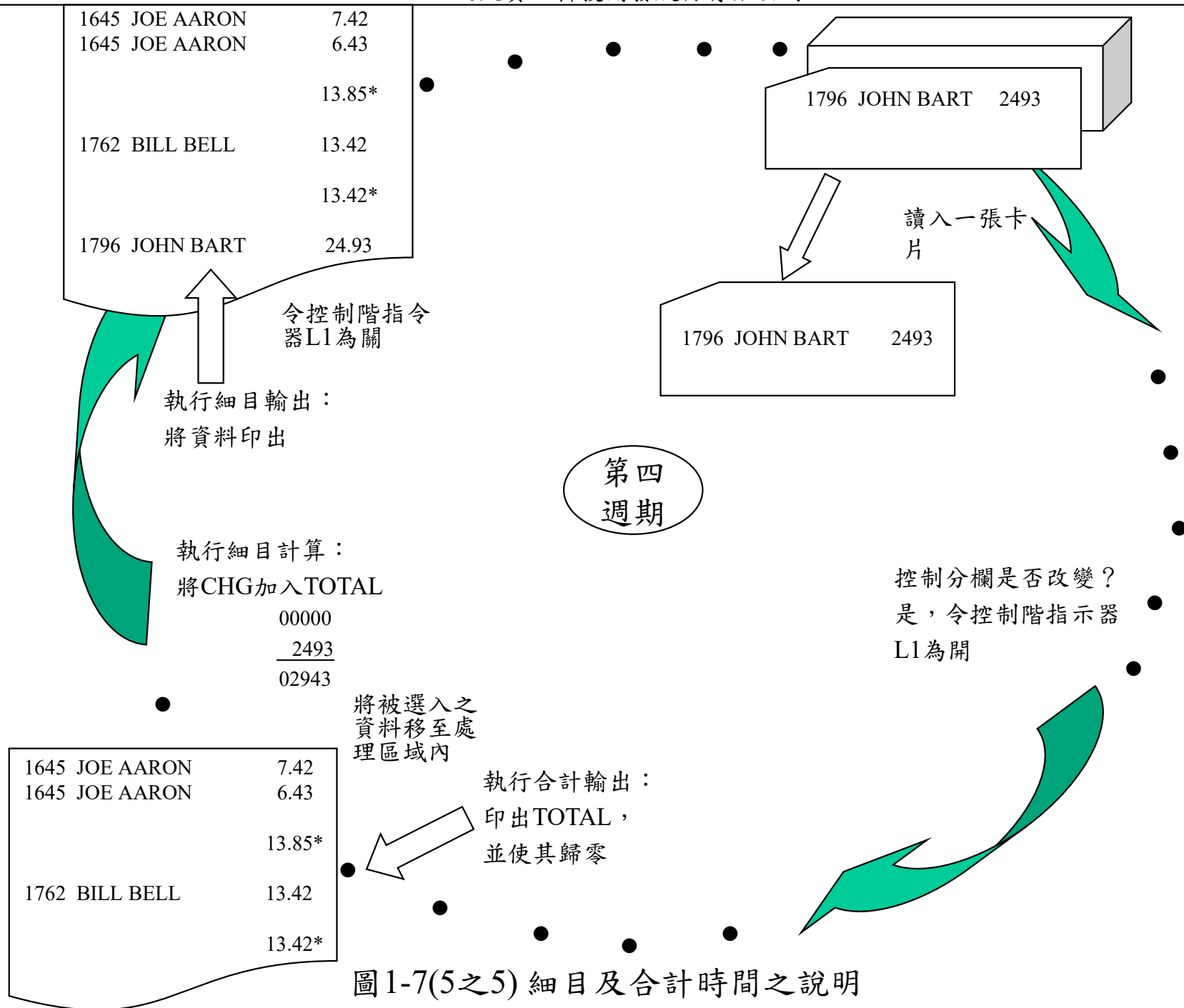
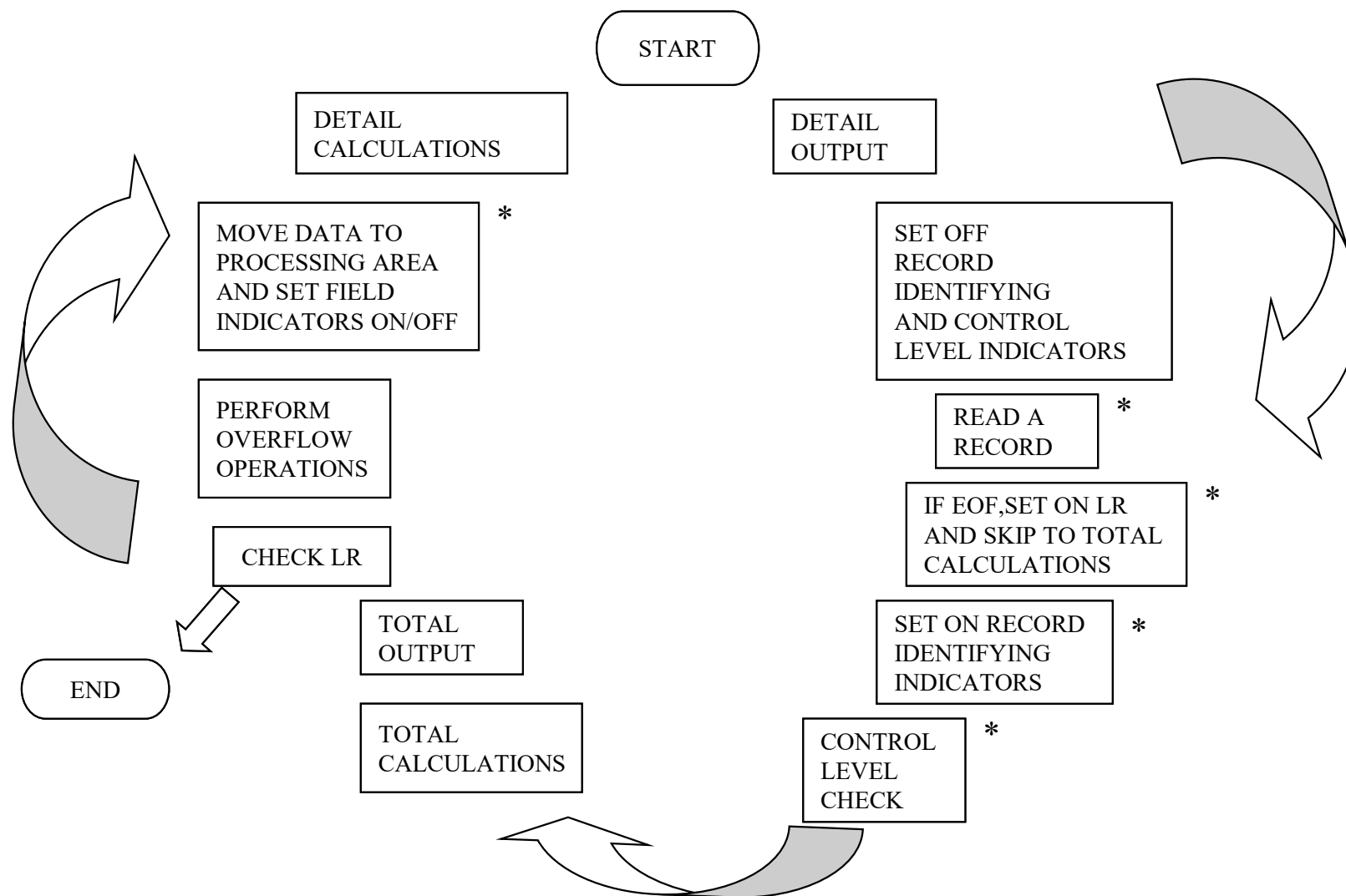


圖1-7(5之4) 細目及合計時間之說明



WHAT IS FULL PROCEDURAL PROCESSING ?



* STEPS DONE BY PROGRAMMER WHEN USING FULL PROCEDURAL PROCESSING

[illegible]

5738PW1 V2R1M1 920327

SEU SOURCE LISTING

1

SOURCE FILE KFPLIB/ ARDDSSRC
MEMBER EXP01

SEQNBR*	1	2	3	4	5	6	7	8
100	A*****							
200	A*	泛太資訊科技開發股份有限公司 - 版權所有					TEL: 7313250	*
300	A*							*
400	A*	PROGRAM NAME : EXP01						*
500	A*	DSPF NAME : EXP01D						*
600	A*	PRTF NAME : EXP01P						*
700	A*	REMARK : 學生基本資料簡冊						*
800	*	IN39	- OVERFLOW IND.					*
900	*	IN45	- END OF FILE IND.					*
1000	*	IN62	- FINISFED MESSAGE					*
1100	*	IN99	- SUBROUTINE ERROR DETECT & SKIP CHECK					*
1200	*****							
1300	F*FLENAM	I P . . F	I	DEVICE+ KEXIT++ENTRY+A U1				
1400	FEXP01D	CF	E	WORKSTN				
1500	FSTPF	IF	E	K	DISK			
1600	F*FLENAM	I . . . F	OV	DEVICE				
1700	FEXP01P	0	E	39	PRINTER			

```

1 8 0 0      * = = = = =
1 9 0 0      *                               M A I N   R O U T I N E
2 0 0 0      * = = = = =
2 1 0 0      C                               E X S R   I N I T
2 2 0 0      *   * I N 0 3   I F   S E T   O N - - - >   E N D   O F   J O B
2 3 0 0      *
2 4 0 0      C * . N 0 1 N 0 2 N 0 3 F a c t o r 1 + + + O p c d e F a c t o r 2 + + + R e s u l t L e n D H H i L o E q C o m m e n t s + + + + +
2 5 0 0      *
2 6 0 0      C               * I N 0 3               D O U E Q ' 1 '
2 7 0 0      C                               E X F M T D S P C 1
2 8 0 0      C                               M O V E A * A L L ' 0 '           * I N , 6 0
2 9 0 0      C *
3 0 0 0      C *       I F   N O T   E N D   O F   J O B   C H E C K   S C R E E N   F I E L D
3 1 0 0      C *
3 2 0 0      C               * I N 0 3               I F E Q   ' O '
3 3 0 0      C                               E X S R   C H E C K
3 4 0 0      C *                               . C H E C K                               ?
3 5 0 0      C *       I F   N O   E R R O R   O C C U R R E D ,       P R I N T   E X T E R N A L   P R I N T E R   F I L E
3 6 0 0      C *
3 7 0 0      C               * I N 9 9               I F E Q   ' O '
3 8 0 0      C                               E X S R   P R I N T
3 9 0 0      C                               E N D I F
4 0 0 0      C *
4 1 0 0      C                               E N D I F
4 2 0 0      C                               E N D D O
4 3 0 0      *       L R   S E T   O N   E N D   O F   F I L E
4 4 0 0      C                               S E T O N                               L R
4 5 0 0      * = = = = =
4 6 0 0      *               I N I T       . . . . I N I T   S C R E E N
4 7 0 0      * = = = = =
4 8 0 0      C               I N I T               B E G S R
4 9 0 0      *
5 0 0 0      C                               M O V E   * B L A N K           D S T 0 1 S
5 1 0 0      C                               M O V E   * B L A N K           D S T 0 1 E
5 2 0 0      C                               T I M E                       H M S D T E   1 2 0
5 3 0 0      C                               M O V E   H M S D T E           D A T E

```

5 7 3 8 P W 1 V 2 R 1 M 1 9 2 0 3 2 7

SEU SOURCE LISTING

SOURCE	FILE	.	.	.	.	.	.	KFP LIB / ARDDSSRC
MEMBER	.	.	.	.	.	.	.	EXP 01

SEQ	NR	*	1	2	3	4	5	6
5400		*						
5500	C				ENDSR			
5600	*							
5700	*		CHECK		CHECK	SCREEN		
5800	*							
5900	C		CHECK		BEGSR			
6000	*							
6100	*	MOVE	LOW	VALUE	TO	BEGINNING	FIELD	
6200	*							
6300	C		DST01S		IFEQ	*BLANKS		
6400	C				MOVE	*LOVAL	DST01S	
6500	C				END			
6600	*							
6700	*	MOVE	HIGH	VALUE	TO	END	FIELD	
6800	*							
6900	C		DST01E		IFEQ	*BLANKS		
7000	C				MOVE	*HI VAL	DST01E	
7100	C				END			
7200	*							
7300	C		DST01S		IFGT	DST01E		
7400	C				SETON		6199	
7500	C				GOTO	ENDCHK		
7600	C				END			
7700	*							
7800	C		ENDCHK		ENDSR			

```

7 9 0 0      * ===== *
8 0 0 0      *                PRINT . . . . PRINT  REPORT
8 1 0 0      * ===== *
8 2 0 0      C                PRINT          BEGSR
8 3 0 0      *
8 4 0 0      * SET THE KEY POINTER
8 5 0 0      *
8 6 0 0      C                DST 0 1 S          SETLISTO
8 7 0 0      C                READ  STO                      4 5
8 8 0 0      *
8 9 0 0      * WRITE REPORT HEADER
9 0 0 0      *
9 1 0 0      C
9 2 0 0      C                MOVE  DATE          SYSDTE          REPORT DATE
9 3 0 0      *                WRITEPH1
9 4 0 0      * DO LOOP , READ THE STUDENT DATA FROM STPF AND WRITE TO PRINTER FILE
9 5 0 0      *
9 6 0 0      C                * I N 4 5          DOWEQ' 0'
9 7 0 0      C                ST 0 1          ANDLEDST 0 1 E
9 8 0 0      *
9 9 0 0      * OVERFLOW 滿 翻 頁 行 數 , 列 印 表 頭                      I L E
1 0 0 0      *
1 0 1 0      C                * I N 3 9          I FEQ' 1'
1 0 2 0      C                WRITEPH1
1 0 3 0      C                SETOF                      3 9
1 0 4 0      C                END
1 0 5 0      C
1 0 6 0      C                WRITEPD 0 1

```

5 7 3 8 P W 1 V 2 R 1 M 1 9 2 0 3 2 7

S E U S O U R C E L I S T I N G

S O U R C E F I L E K F P L I B / A R D D S S R C

M E M B E R E X P 0 1

S E Q N B R * . . . + . . . 1 . . . + . . . 2 . . . + . . . 3 . . . + . . . 4 . . . + . . . 5 . . . + . . . 6 . . .

1 0 7 0 0 C R E A D S T O 4 5

1 0 8 0 0 C E N D D O

1 0 9 0 0 *

1 1 0 0 0 * W R I T E R E P O R T E N D L I N E A N D D S P L A Y F I N I S H E D M E S S A G E

1 1 1 0 0 * W R I T E P E 1

1 1 2 0 0 C

1 1 3 0 0 *

1 1 4 0 0 * E N D S R

1 1 5 0 0 C

* * * * E N D O F S O U R C E * *

5738W1 V2R1M1 920327

SEU SOURCE LISTING

SOURCE FILE KFPLIB/ARDDSSRC.
MEMBER EXP01P

```

SEQNBR*...+... 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7 ...+...
100      A*****
200      A*      泛太資訊科技開發股份有限公司 - 版權所有      TEL:7313250      *
300      A*
400      A*      DSPF NAME      : EXP01D      *
500      A*      PROGRAM NAME  : EXP01      *
600      A*      REMARK        : 學生基本資料簡冊      *
700      A*****
800      A
900      A
1000     A      R  DSPC1
1100     A*      91/05/23      14:22:47      ETPGMR      REL-R03M00      5728-PW1
1200     A
1300     A
1400     A
1500     A
1600     A
1700     A
1800     A
1900     A      DST01S      R      B      8 38REFFLD(ST01)
2000     A      61      DSPATR(RI)
2100     A      61      ERRMSG(' 起始值大於終止值 ' 61)
2200     A
2300     A      DST01E      R      B      8 47' ~ '
2400     A      61      DSPATR(RI)
2500     A      61      ERRMSG(' 起始值大於終止值 ' 61)
2600     A
2700     A
2800     A
2800     A

```

* * * * E N D O F S O U R C E * * * *

5738PW1 V2R1M1 920327

SEU SOURCE LISTING

1

SOURCE FILE KFPLIB/ARDDSSRC.
MEMBER EXP01P

```

SEQNBR* . . . + . . . 1 . . . + . . . 2 . . . + . . . 3 . . . + . . . 4 . . . + . . . 5 . . . + . . . 6 . . . + . . . 7 . . . + . . . 8
100      A*****
200      A*      泛太資訊科技開發股份有限公司 - 版權所有      TEL:7313250      *
300      A*
400      A*      PRTF NAME      : EXP01P      *
500      A*      PROGRAM NAME  : EXP01      *
600      A*      REMARK        : 學生基本資料簡冊      *
700      A*****
800      A
900      A      R PH1
1000     A      34' 學生基本資料簡冊 '
1100     A      SPACEA(2)
1200     A      1' 學生編號 : '
1300     A      DST01S      R      +1REFFLD(ST01)
1400     A      +0' ~ '
1500     A      DST01E      R      +0REFFLD(ST01)
1600     A      52' 日期 : '
1700     A      SYSDTF      6      0      +1EDTCDE(Y)
1800     A      +1' 頁次 : '
1900     A      +1PAGNBR EDTCDE(Z)
2000     A      SPACEA(1)
2100     A      52' 時間 : '
2200     A      +1TIME
2300     A      +2' <EXP01P> '
2400     A      SPACEA(1)
2500     A      1' =====+
2600     A      =====+
2700     A      =====+
2800     A      ====='
    
```

2 9 0 0	A				SPACEA (1)
3 0 0 0	A				1 ' 學 生 編 號 '
3 1 0 0	A				1 1 ' 學 生 姓 名 '
3 2 0 0	A				3 0 ' 電 話 '
3 3 0 0	A				5 0 ' 連 絡 人 '
3 4 0 0	A				SPACEA (1)
3 5 0 0	A				1 ' 地 址 '
3 6 0 0	A				SPACEA (1)
3 7 0 0	A				1 ' =====+
3 8 0 0	A				=====+
3 9 0 0	A				=====+
4 0 0 0	A				===== '
4 1 0 0	A				SPACEA (1)
4 2 0 0	A *	-----			
4 3 0 0	A	R	PD0 1		SPACEA (1)
4 4 0 0	A		ST0 2	R	2
4 5 0 0	A		ST0 3	R	1 1
4 6 0 0	A		ST0 4	R	3 0
4 7 0 0	A		ST0 5	R	5 0
4 8 0 0	A				SPACEA (1)
4 9 0 0	A		ST0 5	R	2
5 0 0 0	A *	-----			
5 1 0 0	A	R	PE1		
5 2 0 0	A				1 ' =====+
5 3 0 0	A				=====+

<EXP01D>

學生資料簡冊列印

日期：10/30/92

學生編號：F0000001~F9999999

*** 請準備80格報表紙 ***

PF3=回主畫面

【泛太資訊】

學生基本資料簡冊

學生編號：F0000001 ~ F9999999

日期：10/30/92 頁次：1
時間：17:45:58 <EXP01P>

學生編號 地 址	學生姓名	電話	連絡人
F921029 台北市三水街33號	李木達	02-331-1234	李水嚴
F921030 新竹市東城街123巷123號	周大頭	02-222-2213	周月眉

報表結束

5738PW1 V2R2M0 920615

SEU SOURCE LISTING

SOURCE FILE RPGLIB/QRPGSRC

MEMBER PODETP

SEQNBR*	1	2	3	4	5	6	7
100	A						REF(APFLDREF)
200	A	R ORDDTL					TEXT('PO LINE ITEM RECORD')
300	A	PORNBR	6	0			TEXT('PURCHASE ORDER NUMBER')
400	A						COLHDG('PURCHASE' 'ORDER' 'NUMBER')
401	A	ITMNBR	5	0			TEXT('ITEM NUMBER')
402	A						COLHDG('ITEM' 'NUMBER')
403	A	ITMDSC	2	5			TEXT('ITEM DESCRIPTION')
404	A						COLHDG('ITEM' 'DESCRIPTION')
900	A	QTYORD	5	0			TEXT('ITEM ORDERED QUANTITY')
1000	A						COLHDG('ITEM' 'ORDERED' 'QUANTITY')
1100	A	K PORNBR					
1200	A	K ITMNBR					

* * * * E N D O F S O U R C E * * * *

** PURCHASE ORDER DETAIL REPORT **

PO NO.	ITEM NO.	ITEM DESC.	ORDER QUANTITY
1 0 0 0 0 0	0 0 0 0 1	CUP - 1	2 5
1 0 0 0 0 0	0 0 0 0 1	CUP - 1	2 3
1 0 0 0 0 0	0 0 0 0 1	CUP - 1	4 5
SUBTOTAL :			9 3
1 0 0 0 0 0	0 0 0 0 2	CUP - 2	3 0
SUBTOTAL :			3 0
1 0 0 0 0 0	0 0 0 0 3	CUP - 3	7 8
SUBTOTAL :			7 8
TOTAL :			2 0 1
2 0 0 0 0 0	0 0 0 0 5	CUP - 5	4 5
2 0 0 0 0 0	0 0 0 0 5	CUP - 5	6 7
2 0 0 0 0 0	0 0 0 0 5	CUP - 5	7 8
SUBTOTAL :			1 9 0
TOTAL :			1 9 0
3 0 0 0 0 0	0 0 0 0 7	CUP - 7	6 7
SUBTOTAL :			6 7
3 0 0 0 0 0	0 0 0 0 8	CUP - 8	4 5
SUBTOTAL :			4 5
TOTAL :			1 1 2
GRANT TOTAL :			5 0 3

0 4 / 1 2 / 9 5 1 2 : 0 1 : 5 9

P A G E 1

ORDER NO .	ITEM NO .	ITEM DESC .	QUANT I T Y
1 0 0 , 0 0 0	1	C U P - 1	2 5
1 0 0 , 0 0 0	1	C U P - 1	2 3
1 0 0 , 0 0 0	1	C U P - 1	4 5
1 0 0 , 0 0 0	2	C U P - 2	3 0
1 0 0 , 0 0 0	3	C U P - 3	7 8
2 0 0 , 0 0 0	5	C U P - 5	4 5
2 0 0 , 0 0 0	5	C U P - 5	6 7
2 0 0 , 0 0 0	5	C U P - 5	7 8
3 0 0 , 0 0 0	7	C U P - 7	6 7
3 0 0 , 0 0 0	8	C U P - 8	4 5

* * * E N D O F R E P O R T * * *

SOURCE	FILE	.	.	.	.	.	.	RPGLIB / QRPGRSRC							
MEMBER	.	.	.	.	.	.	.	PORPT							
SEQNBR *	. . . + . . .	1	. . . + . . .	2	. . . + . . .	3	. . . + . . .	4	. . . + . . .	5	. . . + . . .	6	. . . + . . .	7	. . . + . . .
1 0 0	A									REF (APFLDREF)					
2 0 0	A			R	PH1					SKIPB (2)					
3 0 0	A									2 0 ' * * PURCHASE ORDER DETAIL REPORT *					
4 0 0	A									SPACEA (2)					
4 0 1	A									2 ' = = = = = -					
4 0 2	A									= = = = = -					
4 0 3	A									= = = = = ' -					
4 0 4	A									SPACEA (1)					
4 0 5	A									2 ' PO NO . ITEM NO . ITEM DSC . -					
4 0 6	A									ORDER QUANTITY					
4 0 7	A									SPACEA (1)					
4 0 8	A									2 ' - - - - -					
4 0 9	A									- - - - -					
4 1 0	A									- - - - - ' -					
4 1 1	A									SPACEA (1)					
5 0 0	A			R	PD1					SPACEA (1)					
5 0 1	A				PORNBR	R				6					
5 0 3	A				ITMNBR	R				+ 3					
5 0 4	A				ITMDSC	R				+ 3					
5 0 5	A				QTYORD	R				+ 6 EDTCDE (1)					

```
6 0 3      A
6 0 4      A
6 0 5      A
0 0 0      A      S T O T      6      0
1 0 0      A      R   P T 2
2 0 0      A
3 0 0      A
4 0 0      A
5 0 0      A
5 0 1      A
6 0 0      A      T T O T      6      0
7 0 0      A      R   P E 1
8 0 0      A
9 0 0      A
0 0 0      A
1 0 0      A
1 0 1      A
2 0 0      A      G T O T      6      0

      - - - - -
      S P A C E A ( 1 )
1 0 ' S U B T O T A L      : '
5 3 E D T C D E ( 1 )
      S P A C E A ( 1 )
2 ' - - - - -
      - - - - -
      - - - - -
      S P A C E A ( 1 )
1 0 ' S U B T O T A L      : '
5 3 E D T C D E ( 1 )
      S P A C E A ( 1 )
2 ' = = = = =
      = = = = =
      = = = = = '
      S P A C E A ( 1 )
1 0 ' G R A N T      T O T A L      : '
5 3 E D T C D E ( 1 )

* * * * E N D O F S O U R C E * * * *
```


5 7 3 8 PW1 V 2 R 2 M 0 9 2 0 6 1 5

SEU SOURCE LISTING

SOURCE FILE RPGLIB / QRPGRSRC
MEMBER RPGTST

```

SEQNBR* . . . + . . . 1 . . . + . . . 2 . . . + . . . 3 . . . + . . . 4 . . . + . . . 5 . . . + . . . 6 . . . + . . . 7 .
200      FPODETP   IP   E           K           DISK
201      FPORPT    O    E           39          PRINTER
202      IORDDTL
203      I                                     PORNBR 2
204      I                                     ITMNBRL 1
300      C*****
400      C*                               MAIN   ROUTINE
500      C*****
600      C  N10                               EXSR  INIT
700      C                               ADD   QTYORD      STOT          SUBTOTAL
701      C                               ADD   QTYORD      TTOT          TOTAL
702      C                               ADD   QTYORD      GTOT          GRANTTOT
703      C*OVERFLOW
704      C                               *IN39      IFEQ  ' 1 '
705      C                               EXSR  HEAD
706      C                               END
707      C*
800      C                               WRITE PD1
900      CL1  10                               EXSR  SUBL1
1000     CL2  10                               EXSR  SUBL2
1100     CLR                               WRITE PE1          END OF REPT
    
```

```

1101 C *****
1102 C *              I N I T      S U B R O U T I N E
1103 C *****
1104 C              I N I T      B E G S R
1105 C                      E X S R   H E A D
1106 C                      S E T O N                      1 0
1107 C                      E N D S R
1108 C *****
1109 C              H E A D      S U B R O U T I N E
1110 C *****
1111 C              H E A D      B E G S R
1112 C                      W R I T E P H 1
1113 C                      S E T O F                      3 9
1114 C                      E N D S R
1115 C *****
1116 C              S U B L 1      S U B R O U T I N E
1117 C *****
1200 C              S U B L 1      B E G S R
1300 C                      W R I T E P T 1
1400 C                      Z - A D D 0                      S T O T
1500 C                      E N D S R
1600 C *****
1700 C              S U B L 2      S U B R O U T I N E
1800 C *****
1900 C              S U B L 2      B E G S R
2000 C                      W R I T E P T 2
2100 C                      Z - A D D 0                      T T O T
2200 C                      E N D S R

* * * *   E N D   O F   S O U R C E   * * * *

```

第六章：資料結構及 Array & Table 介紹

單元內容

本單元將介紹資料結構的多種用法。一開始針對資料結構在1卡上的定義及起始值設定，以及基本資料結構的重新定義，結合及分割欄位的規則，建立副程式參數組合等。

單元目標

撰寫程式碼，使用基本資料結構組合或重定義。

修改有呼叫副程式之程式，使用資料結構的方式定義參數組合。

使用資料結構存取資料區的資料。

Array & Table 介紹

陣列型態 (ARRAY TYPE)

執行時才輸入資料之陣列 (Run-time ARRAY)

編譯時即放入資料之陣列 (Compile-time ARRAY)

PAN PACIFIC

編譯時即放入資料之陣列 (COMPILE-TIME ARRAY)

E			Record Sequence of the Chaining File										To Filename	Table or Array Name	Number of Entries Per Record	Number of Entries Per Table or Array	Length of Entry	P/B/L/R	Decimal Positions Sequence(A/D)	Table or Array Name (Alternation Format)	Length of Entry	P/B/L/R	Decimal Positions Sequence(A/D)	Commants																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Line	Form Type	Number of the Chaining Field																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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表示程式尾之資料
每行數6個
陣列元素(ELEMENT)

** ← 程式最後面第一、二欄位打上 '**' 第三欄留空

111222333444555666
777888999AAABBBCCCC

上述之陣列如下：

111	222	333	444	555	666	777	888	999	AAA	BBB	CCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

[illegible]

編譯時即放入資料之陣列的運用 (COMPILE-TIME ARRAY)

[illegible][illegible]

**

資料不存在

資料KEY值重覆

資料輸入錯誤

對 照 表
TABLE

對照表特性

1. 定義：TABLE名稱前三碼必須是 ‘TAB’
2. 可運用的型態：編譯時即放入資料
(Compile-Time)
3. 操作指令：LOKUP

資料結構概念和定義

(DATA STRUCTURE CONCEPTS AND DEFINITION)

資料結構的特性

儲存區(STORAGE AREA)

程式建立

重新定義欄位空間

程式內部使用欄位之處理

文字字串處理

空白起始設定

資料結構型態

基本

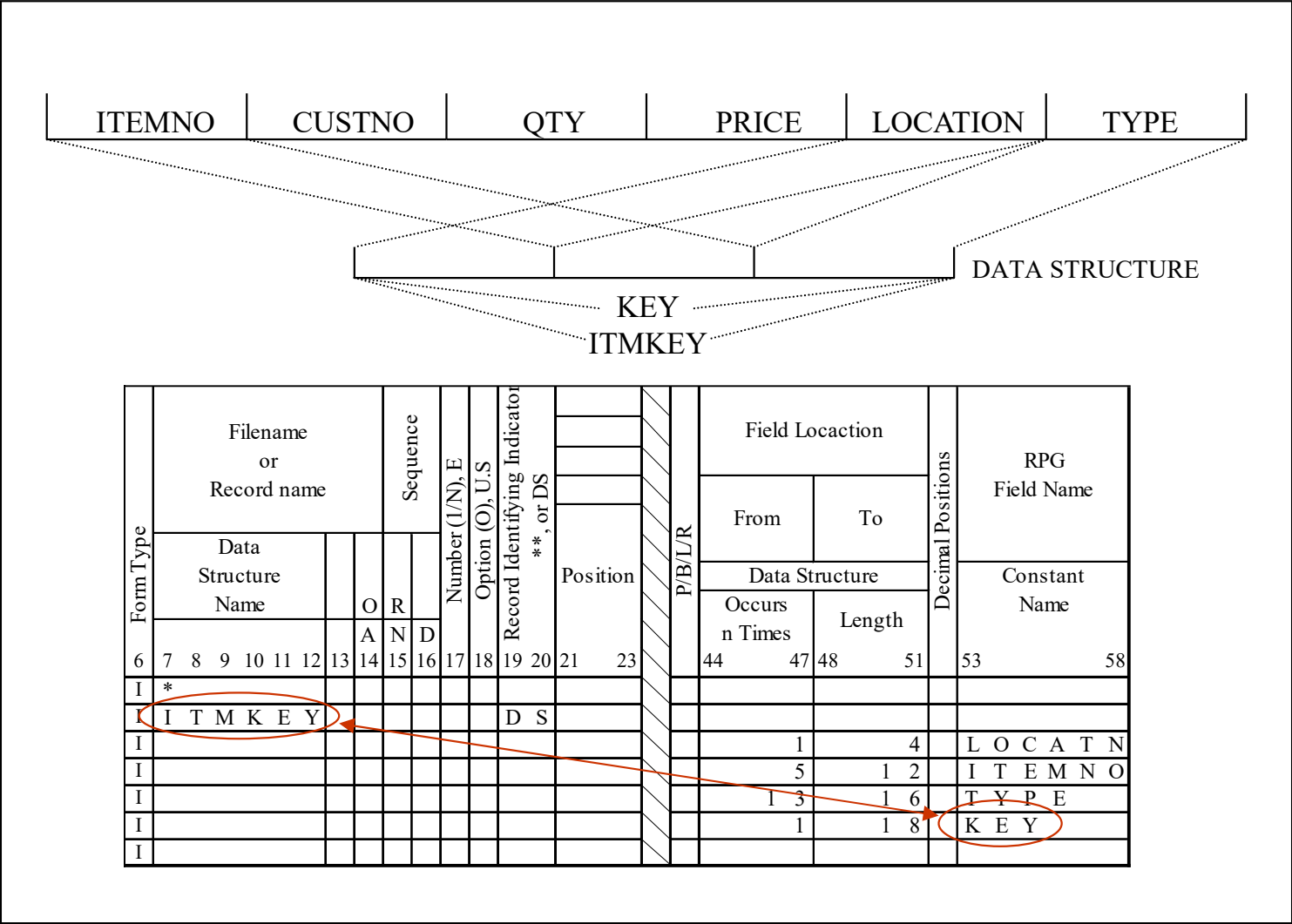
多重處理

資料區

程式執行狀態

檔案執行訊息

程式內描述資料結構的一般撰寫法則



程式外部描述資料結構的一般撰寫法則

ITEMNO	NAME	SEASCN	PRICE	LOCIGAL FILE ITEMMSTR
MODEL	FABRIC	COLOR	SIZE	DATA STRUCTURE

①

A	Name Type Reserved	Name	Reference(R)	Length	Date Type Decimal Positions	Function
	17 18 19		28 29 30	34 35 36 37 45	55	
A						R E F (R E F F L E)
A	R	I T M D S C				
A		M O D E L	R			
A		F A B R I C	R			
A		C O L O R	R			
A		S I Z E	R			
A						

②

CRTPF FILE (RPGLIB/ITEMNODSC) MBR(*NONE)

③

I	Form T	Data Structure Name	O R	Number Option	Record Identify	Position	Not(N) C/Z/D	Charact	Position	Not(N) C/Z/D	Charact	Position	Not(N)
3 4 5	6 7 8 9 10 11 12	13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39											
0 1		D S C P T N		E	D S I T E M N O D S C								
0 2													
0 3													

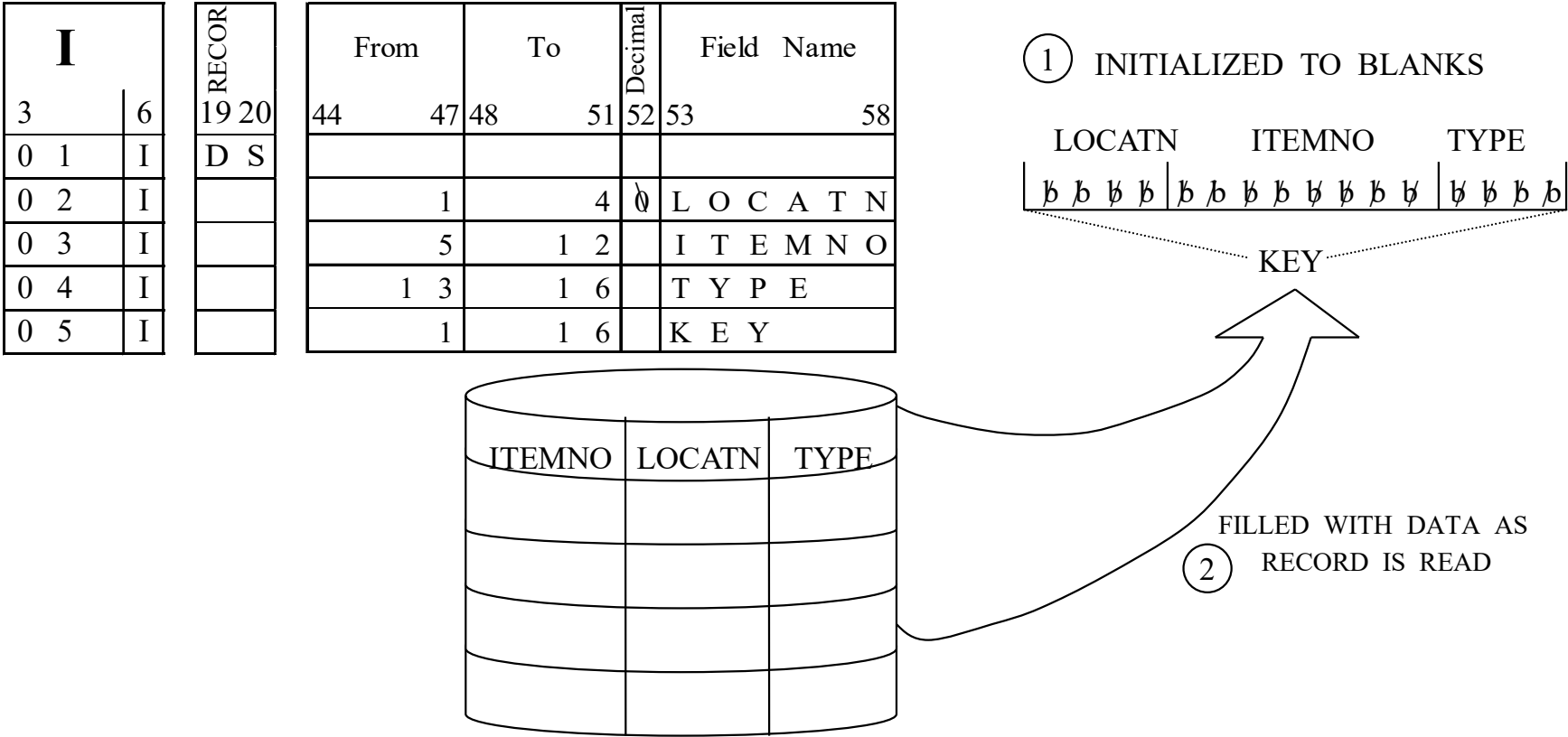
需要資料結構
名稱定義

外部宣告檔案名稱包含
一個描述子欄位的單一
資料記錄列

程式外部描述資料結構的一些優點包含下列幾點：

- 資料定義的整合維護
- 降低撰寫需求

程式使用資料結構執行情況



當你執行資料結構欄位初值總體設定時，文數字欄位會清成空白，數字欄位則會清成零。(第十八欄打上 'I')

當你設定資料結構子欄位初值時，其他子欄位所在行的第八欄沒打上 'I' 的，皆不會被設定初值。

使用固定常數值欄位(NAMED CONSTANTS) 設定子欄位初值

Line			Form Type	Filename or Record Name										Sequence		Number (1/N), E	Option (O), U, S	Record Identifying Indicator: **, or DS	Subfield Initialization Value												Field Location		RPG Field Name	Control Level (L1-L9)	Matching Fields or Chaining Fields	Field Record Relation	Field Indicators																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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				Data Structure Name										O	R				Position	Not (N)	C/Z/D	Character	Position	Not (N)	C/Z/D	Character	Position	Not (N)	C/Z/D	Character	P/B/L/R	Form	To	Decimal Positions	Constant Name				Plus	Minus	or	Zero																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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本例中LOCATN和TYPE初值將被設定成與它串連的固定常數值欄位的值。因為ITEMNO第8欄有打上 'I'但沒有串連的固定常數值欄位，所以它的初值就被設定成空白。

外部宣告資料結構欄位初值設定

[illegible]

這個例子顯示如何置換一個已被總體初值設定的資料結構，另外再設定特殊初值給適當的子欄位。

基本資料結構 (BASIC DATA STRUCTURES)

基本資料結構的使用

組合欄位

切割欄位

陣列處理

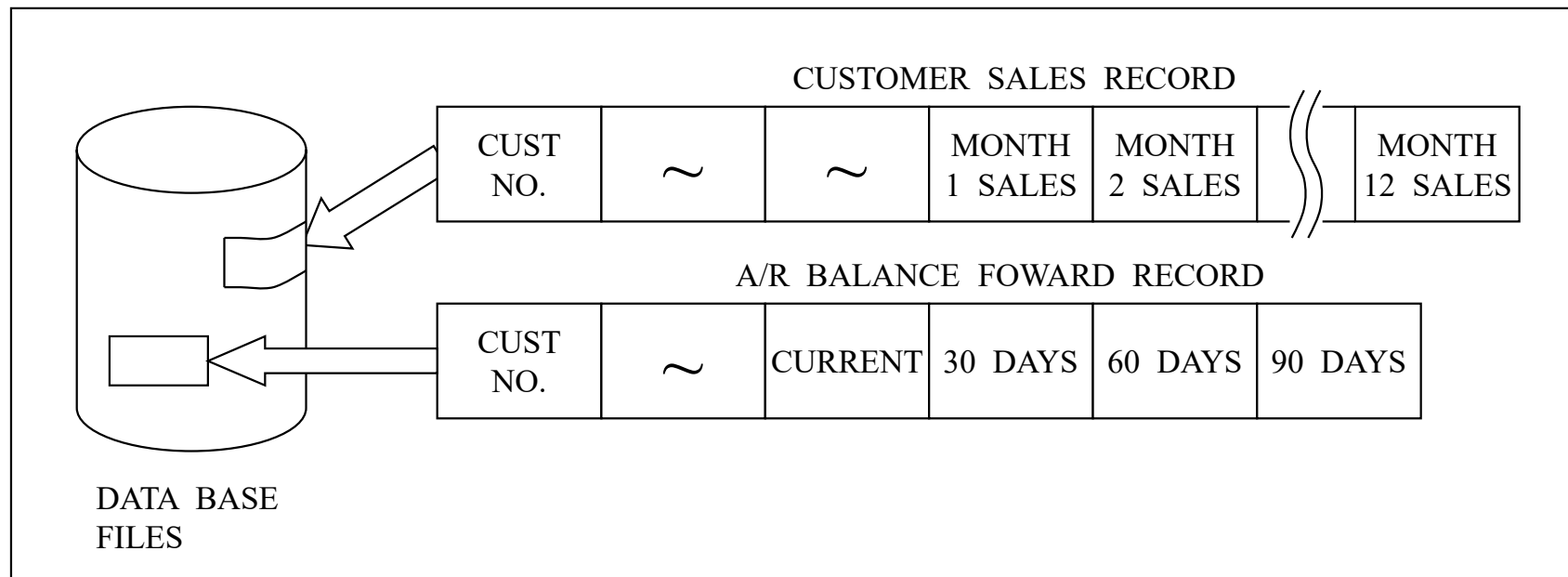
重新定義欄位

參數組合 (PARAMETER LISTS)

ITEMNO	NAME	SEASON	PRICE
	MODEL	FABRIC	COLOR
			SIZE

[illegible]

使用資料結構定義外部宣告陣列



資料庫定義的欄位被使用成陣列(ARRAY)元素的決定因素如下：

這些欄位可以定義成一個陣列嗎？

使用於程式內的欄位型態為何？

- 像陣列？
- 或是像獨立的欄位？

這些欄位可否被QUERY使用？

0	1	1	2	8	9
DAY			MTH	YR	
DAYMTH			MTHYR		
CDATE					

PAN PACIFIC

利用資料結構定義參數欄位組

[illegible][illegible]

特殊資料結構

特殊資料結構

資料區資料輸入

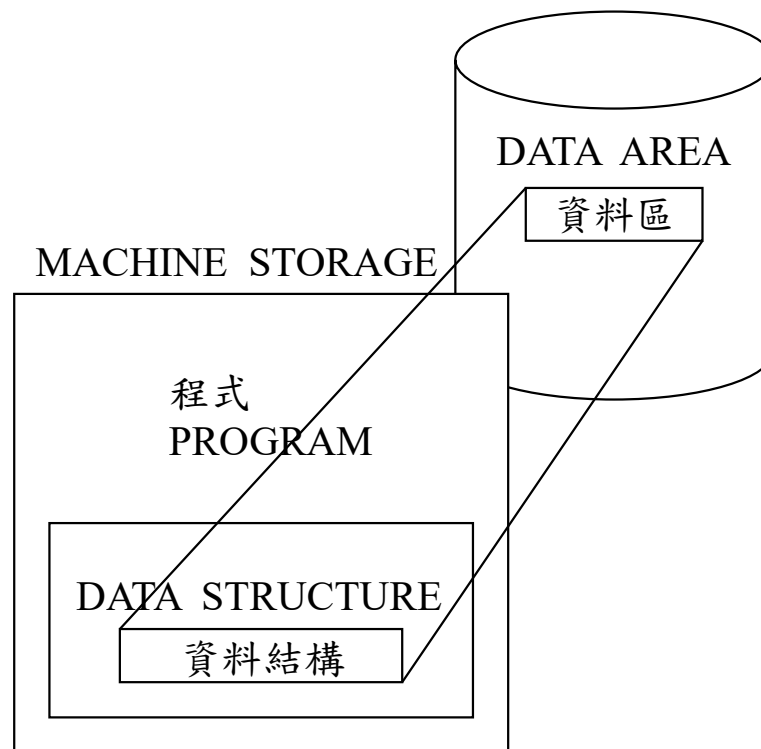
多重處理 (MULTIPLE OCCURRENCE)

檔案執行狀態訊息

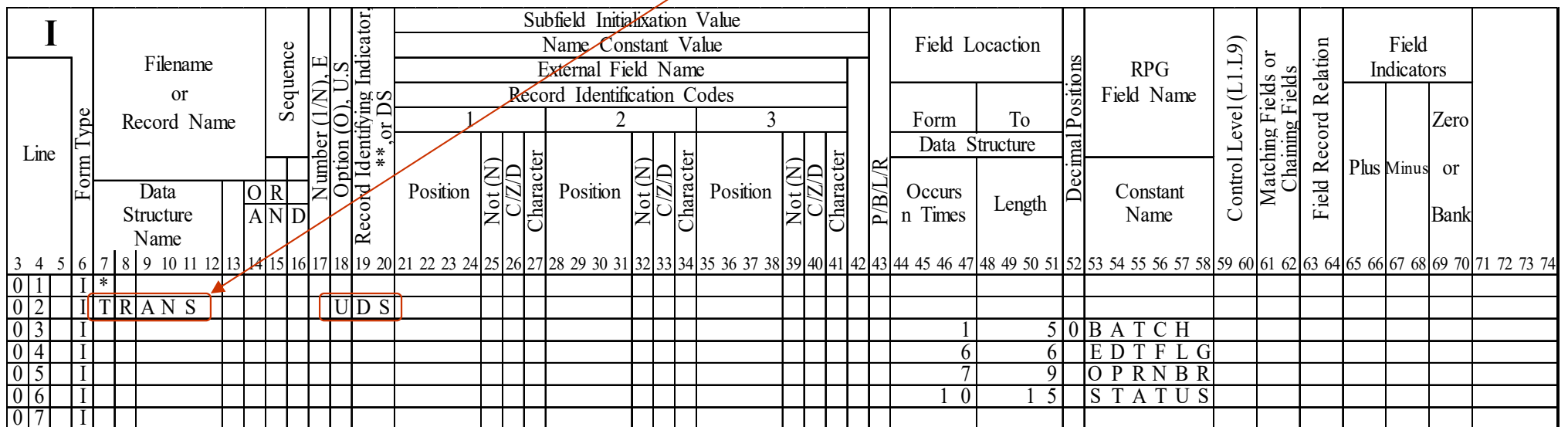
程式執行狀態

資料區之資料結構

RPG 程式內部直接經由資料結構存取資料區資料。



*DTAARA



資料區資料結構使用DEFN/IN/OUT (定義/輸入/輸出)

Form Type	Control Level (L0-L9 LR, SR, AN/OR)		Indicators										Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust (H)	Arithmetic				
			And					And								Plus		Minus	Zero							
																Compare		1>2	1<2			1=2				
																Look Up(Factor 2) is		High	Low			Equal				
6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58
C	*																									
C														* N A M V A R	D E F N			T R A N S	1 5							
C														* L O C K	I N		T R A N S									
C															M O V E		' D E T A I L '	S T A T U S								
C															O U T		T R A N S									
C																										
C																										
C																										
C																										

```
graph LR; A[編輯程式] <--> B[*LDA]; B -- SBMJOB --> C[批次程式]; B --> D[執行程式]
```

PAN PACIFIC

[illegible]

[illegible]

[illegible]

[illegible]

第七章：次檔案(SUBFILE)查詢 (Subfiles Used for Inquiry)

單元內容

本課程一開始將先回顧DDS如何定義一個SUBFILE，其中包含與此SUBFILE相關的RPG程式中接續行(F SPEC.)、燈號指示器、和操作指令(OPERATION CODE)。我們將會以兩支簡單的SUBFILE程式來說明。第一支程式主要運作方式是在SUBFILE顯示在螢幕之前先填滿所要查詢的資料。第二支程式則是一次只讀一頁SUBFILE資料顯示在螢幕。最後我們再討論兩個控制SUBFILE輸出行數和列數的KEYWORDS。

單元目標

能修改螢幕檔(DSP. FILE)將SUBFILE有關的FORMAT資料輸入或更正。

列示SUBFILE查詢程式可用的操作指令(O.P. CODE)。

針對每一個操作指令解釋其在檔案記錄格式中之用途。

在F卡接續行DSPF下輸入所使用到的SUBFILE。

寫一支SUBFILE查詢程式。

修改DDS讓SUBFILE一次只讀一頁資料進去。

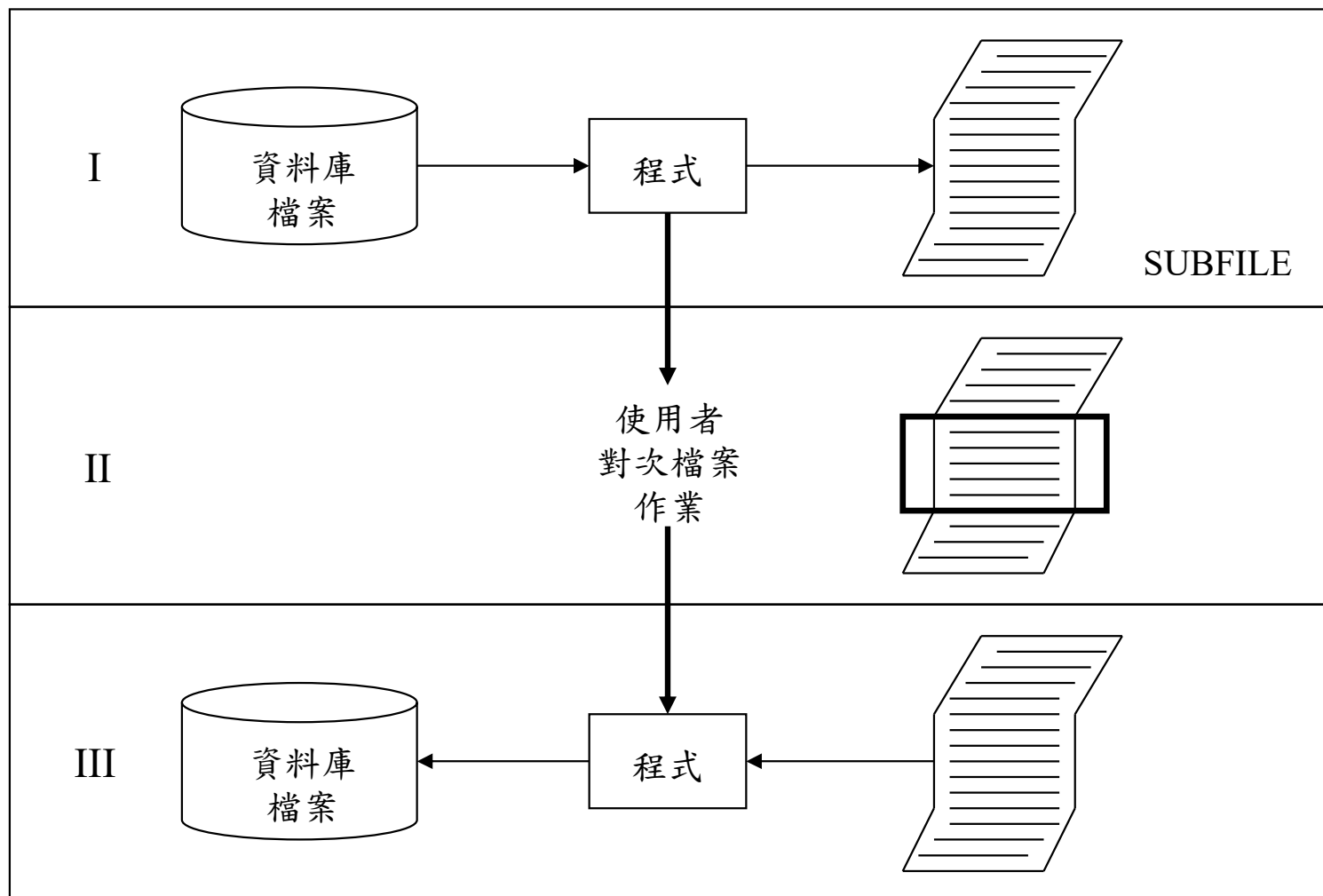
修改程式中的C卡，或一次只填一頁查詢資料於SUBFILE。

解釋使用SFLDROP和SFLLIN來修改SUBFILE的顯示方式。

次檔案的程式設計

(SUBFILE PROGRAMMING)

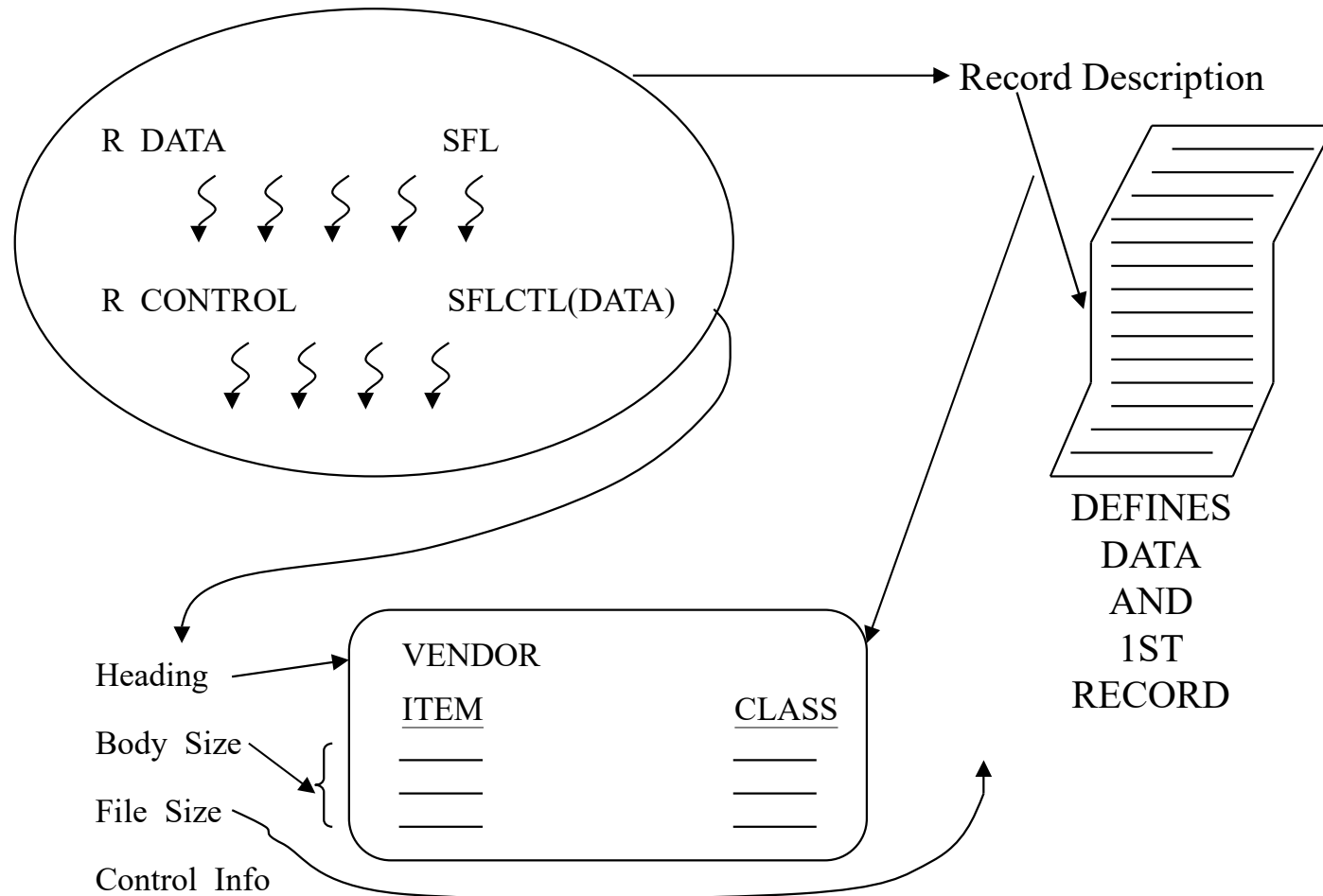
次檔案的使用 (SUBFILE USE)



螢幕列示圖：運用次檔案查詢、修改資料

[illegible]

次檔案記錄 (SUBFILE RECORDS)



次檔案主要的DDS關鍵字元(KEYWORDS)

[illegible]

使用控制記錄格式(CONTROL RECORD)
來顯示SUBFILE或執行控制功能

WRITE
EXFMT

利用燈號指示器指定做什麼動作

實體螢幕輸入 / 輸出 - EXFMT 操作指令

Form Type	Control Level (LO-LR, SR, AN/OR)			Indicators										Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust (H)	Arithmetic					
				And					And								Name	Length	Plus	Minus			Zero					
																			Compare									
																			1>2	1<2			1=2					
High	Low	Equal																										
6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43											48	49	51	52	53	54	56	58
C														S	E	T	O	N							8	5	9	5
C	*																											
C														E	X	F	M	T	C	O	N	T	R	O	L			
C	*																											
C														S	E	T	O	F							8	5	9	5
C																												

名稱定義：於 DDS 中
(SUBFILE 控制格式名稱)
操作者必須按 ‘執行鍵’ 才會繼續執行

用 WRITE 操作指令執行控制功能

[illegible]

使用次檔案記錄格式(SUBFILE RECORDS),
將資料放入次檔案中

WRITE

相關記錄序號(RRN)將決定
記錄資料跑到何處

螢幕檔案(DISPLAY FILE)次檔案的定義

[illegible]

相關記錄序號欄位
用來處理次檔案資料

次檔案記錄格式 定義在DDS中

WRITE 操作指令將資料放入次檔案中

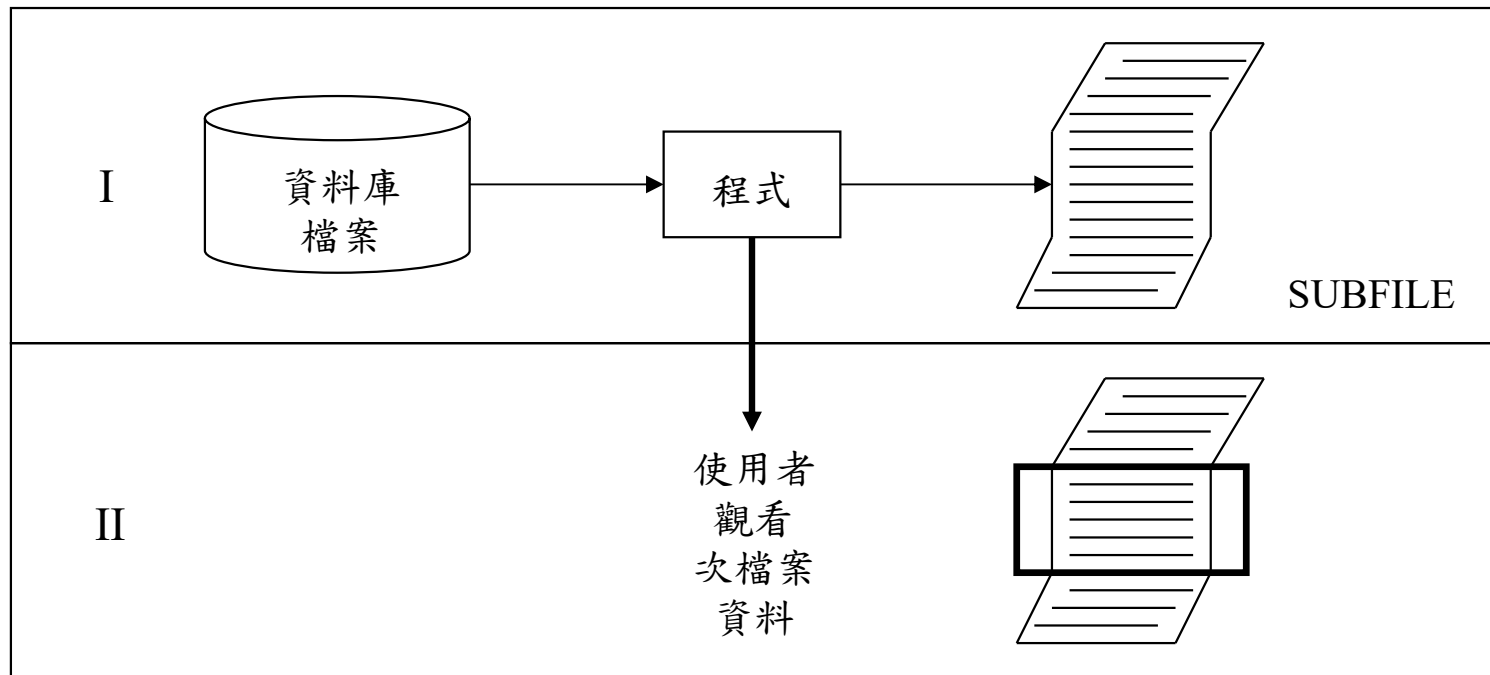
C		Line	Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators												Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust (H)	Arithmetic				
					And						And									Name	Length			Plus	Minus	Zero		
																				Compare				Look Up(Factor 2) is				
																				1>2	1<2			1=2	High	Low	Equal	
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58
1		C	*												1													
2		C	*																									
3		C	*																									
4		C	*																									
5		C														A D D	1			R R N			2	0				
6		C														W R I T E		D A T A									4	0
7		C																										
8		C																										
9		C																										
0		C																										
1		C																										
2		C																										
3		C																										
4		C																										
5		C																										
6		C																										
7		C																										
8		C																										
9		C																										
0		C																										

NAME DEFINED IN DDS
(SUBFILE RECORD FORMAT)

40 ON = SUBFILE FULL

次檔案的查詢程式 (SUBFILE FOR INQUIRY)

使用次檔案來做查詢



程式設計者的次檔案作業

啟動 (ACTIVATING)

資料輸入 (LOADING)

螢幕顯示 (DISPLAYING)

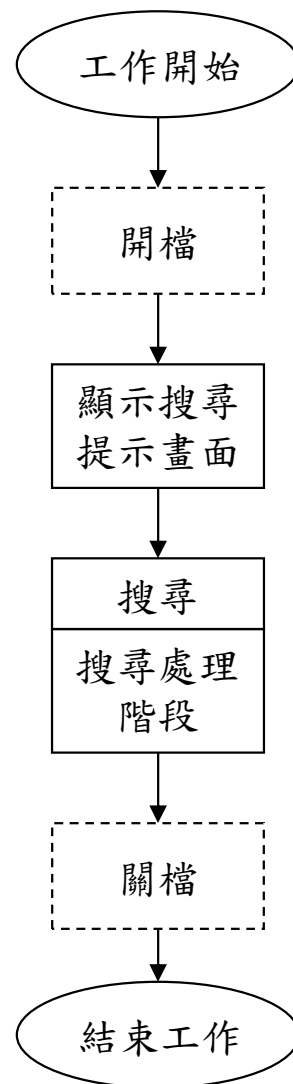
執行處理 (PROCESSING)

啟動

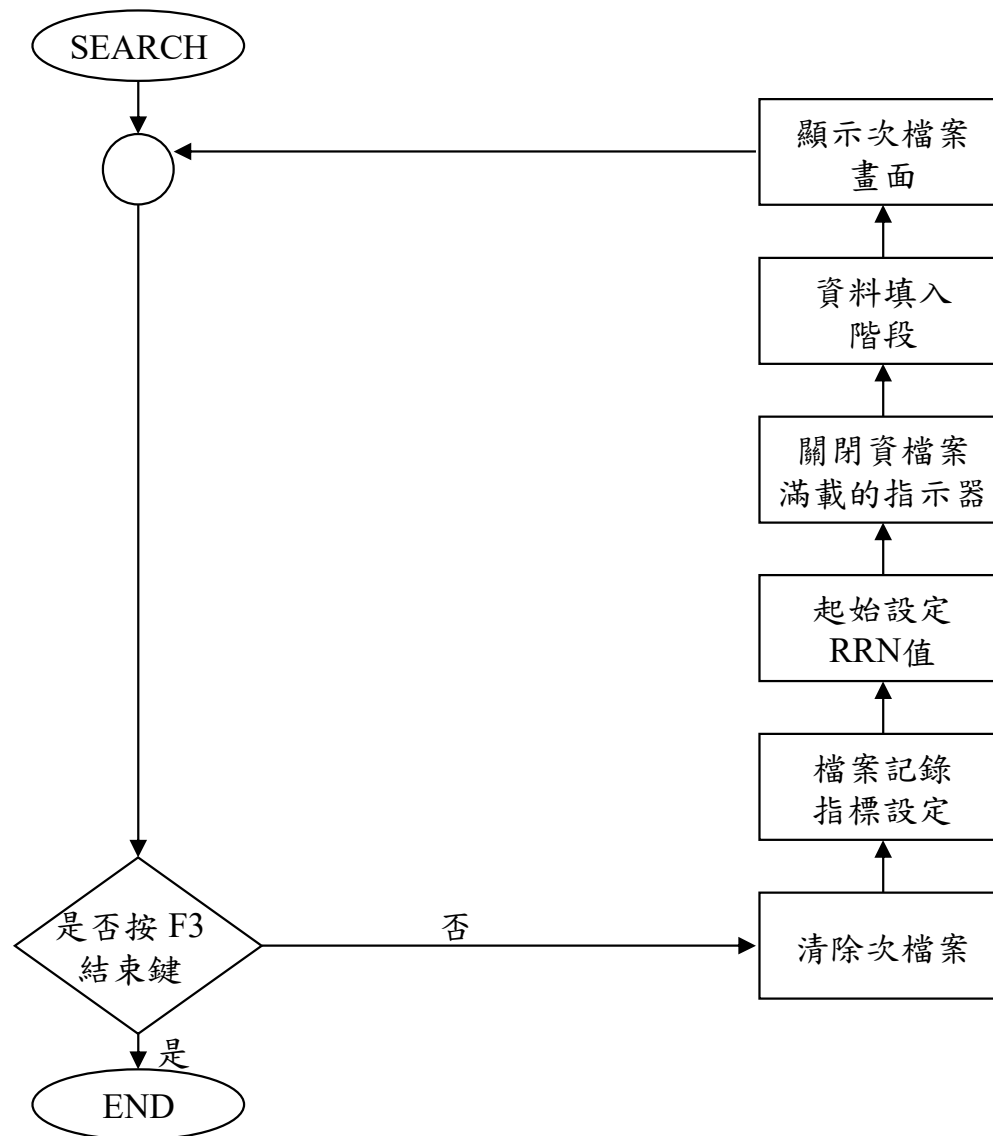
將資料寫入
次檔案記錄中

單筆啟動記錄資料

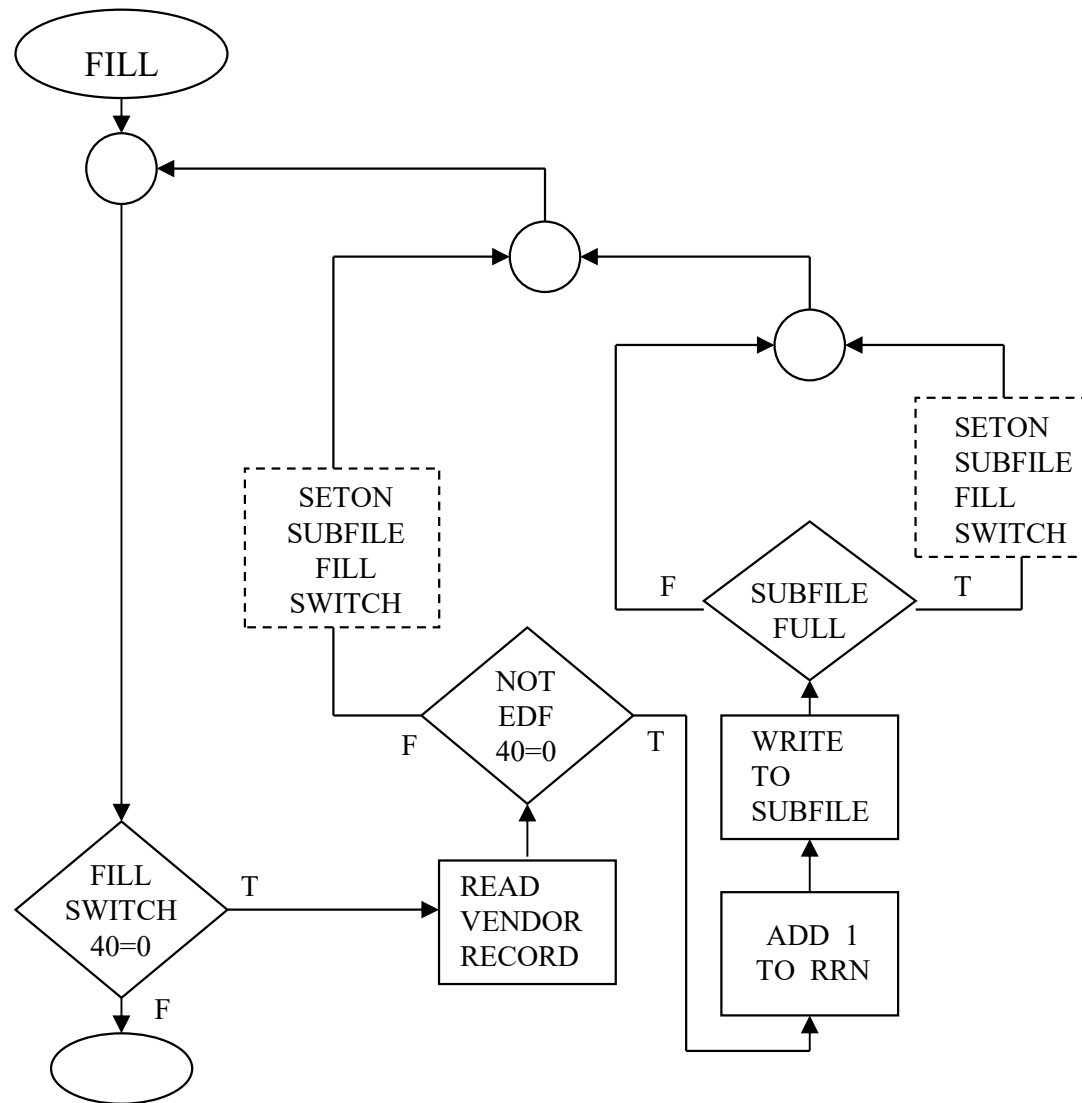
次檔案查詢作業：結構化流程圖



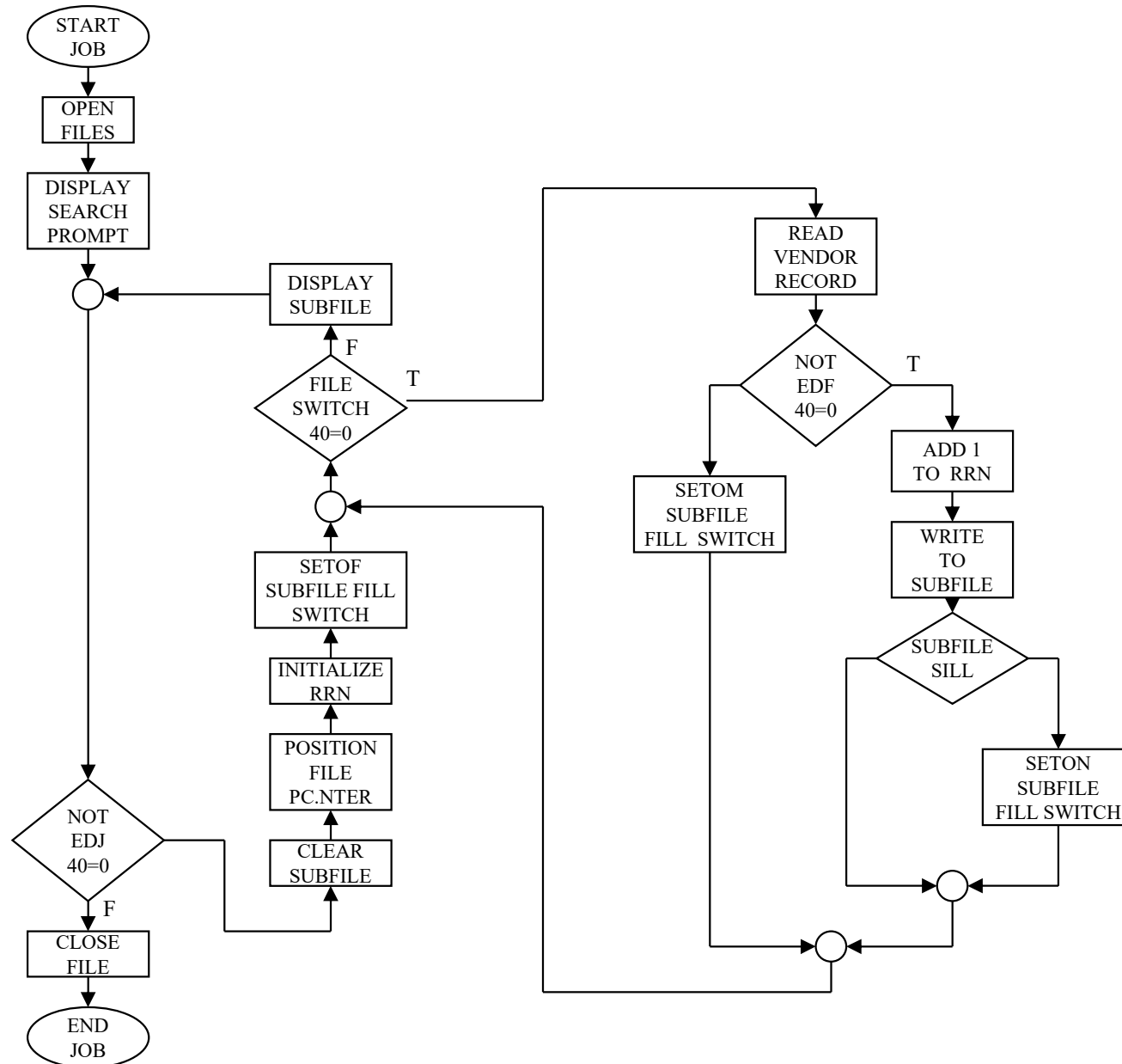
次檔案查詢作業：搜尋檔案資料階段



次檔案查詢作業：資料填入次檔案階段



使用次檔案查詢資料 - 彙總式流程圖



7-22

PAN PACIFIC

7-23

PAN PACIFIC

PAN PACIFIC

次檔案查詢程式(四之一)

[illegible][illegible]

PAN PACIFIC

次檔案查詢程式 (四之三)

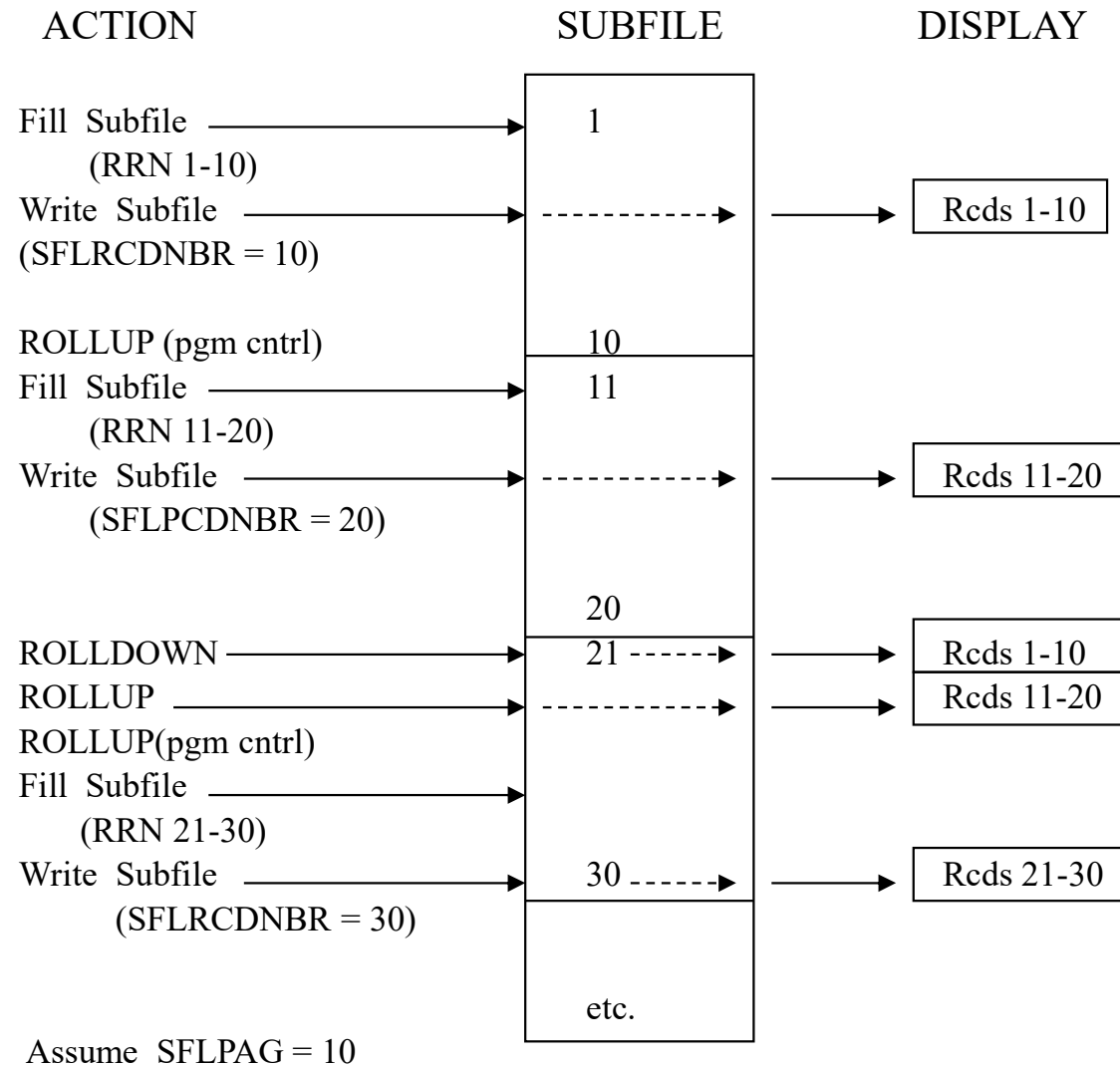
C		Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust (H)	Arithmetic				
Line	5			And							And										Name	Length	Plus	Minus			Zero				
				Compare																											
				1>2			1<2			1=2																					
				Look Up(Factor 2) is																											
				High				Low				Equal																			
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58			
1		C	*																												
2		C	*		FILL							SUBFILE																			
3		C	*																												
4		C																													
5		C																													
6		C																													
7		C																													
8		C																													
9		C																													
0		C																													
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8		C																													
9		C																													
0		C																													

次檔案查詢程式 (四之四)

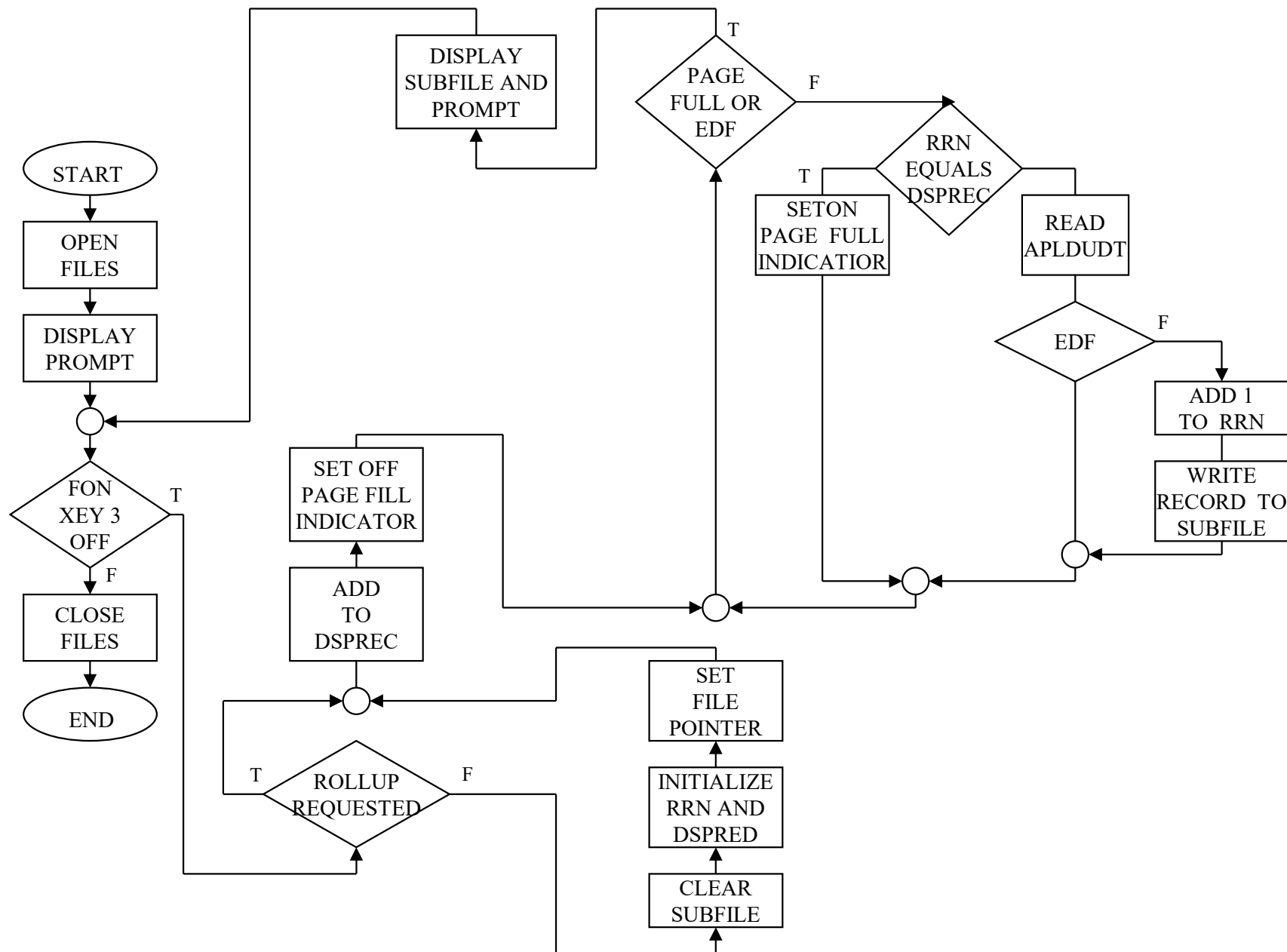
C		Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field			Decimal Positions	Half Adjust (H)	Arithmetic														
Line	4																									Plus	Minus	Zero												
																										Compare														
																										1>2	1<2	1=2												
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單頁次檔案資料輸入

單頁次檔案資料輸入



單頁次檔案資料輸入



DDS - 單頁次檔案資料輸入之一

[illegible]

DDS - 單頁次檔案資料輸入之二

[illegible]

[illegible]

單頁次檔案資料輸入之二

C		Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust (H)	Arithmetic				
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PAN PACIFIC

單頁次檔案資料輸入之四

C	Line	Form type	Control Level(L0-L9,LR,SR,AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half adjust (H)	Arithmetic		
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次檔案(SUBFILE)顯示方式控制

次檔案(SUBFILE)顯示方式控制

<p>SFLDROP SFLFOLD SFLLIN</p>

7-42

PAN PACIFIC

- TRUNCATED

FOLDED

注意: 次檔案記錄格式 SFL RECORD
在DDS中撰寫成兩行

SFLFOLD

Form Type		Conditioning														Name Type (b/R/K/S/O)	Reserved	Name	Reference (R)	Length	Date Type (b/A/P/S/B/F A/SX/Y/N/I/W)	Decimal Positions	Usage (b/OI/B/H/M/P)	Location				Function																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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874325 SMITH 845-0011

TRUNCATED

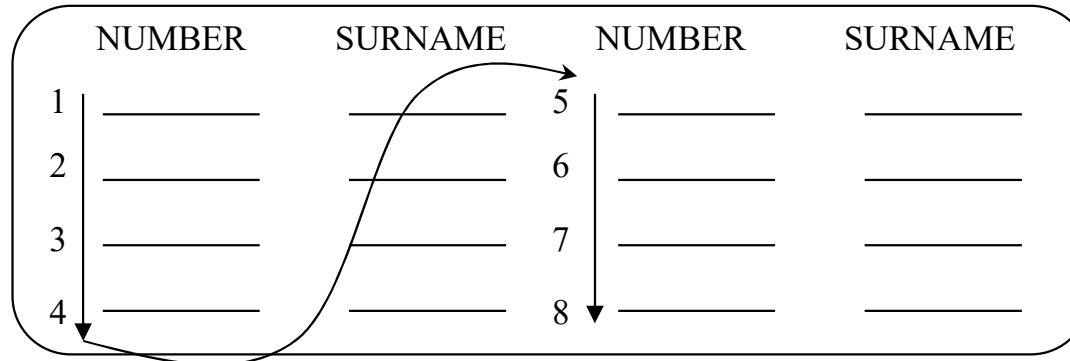
注意: 次檔案記錄格式 SFL RECORD
在DDS中撰寫成兩行

7-44

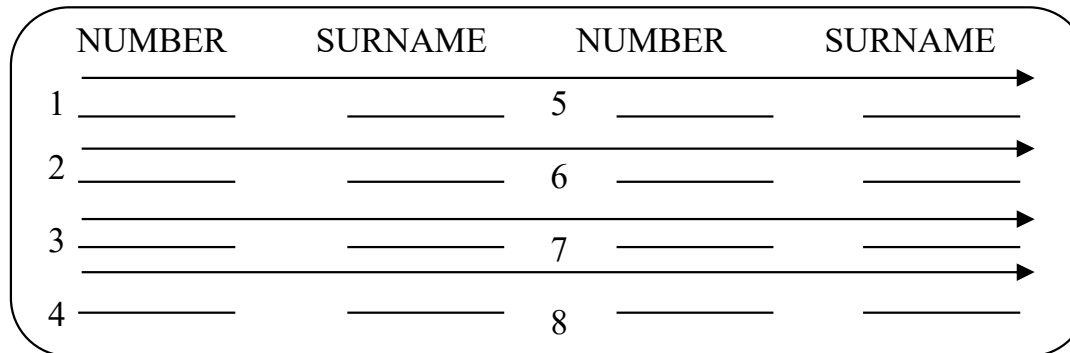
PAN PACIFIC

兩排螢幕資料
間隔2個字元

SFLLIN REMINDER (SFLLIN 提示)



次檔案排列順序



螢幕游標移動順序

第八章：運用次檔案查詢修改資料檔

單元內容

本單元延續上一單元，更進一步討論利用次檔案輸入及修改資料，再回存資料庫檔案的一些觀念，它包含 RPG/400 所須使用到的操作指令。另外一個相關主題描述兩個特別的考量：即是關於任何有關檔案維護程式中螢幕檔所使用的 DDS 關鍵字。本單元將用一支實例程式來說明。

單元目標

解釋 CHAIN 操作指令如何運作在次檔案裡。

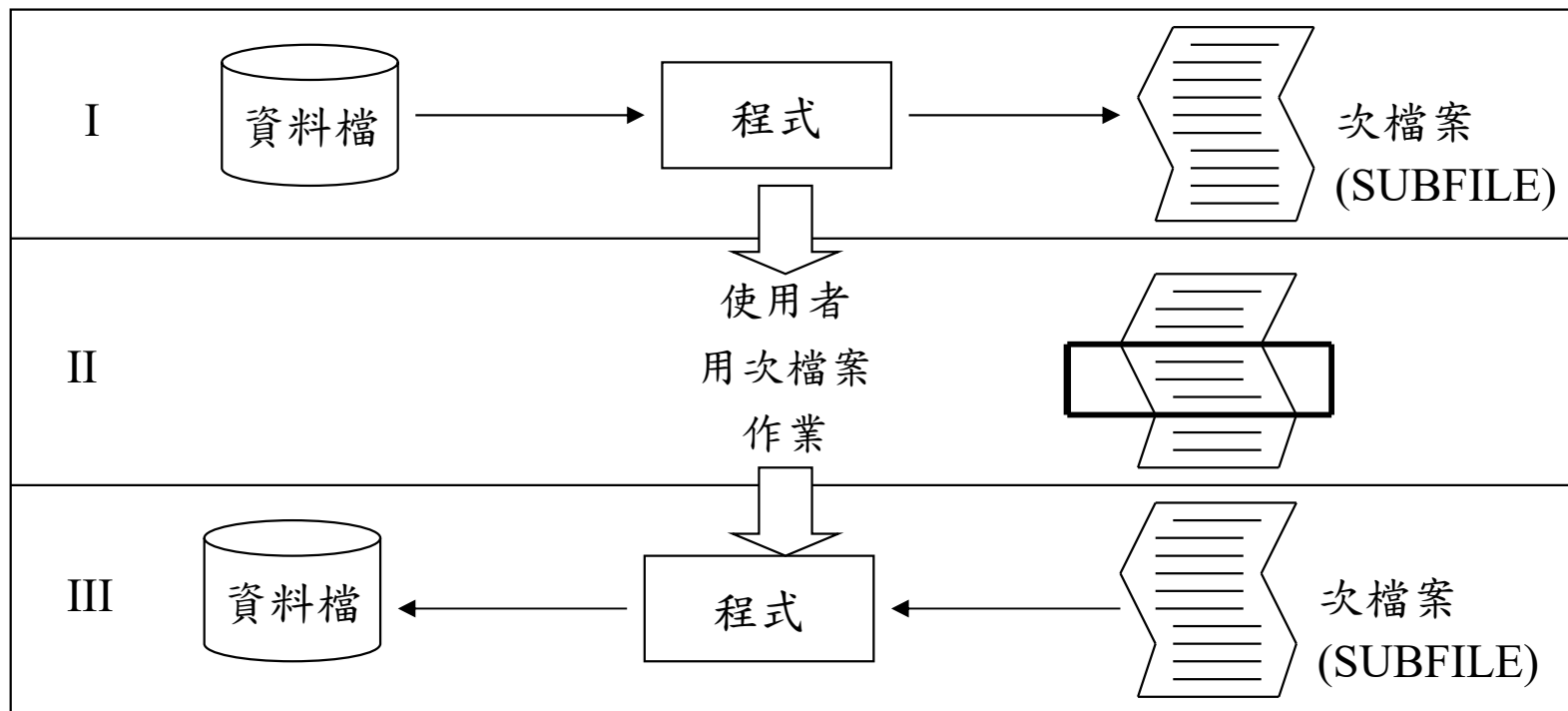
解釋 READC 操作指令。

討論 RTNDTA DDS 關鍵字的意思。

解釋 CA 鍵和 CF 鍵的不同。

使用上述技巧去修改程式，以達成運用次檔案查詢修改功能來更動資料庫檔案資料。

使用次檔案修改資料檔資料



程式設計者次檔案作業步驟

啟動

資料讀入

螢幕顯示

執行處理

啟動

將資料寫入次檔案記錄中

單筆啟動記錄資料

從次檔案中接受記錄

CHAIN (BY RRN)

READC

8-7

PAN PACIFIC

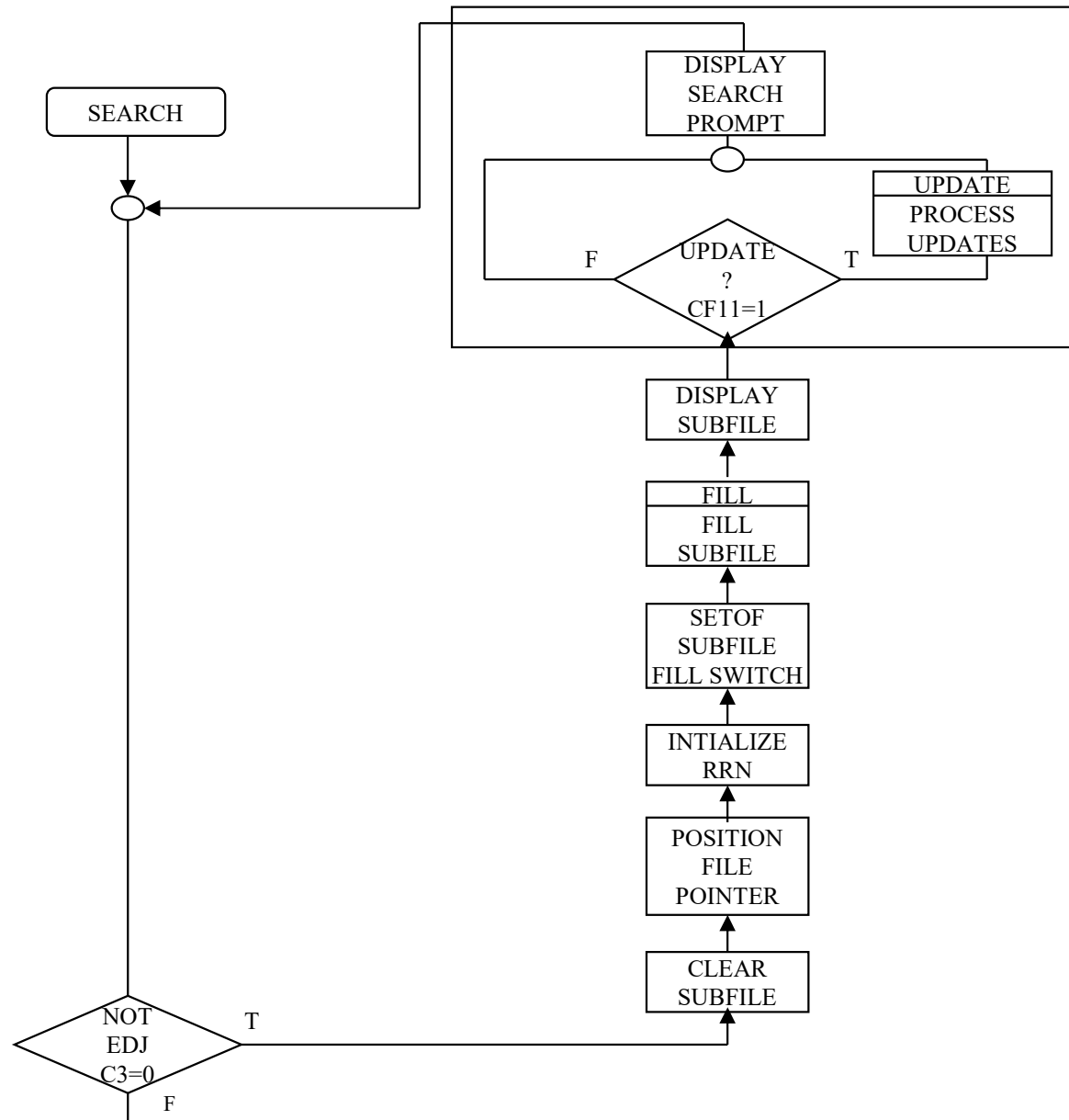
READC 操作指令

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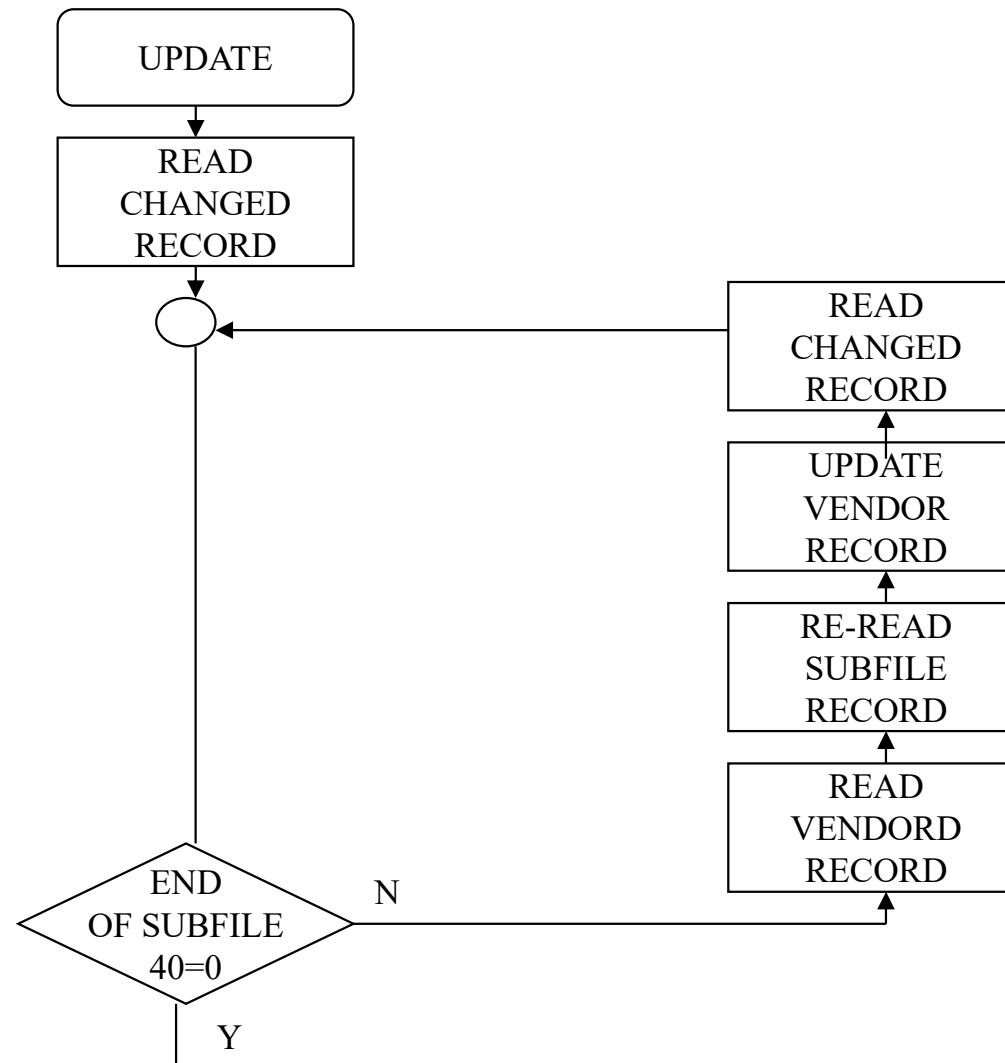
40 ON 表到檔案尾
資料結束

使用次檔案查詢修改資料檔案撰寫技巧

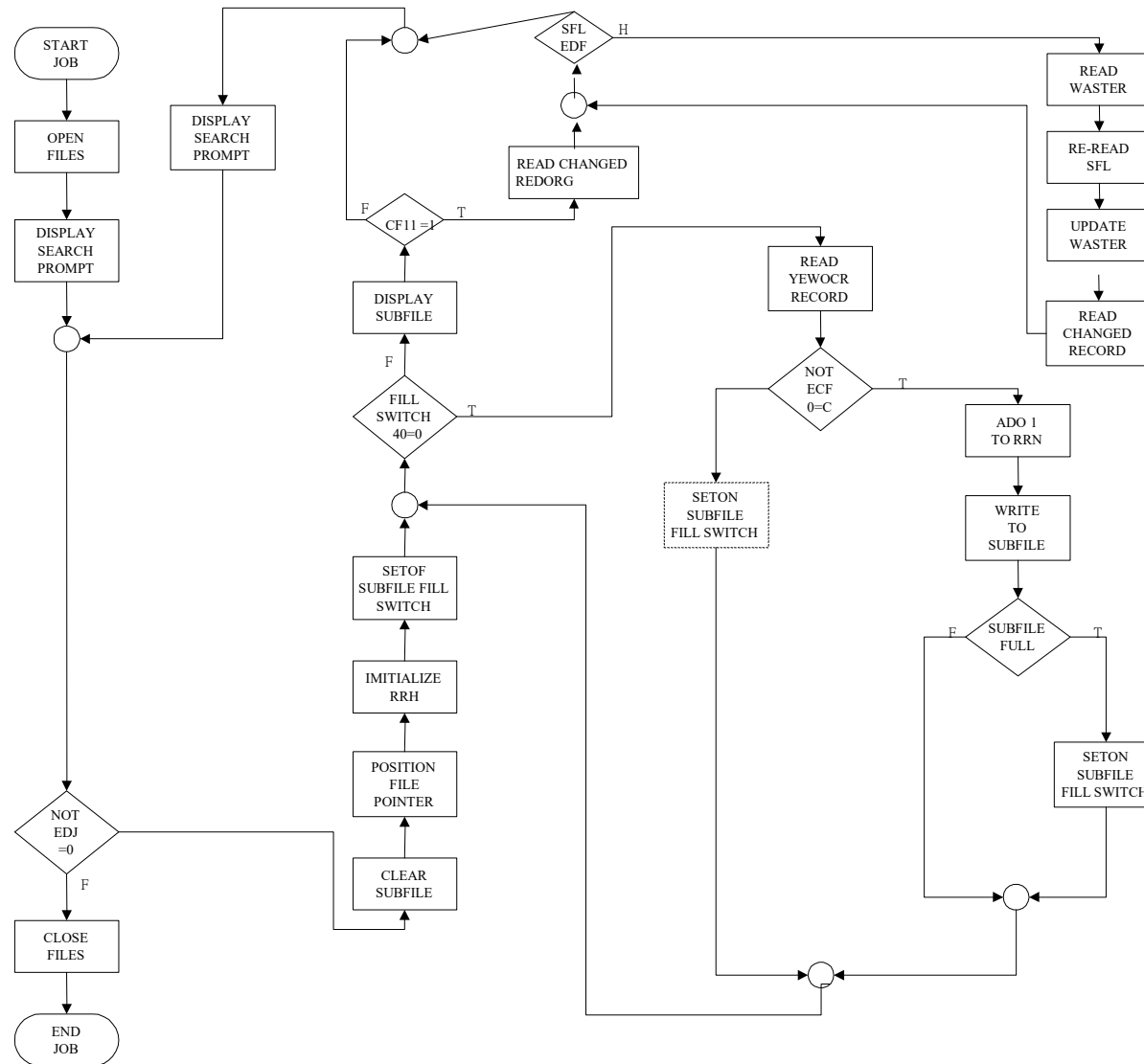
增加修改功能於次檔案查詢程式中



執行更新 (修改) 處理



運用次檔案修改 - 彙總流程圖



DATA DESCRIPTION SPECIFICATIONS

Form Type	Conditioning																Name type (b/R/K/S/O)	Reserved	Name	Reference (R)	Length	Date Type (b/P/S/B/F A/S/X/Y/N/I/W)	Decimal Positions	Usage (H/O/B/H/M/P)	Location						Function																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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SUBFILE FOR UPDATE 之二

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9		C														W R I T E		C O N T R O L											
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SUBFILE FOR UPDATE 之三

C		Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field				Decimal Positions	Half Adjust (H)	Arithmetic							
Line				And							And										Name	Length	Plus	Minus			Zero							
				Compare																														
				1>2							1<2																	1=2						
				Look Up(Factor 2) is																														
				High							Low																	Equal						
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58						
1		C	*																															
2		C	*		FILL				SUBFILE																									
3		C	*																															
4		C																																
5		C																																
6		C																																
7		C																																
8		C																																
9		C																																
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SUBFILE FOR UPDATE 之 四

C		Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field			Decimal Positions	Half Adjust (H)	Arithmetic									
Line	4																									Plus	Minus	Zero							
																										Compare									
																										1>2	1<2	1=2							
																										Look Up(Factor 2) is									
																										High	Low	Equal							
5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58								
1	C	*																																	
2	C	*		DISPLAY				SUBFILE																											
3	C	*																																	
4	C																S E T O N								8	5	9	5							
5	C																W R I T E	F C N K E Y																	
6	C																E X F M T	C O N T R O L																	
7	C																S E T O F								8	5	9	5							
8	C																																		
9	C																																		
0	C																																		
1	C																																		
2	C																																		
3	C																																		
4	C																																		
5	C																																		
6	C																																		
7	C																																		
8	C																																		
9	C																																		
0	C																																		

SUBFILE FOR UPDATE 之 五

C		Form Type	Control Level (L0-L9, LR, SR, AN/OR)	Indicators														Factor 1	Operation	Factor 2	Result Field		Decimal Positions	Half Adjust (H)	Arithmetic					
				And							And										Name	Length			Plus	Minus	Zero			
And							And							Compare																
Not						Not			Not								1>2				1<2	1=2								
Look Up(Factor 2) is	High			Low	Equal																									
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	27	28	32	33	42	43	48	49	51	52	53	54	56	58		
1		C	*																											
2		C	*		PROCESS UPDATE																									
3		C	*																											
4		C																												
5		C																												
6		C																												
7		C																												
8		C																												
9		C																												
0		C																												
1		C																												
2		C																												
3		C																												
4		C																												
5		C																												
6		C																												
7		C																												
8		C																												
9		C																												
0		C																												

SUBFILE FOR UPDATE 之 六

[illegible]

LAB1 結構化程式設計 (一)

請寫一支RPGS1程式設計算所得稅

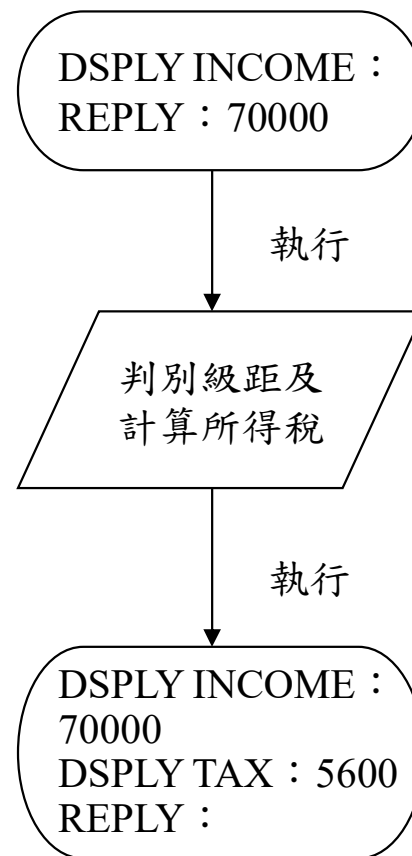
程式要求如下：

1. 利用DSPLY指令將所得總額由螢幕輸入。
2. 再利用SELEC指令判別所得級距，並且計算出應付所得稅。
3. 再次利用DSPLY指令將所得稅顯示於PGMMSG畫面上。
4. 稅率級距假設如下：

60,000 以下	0%
60,001 ~ 100,000	8%
100,001 ~ 200,000	12%
200,001 ~ 400,000	20%
400,001 ~ 600,000	30%
600,000 以上	40%

5. 流程圖：

變數：
所得總額：IC(6,0)
所得稅 IX(6,0)



LAB2 結構化程式設計 (二)

請將 RPGS1 COPY 另一支程式 RPGS2

接續 LAB1，程式需求修改如下：

1. 利用 DO 迴圈讓程式可以一直做，直到所得總額 = 999999，直接結束程式 (LEAVE)。

LAB3 結構化程式設計 (三)

請將 **RPGS2 COPY** 成另一支程式 **RPGS3** 延續 **LAB2** 需求如下：

- 1.利用 ITER 跳過所得總額輸入小於40,000並且繼續下一迴圈。
- 2.試將稅額計算之程式區段放入一個子程序(SUBROUTINE)中，重組 **RPGS3** 之程式。

INTRODUCTION

THIS WORKBOOK IS DESIGNED FOR LAB EXERCISES FOR THE AS/400 INTERACTIVE RPG PROGRAMMING WORKSHOP. THESE EXERCISES ARE BASED ON AN ACCOUNTS PAYABLE/PURCHASE ORDERING APPLICATION WHICH COUNTAINS REALISTIC REQUIREMENTS THAT HAVE SEEN SIMPLIFIED TO MAKE THEM PRACTICAL, YET WORKABLE WITHIN THE TIME LIMITS OF THE CLASS. OPTIONAL EXERCISES ARE ALSO INCLUDED TO GIVE YOU ADDITIONAL PRACTIES IF TIME IS AVAILABLE.

YOUR LIBRARY WILL CONTAIN THE FOLLOWING OBJECTS :

APFLDREF	- ACCOUNTS PAYABLE/PURCHASE ORDER FILED REFERENCE FILE
DEUDATEL	- LOGICAL OPEN VENDOR INVOICE FILE (KEY IS INVOICE NUMBER WITHIN DUE MONTH/DAY WITHIN YEAR)
ITEML	- LOGICAL ITEM MASTER FILE(KEY IS ITEM NUMBER)
ITEMP	- ITEM MASTER FILE(ARRIVAL SEQUENCE)
OPNINVP	- OPEN VENDOR INVOICE FILE (ARRIVAL SEQUENCE)
PODETP	- PURCHASE ORDER DETAIL FILE (ARRINAL SEQUENCE)

PONSRL - LOGICAL PURCHASE ORDER FILE - BUILT OVER THE TWO PHYSICAL FILES POSUMP AND PODETP. THE FILE HAS AN ACCESS PATH KEYED ON PURCHASE ORDER NUMBER.

PONSRL - LOGICAL PURCHASE ORDER FILE - BUILT OVER THE TWO PHYSICAL FILES POSUMP AND PODETP. THE SUMMARY RECORDS (FROM POSUMP) ARE KEYED ON PURCHASE ORDER NUMBER AND THE DETAIL RECORDS (FROM PODETP) ARE KEYED ON ITEM NUMBER WITHIN PURCHASE ORDER NUMBER.

POSUMP - PURCHASE ORDER SUMMARY FILE (ARRIVAL SEQUENCE)

VENODRL - LOGICAL VENDOR MASTER (KEY IS VENDOR NUMBER)

VENODRP - VENDOR MASTER FILE (ARRIVAL SEQUENCE)

QDDSSRC - SOURCE FILE CONTAINING ALL OF YOUR DDS SOURCE MEMBERS FOR FILES CREATED IN THIS WEEK'S LAB EXERCISES

ORPGSRC - SOURCE FILE CONTAINING ALL OF YOUR RPG SOURCE MEMBERS FOR FILES CREATED IN THIS WEEK'S LAB EXERCISES

PLASE NOTE :

THE LIBRARY YOU WILL BE WORKING WITH IS PRGXX, WHERE XX IS YOUR ASSIGNED TEAM NUMBER, ALL FILED DEFINITIONS, UNLESS OTHERWISE NOTED, ARE TO BE REFERENCED FORM THE FILED REFERENCE FILE APFLDREF, DDS FOR IN QDDSSRC IN YOUR LIBRARY.

ALL OBJECTS ARE TO BE CREATED IN YOUR LIBRARY.

ALL SOURCE MEMBERS FOR FILES ARE TO BE CREATED IN QDDSSRC.

ALL SOURCE MEMBERS FOR PROGRAMS ARE TO BE CREATED IN QRPGRSRC.

ALL REFERENCE TO THE SUFFIX “XX” IN THIS WORKBOOK REFER TO YOUR ASSIGNED TEAM NUMBER.

SIGN ON BY ENTERING YOUR USERID (RPGXX) AND PASSWORD (RPGXX). ALL EXERCISES WILL BE DONE USING WRKMBRPDM.

LAB EXERCISE 1

THE PURPOSE OF THIS EXERCISE IS FOR YOU TO USE STRUCTURED PROGRAMMING TECHNIQUES IN DEVELOPING YOUR PROGRAM LOGIC.

THIS EXERCISE IS A FILE UPDATE PROGRAM OF AN OPEN PURCHASE ORDER FILE. THE SYSTEM HAS AN OPEN PURCHASE ORDER FILE CONTAINING OUTSTANDING PURCHASE ORDERS. THE OPEN PURCHASE ORDER FILE IS A LOGICAL FILE, PORDERL, WHICH IS BUILT OVER TWO PHYSICAL FILES : A PURCHASE ORDER SUMMARY FILE, POSUMP, AND A PURCHASE ORDER DETAIL RECORDS FOR EACH PURCHASE ORDER IN THE OPEN PURCHASE ORDER FILE. A SUMMARY RECORD ALWAYS HAS AT LEAST ONE DETAIL FILE PO DETP. THERE IS ONE SUMMARY RECORD AND POSSIBLY MULTIPLE DETAIL RECORD. AS THE MERCHANDISE ARRIVES IN THE RECEIVING DEPARTMENT, A CLERK USES THE PURCHASE ORDER UPDATE PROGRAM TO ENTER THE QUANTITY RECEIVED.

GIVEN THE FOLLOWING REQUIREMENTS, DEVELOP YOUR PROGRAM USING STRUCTURED PROGRAMMING TECHNIQUES.

1. THE PROGRAM INITIALLY DISPLAYS A PROMPT SCREEN WHICH ALLOWS THE OPERATOR TO ENTER PURCHASE ORDER NUMBER, THE ITEM NUMBER, AND THE QUANTITY DELIVERED OR TO END THE JOB, THE LAYOUT FOR THIS SCREEN IS ON PAGE 5.
2. THE OPEN PURCHASE ORDER FILE PORDERL IS A LOGICAL FILE BASED ON THE TWO PHYSICAL FILES POSUMP (SUMMARY RECORDS), AND PO DETP (DETAIL RECORDS). ALL OF THESE FILES ARE IN YOUR LIBRARY, AND THE DDS ARE IN YOUR SOURCE FILE QDDSSRC.

3. THE PROGRAM IS TO VALIDATE THE PURCHASE ORDER NUMBER AND ITEM NUMBER THAT ARE

A. FIRST ACCESS THE DETAIL RECORD WHICH IS KEYED ON PURCHASE ORDER NUMBER. IF THE PURCHASE ORDER NUMBER AND ITEM NUMBER. IF THE DETAIL RECORD CANNOT BE FOUND, ACCESS THE SUMMARY RECORD WHICH IS KEYED ON PURCHASE ORDER NUMBER.

B. IF NEITHER THE DETAIL NOR THE SUMMARY RECORD CAN BE FOUND, DISPLAY THE MESSAGE : "INVALID PURCHASE ORDER NUMBER".

C. IF THE SUMMARY RECORD CAN BE FOUND BUT NOT THE DETAIL, DISPLAY THE MESSAGE : "INVALID ITEM NUMBER".

D. IF THE DETAIL RECORD IS FOUND, M UPDATE THE QUANTITY RECEIVED FILED (QTYREC) IN THE DETAIL RECORD BY ADDING TO IT THE QUANTITY DELIVERED (QTYDEL) THAT WAS ENTERED BY THE OPERATOR.

E. IF THE UPDATED QUANTITY RECEIVED (QTYREC) IS EQUAL TO THE QUANTITY ORDERED (QTYORD), UPDATE THE STATUS CODE WITH A "C" AND THE DATE RECEIVED WITH TODAY'S DATE.

F. RE-DISPLAY THE PROMPT SCREEN.

4. CREATE YOUR DISPLAY FILE DSP001 IN YOUR LIBRARY, THE DDS FOR THIS FILE IS IN YOUR SOURCE FILE QDDSSRC.

5. REFRESH THE DATA IN YOUR FILES BY ENTERING THE COMMAND :

CALL REFRESH

6. CODE YOUR PROGRAM, NAMING IT RPG01, AND ENTER IT INTO QRPGRSRC.

7. CREATE THE PROGRAM RPG01 IN YOUR LIBRARY.

8. BEFORE EXECUTING YOUR PROGRAM, LIST THE RECORDS IN THE PORDERL FILE BY ENTERING THE COMMAND :

CALL LIST1

YOUR LISTING SHOULD BE THE SAME AS THAT ON PAGE 6.

9. EXECUTE YOUR PROGRAM INTERACTIVELY AND ENTER THE FOLLOWING RECEIPTS :

<u>PURCHASE</u>	<u>ITEM</u>	
<u>ORDER NO..</u>	<u>NUMBER</u>	<u>QUANTITY</u>
400005	50	5
400010	75	500
400015	275	2

TEST YOUR PROGRAM'S ERROR LOGIC BY KEYING AN INVALID PURCHASE ORDER NUMBER OF 999999, AND AN INVALID ITEM NUMBER OF 99999 WHILE ENTERING ONE OF THE ABOVE LINES.

10. RE-ENTER THE COMMAND :

CALL LIST1

AND COMPARE YOUR LISTING TO THE ONE ON PAGE 7. THE NEW LISTING SHOULD REFLECT THE RECEIPT THE RECEIPT TRANSACTIONS JUST ENTERED.

11. IF YOU NEED TO REFRESH YOUR FILES, ENTER THE COMMAND :

CALL REFRESH

BEFORE EXECUTING

EXERCISE 1 TEAM J									
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00						
					25	LINED PAPER	25		0/00/00
					150	BEAKERS	100		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00						
					50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00						
					75	BOTTLES	500		0/00/00
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00						
				C	175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2		0/00/00
400020	5075	PETER VAN ROTH CORP.	169.50						
				C	300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50						
				C	500	PICTURES	13	13	2/05/80

Display Screen Layout Sheet

PROMPT SCREEN - PURCHASE ORDER UPDATE

COLUMN

[illegible]

AFTER EXECUTING

EXERCISE 1 TEAM J									
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00		25	LINED PAPER	25		0/00/00
					150	BEAKERS	100		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00		50	SPOOLS	10	10	3/02/81
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00		75	BOTTLES	500	500	3/02/81
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00		175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2	2	3/02/81
400020	5075	PETER VAN ROTH CORP.	169.50		300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50		500	PICTURES	13	13	2/05/80

Lab 2

程式目的：請 CODING 一支RPG程式，進行採購單明細檔、採購項目的新增、修改、刪除作業。

程式處理要點

1. 請將下列處理方式：

A. 新增一採購項目：

畫面輸入欄位：PURCHASE ORDER NUMBER

ITEM

QUANTITY

當畫面資料輸入，按執行鍵時，請檢查該採購項目不可存在於採購單明細檔中 (PORDERL 中之 ORDDTL 記錄列)；如果存在，請顯示下列錯誤訊息 (即是 SETON *IN20)(CAN NOT ADD-ITEM ALREADY EXISTS IN PORCHASE ORDER):CHECK O.K. 寫入檔案中。

注意：一般正常的 MAINRENACE 程式，皆須先檢查採購單是否存在採購主檔中，本練習為簡化CODING，所以省略之。

B. 刪除一採購項目：

畫面上只需輸入：PURCHASE ORDER NO. ITEM NUMBER

並且在按執行鍵後，先檢查是否存在；若不存在，SETON *IN10, SHOW ERRMSG, 存在則直接刪除。

C.修改採購項目數量，畫面輸入欄位：

PURCHASE ORDER NUMBER

ITEM

QUANTITY

按執行鍵後，檢查是否存在檔案中，若不存在，SETON *IN10, SHOW ERRMSG, 存在則直接修改存檔。

2. COMPILE DISPLAY FILE: DSP002, 螢幕畫面如後。
3. 還原檔案資料: CALL REFRESH。
4. 在你的LIB中之QRPGSRC, CODING你的RPG02程式。
5. COMPILE RPG02 程式。
6. 請於執行前先列印採購單明細報表，備比較執行結果：CALL LIST2
7. 請輸入下列資料

MAINTAIN	PORCHASE	ITEM	QUANTITY	ERRMSG
<u>CODE</u>	<u>ORDER NO.</u>	<u>NO</u>		
1	400001	100	50	
2	400001	25		
3	400001	150	150	
1	400001	375	10	ERR-ALREADY EXIST
2	400001	99999		ERR-NOT FOUND
3	400001	99999	10	ERR-NOT FOUND

注意：請確實依上述資料輸入。

8. 列印執行後結果，並比較執行前、後兩份報表。CALL LIST2
9. 如果需要還原檔案資料，請重新 CALL REFRESH。

[illegible]

BEFORE EXECUTING

EXERCISE 2 TEAM J

PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00						
					25	LINED PAPER	25		0/00/00
					150	BEAKERS	100		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00						
					50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00						
					75	BOTTLES	500		0/00/00
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00						
				C	175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2		0/00/00
400020	5075	PETER VAN ROTH CORP.	169.50						
				C	300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50						
				C	500	PICTURES	13	13	2/05/80

AFTER EXECUTING

EXERCISE 2 TEAM J									
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00						
					100		50		0/00/00
					150	BEAKERS	150		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00						
					50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00						
					75	BOTTLES	500		0/00/00
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00						
				C	175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2		0/00/00
400020	5075	PETER VAN ROTH CORP.	169.50						
				C	300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50						
				C	500	PICTURES	13	13	2/05/80

LAB 3

本作業主要目的在於運用副程式進行採購單整張刪除作業。

請利用 RPG02 程式，將 RPG02 COPY 成 RPG03，並且修改 RPG03，增加採購單整張刪除之選項，透過選項 CALL 副程式 (RPG03S)，進行刪除資料存在的檢查及刪除。

RPG03S 使用另一個邏輯檔：PONBRL，此檔涵蓋表頭檔 (POSUMP) 及明細檔 (PODETP) KEY 值只有採購單號。

1. DISPLAY FILE 新的選項功能已為各位加上，請 COMPILE DSP003 即可。
2. COPY RPG02 成 RPG03，並且加上整張採購單刪除的選項處理，請注意畫面檔名要改成 DSP003，。
3. RPG03 程式中，選項 4 成立時，必須 CALL 副程式 RPG03S，參數傳出為採購單號 (PORNBR)，傳入參數為 *IN10 (檔案資料檢核燈號一檢查採購單存不存在。)
請注意，RPG03 其他選項功能同 RPG02。
4. 請 COMPILE RPG03 並確認 COMPILE 完成。
5. 請撰寫 RPG03S，使用之檔案為 PONBRL。

資料檢查方式如下：

- (1) 檢查採購單是否存在。

(2) 假如存在的話，先刪除採購表頭檔 (SUMMARY FILE) 再刪除採購項目明細檔。

(3) 假如不存在，將錯誤狀況傳回主程式。

6. COMPLIE RPG035

7. 重新設定檔案資料：CALL REFRESH

8. 執行前報表列印：CALL LIST3

9. 依下列資料執行你(妳)的程式

MAINTAIN	PORCHASE	ITEM	QUANTITY
CODE	ORDER NO	NO	
1	400001	100	50
2	400001	25	150
3	400001	150	
4	400115		
4	400016		ERROR-NOT FOUND
4	400010		

10. 執行後報表列印：CALL LIST03 (報表同 LAB-4-2) 並且比對執行後之報表。

11. 若要重新執行測試，請 CALL REFRESH。

PROMPT SCREEN - PURCHASE ORDER MAINTENANCE

COLUMN

ROW	1-10										11-20										21-30										31-40										41-50										51-60										61-70										71-80									
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0										
01																																																																																
02	OPEN PURCHASE ORDER FILE MAINTENANCE																																																																															
03																																																																																
04	MAINTENANCE																																																																															
05	CODE OPTIONS																																																																															
06																																																																																
07	1. ADD AN ITEM (ENTER P.O.#, ITEM #, QTY)																																																																															
08	2. DELETE AN ITEM (ENTER P.O.#, ITEM #)																																																																															
09	3. MODIFY A QUANTITY ORDERED (ENTER P.O.#, ITEM #, QTY)																																																																															
10	4. DELETE AN ENTIRE PURCHASE ORDER (ENTER P.O.#)																																																																															
11																																																																																
12																																																																																
13	OPTION P.O.# ITEM # QTY																																																																															
14	X XXXXXX XXXXX XXXXX																																																																															
15																																																																																
16	TO END THE JOB, PRESS CMD KEY 3																																																																															
17																																																																																
18	TO ENTER A TRANSACTION, PRESS ENTER																																																																															
19																																																																																
20																																																																																
21																																																																																
22																																																																																
23																																																																																
24	ERROR MESSAGES																																																																															

BEFORE EXECUTING

EXERCISE 3 TEAM J									
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00		25	LINED PAPER	25		0/00/00
					150	BEAKERS	100		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00		50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00		75	BOTTLES	500		0/00/00
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00						
				C	175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2		0/00/00
400020	5075	PETER VAN ROTH CORP.	169.50						
				C	300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50						
				C	500	PICTURES	13	13	2/05/80

AFTER EXECUTING

EXERCISE 3 TEAM J									
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00		100		50		0/00/00
					150	BEAKERS	150		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00		50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400020	5075	PETER VAN ROTH CORP.	169.50	C	300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50	C	500	PICTURES	13	13	2/05/80

LAB 4

本練習題目的在於使用IN, OUT, OPERATION-CODE, 來修改資料區 (DATA AREA)之資料。

請用 RPG02 再新增進一步的需求：加總異動次數及異總數量並將上列兩欄位寫入資料區 (DTAARA)；資料區包含上列兩欄位，每次執行程式時，都必須修改資料區內資料。

資料區 (DTAARA)已存在你的 LIBRARY 中。請注意：資料區的儲存是以文字的方式，你的程式必須切割資料區的字串成兩個獨立欄位，本資料區為6位長之數字且預設值為0，其中前兩個 BYTE 記錄異動次數，後四個 BYTES 記錄異動總數量。

練習步驟：

1. 本練習畫面直接使用 DSP002，所以不須重新編譯。
2. COPY RPG02 成 RPG04，同時並進行修改程式邏輯，用以計算總異動數量成功異動之次數，並且每次異動完成後，UPDATE 到資料區中。
3. 編譯 RPG04 程式。
4. 檔案資料重新設定：CALL REFRESH。
5. 執行前檔案資料列印：CALL LIST4 (報表同 LAB-4-4)

6. 依下列異動條件執行你（妳）的程式。

MAINTAIN CODE	PORCHASE ORDER NO	ITEM NO	QUANTITY
1	400001	50	50
1	400001	420	25
2	400001	25	
3	400001	999	ERROR-NOT FOUND
3	400001	150	200

7. 執行後資料列印：CALL LIST4

比較執行後報表之異動次數及異動總數量，並且 DATA AREA 應等於 40275。

8. 如要重新設定資料：CALL REFRESH。

			EXERCISE	4	TEAMXX					
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED	
400001	10	JOHN M. SMITH & SONS	500.00	C	25	LINED PAPER	25	25	2	12 89
					150	BEAKERS	100		9	20 89
				C	375	EDGERS	30	30	3	19 90
				C	475	RIBEORS	100	100	4	25 90
400005	11	FETENER & FEOETER	110.00	C	50	SPOOLS	10	5	4	27 89
					100	INVITATIONS	15	15	8	24 89
				C	200	LADDERS	6	6	3	29 90
				C	400	FILES	6	6	6	15 90
400010	16	BRAND X BEER	350.00		75	BOTTLES	500		3	23 90
					450	CANS	25		8	25 90
400015	431	MAFGAEET HART INC.	121.00	C	175	CARTETS	3	3	1	19 90
				C	250	SPINDLES	5	5	4	17 90
				C	275	MOLDS	2			
400020	5075	PETHER VAN ROTH CORP.	159.50	C	300	DISPLAYS	6	6	4	22 89
					420	CABTNETS	9		9	27 89
400025	7374	PHOTO LABS INC.	45.50	C	500	PICTURES	13	13	5	05 89

			DISPLAY ATAT AREA		RPGXX.	DATAARA	09	25	90	10:30	2	0	PAGE	1
DATA AREA.....	:	DATAARA	DATAARA											
LIBRARY.....	:		RPGXX											
TYPE.....	:	TYPE	*DEC											
LENGTH.....	:	LEN	6.0											
TEXT DESCRIPTION.....	:	TEXT	DATA AREA FOR TEAM : X											
VALUE.....	:	VALUE	0											

			EXERCISE	4	TEAMXX					
PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED	
400001	10	JOHN M. SMITH & SONS	500.00	C	50		50		0	00 00
					150	BEAKERS	200		0	00 00
				C	375	EDGERS	30	30	3	19 90
				C	400		25		0	00 00
					475	RIBEORS	100	100	4	25 90
400005	11	FETENER & FEOETER	110.00	C	50	SPOOLS	10	5	4	27 89
					100	INVITATIONS	15	15	8	24 89
				C	200	LADDERS	6	6	3	29 90
				C	400	FILES	6	6	6	15 90
400010	16	BRAND X BEER	350.00		75	BOTTLES	500		3	23 90
					450	CANS	25		0	00 00
400015	431	MAFGAEET HART INC.	121.00	C	175	CARTETS	3	3	1	19 90
				C	250	SPINDLES	5	5	4	17 90
				C	275	MOLDS	2		0	00 00
400020	5075	PETHER VAN ROTH CORP.	159.50	C	300	DISPLAYS	6	6	4	22 89
					420	CABTNETS	9		0	00 00
400025	7374	PHOTO LABS INC.	45.50	C	500	PICTURES	13	13	5	05 89

			DISPLAY	ATAT	AREA	RPGXX.	DATAARA	09	25	90	10:30	2	0	PAGE	1
DATA AREA.....			DATAARA	DATAARA											
LIBRARY.....				RPGXX											
TYPE.....			TYPE	*DEC											
LENGTH.....			LEN	6.0											
TEXT DESCRIPTION.....			TEXT	DATA	AREA	FOR	TEAM	: X							

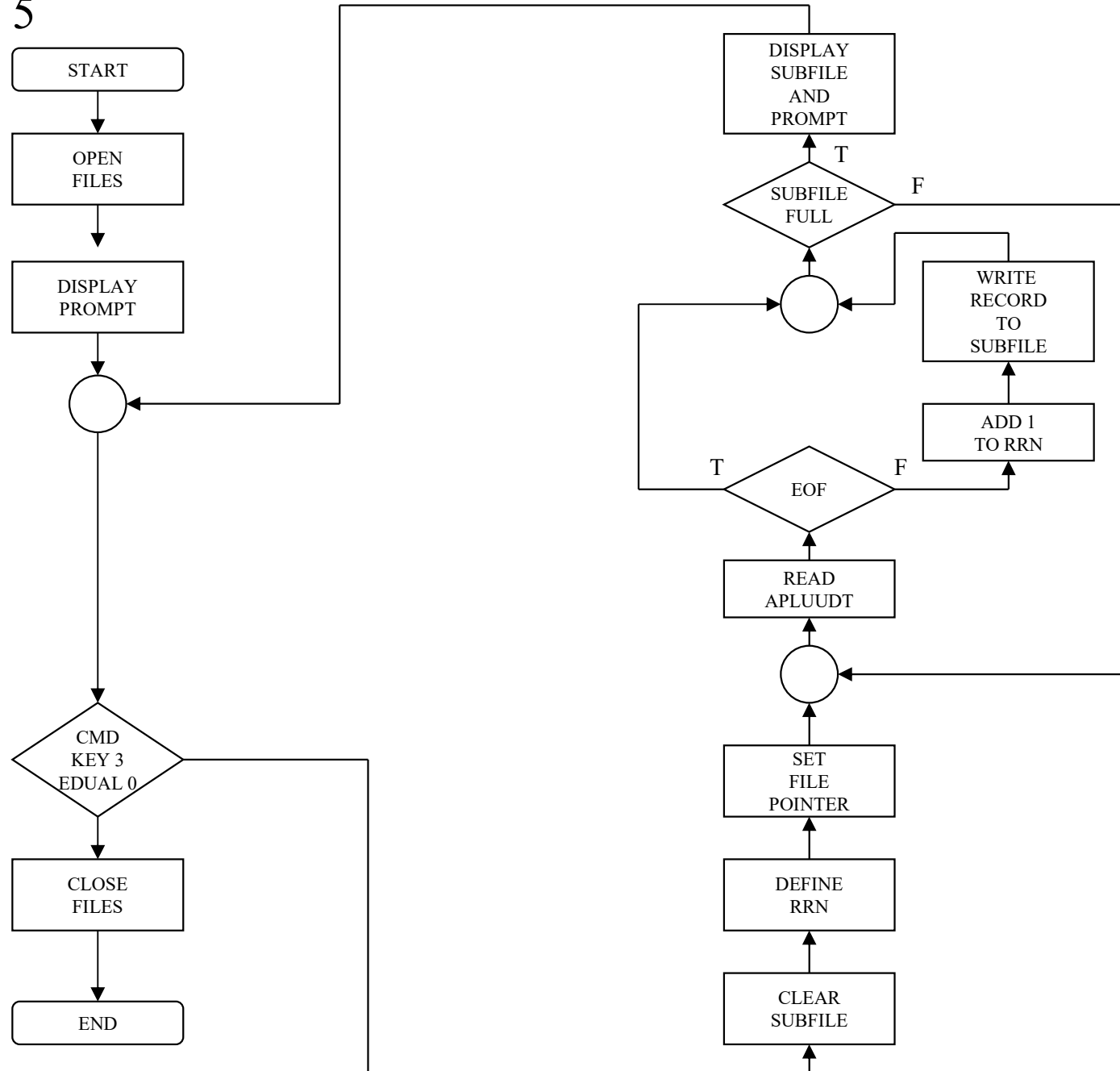
LAB 5

程式目的：請寫出一支 SUBFILE 查詢程式，查詢廠商發票資料。

練習步驟：

1. 請根據 LAB5-2 頁的流程圖撰寫此支程式。
2. 此程式所使用的為一邏輯檔（廠商發票檔）DUEDATEL。
3. 螢幕畫面在 LAB5-3 頁。
4. 在DSPF中已定義好一部分Keyword，您必須再定義另一部分有關 SUBFILE CONTROL RECORD 的 Keyword 其 DDS 存在 QDDSSRC 中。
5. 請將 SUBFILE SIZE 設定為 20。
6. 編輯您的 DISPLAY FILE (DSP005)。
7. 檔案資料重新設定：CALL REFRESH。
8. 開始撰寫 RPG05 程式。
9. 編寫好 RPG05 程式。
10. 執行程式：請輸入日期 1 月 1 日 1980 年及 3 月 30 日 1980 年。
11. 執行結果應與 LAB5-4 頁相同。

EXERCISE 5



COLUMN

ROW	1-10										11-20										21-30										31-40										41-50										51-60										61-70										71-80									
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
01																																																																																
02	VENDOR INVOICE SELECTION																																																																															
03																																																																																
04	TO DISPLAY ALL INVOICES, PRESS ENTER.																																																																															
05																																																																																
06	TO DISPLAY INVOICES DUE BEYOND A SPECIFIC DATE, KEY THE YEAR AND																																																																															
07	MONTH/DAY, THEN PRESS ENTER.																																																																															
08																																																																																
09	TO END JOB, PRESS CMD KEY 3																																																																															
10																																																																																
11																																																																																
12																																																																																
13	VENDOR INVOICE DUE GROSS DISCOUNT ENT STATUS																																																																															
14	NUMBER NUMBER DATE AMOUNT AVAILABLE AMOUNT																																																																															
15	XXXXXX X-----X XX/XX/XX XX,XXX.XX XXX.XX XX,XXX.XX X																																																																															
16																																																																																
17	(VNDNBR) (INVNBR) (DUDATE) (MERCH) (DCTAVL) (NET) (STATUS)																																																																															
18																																																																																
19																																																																																
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22																																																																																
23																																																																																
24																																																																																
	1-10										11-20										21-30										31-40										41-50										51-60										61-70										71-80									
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0

SAMPLE SUBFILE DISPLAY FOR EXERCISE 5

VENDOR INVOICE SELECTION						
TO DISPLAY ALL INVOICES, PRESS ENTER.						
TO DISPLAY INVOICES DUE EEEYCN A SPECIFIC DATE. KEY THE YEAR 00 AND MONTH/DAY 0000. THEN PRESS ENTER						
TO END JOB, PRESS CMD KEY 3						
VENDOR NUMBER	INVOICE NUMBER	DUE DATE	GROSS AMOUNT	DISCOUNT AVAILABLE	NET AMOUNT	STATUS
10502	872	1/01/80	500.00	50.00	450.00	C
88714	147	1/15/80	600.00	60.00	540.00	C
73013	812	1/30/80	400.00	40.00	360.00	C
56567	923	2/01/80	100.00	10.00	90.00	C
21178	124	2/15/80	120.00	12.00	108.00	C
07733	536	2/28/80	150.00	15.00	135.00	C
00612	138	3/01/80	300.00	30.00	270.00	C
07374	36	3/15/80	600.00	60.00	540.00	C

VENDOR INVOICE SELECTION						
TO DISPLAY ALL INVOICES, PRESS ENTER.						
TO DISPLAY INVOICES DUE EEEYCN A SPECIFIC DATE, KEY THE YEAR 00 AND MONTH/DAY 0000, THEN PRESS ENTER						
TO END JOB, PRESS CMC KEY 3						
VENDOR NUMBER	INVOICE NUMBER	DUE DATE	GROSS AMOUNT	DISCOUNT AVAILABLE	NET AMOUNT	STATUS
11002	24	3/30/80	500.00	50.00	450.00	C
06242	37	4/01/80	100.00	10.00	90.00	C
84210	116	4/15/80	150.00	15.00	135.00	C
72302	84	4/30/80	50.00	5.00	45.00	C

FILE LIST BEFORE EXECUTING

EXERCISE 5 TEAM J							
VENDOR NUMBER	INVOICE NUMBER	PO DATE	DUE DATE	GROSS AMOUNT	DISCOUNT AVAILABLE	NET AMOUNT	STATUS
10502	872	600050	1/01/80	500.00	50.00	450.00	C
88714	147	600060	1/15/80	600.00	60.00	540.00	C
73013	812	600070	1/30/80	400.00	40.00	360.00	C
56567	923	60080	2/01/80	100.00	10.00	90.00	C
21178	124	60090	2/15/80	120.00	12.00	108.00	C
7733	536	600100	2/28/80	150.00	15.00	135.00	C
612	138	600110	3/01/80	300.00	30.00	270.00	C
7374	36	600120	3/15/80	600.00	60.00	540.00	C
11002	24	600130	3/30/80	500.00	50.00	450.00	C
6242	37	600140	4/01/80	100.00	10.00	90.00	C
84210	116	600150	4/15/80	150.00	15.00	135.00	C
72302	84	600160	4/30/80	50.00	5.00	45.00	C

SAMPLE SUBFILE DISPLAY

VENDOR INVOICE SELECTION							
TO DISPLAY ALL INVOICES, PRESS ENTER.							
TO DISPLAY INVOICES DUE EYECNC A SPECIFIC DATE, KEY THE YEAR 80 AND MONTH/DAY 0130, THEN PRESS ENTER							
TO END JOB, PRESS CMC KEY 3							
TO UPDATE THE INVOICES, PRESS CMD KEY 5.							
VENDOR NUMBER	INVOICE NUMBER	DUE DATE	GROSS AMOUNT	DISCOUNT AVAILABLE	NET AMOUNT	STATUS	PAY
56567	923	2/01/80	100.00	10.00	90.00	C	X
21178	124	2/15/80	120.00	12.00	108.00	C	
07733	536	2/28/80	150.00	15.00	135.00	C	
00612	138	3/01/80	300.00	30.00	270.00	C	
07374	36	3/15/80	600.00	60.00	540.00	C	X
11002	24	3/30/80	500.00	50.00	450.00	C	
06242	37	4/01/80	100.00	10.00	90.00	C	
84210	116	4/15/80	150.00	15.00	135.00	C	X

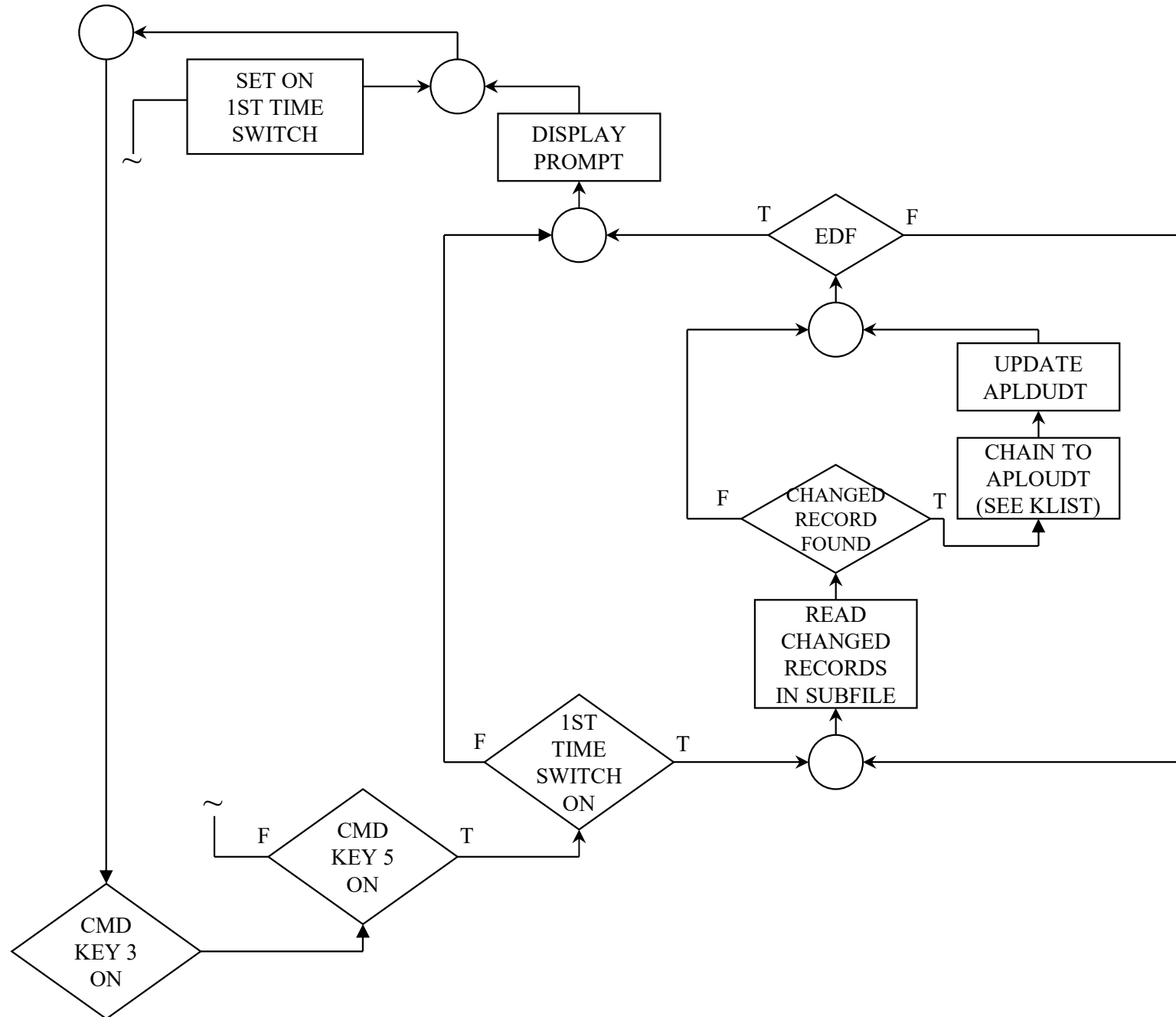
LAB 6

程式目的：請撰寫出一支可執行修改功能之 SUBFILE 程式，利用先前所寫好之 RPG05 程式為主體，增加修改功能。利用 RPG05 為主體，增加一個欄位，可讓程式選擇付款給那些廠商所開之發票。

練習步驟：

1. 螢幕畫面在 LAB6-4 頁，框框內的部分是新增的說明及欄位。
2. 新增加的部分已經 CODING 在 DSP006 中，目前只需要定義一個 Payment 欄位。
3. 請按照 LAB6-3 頁之流程圖撰寫程式。
4. 請拷貝 RPG05 成 RPG06，並且加上修改功能，可讓使用者在 PAY 欄位內輸入 “X”，表示付款給該廠商所開之發票。
5. 編輯 RPG06 程式。
6. 檔案資料重新設定：CALL REFRESH。
7. 執行前報表列印：CALL LIST6。列印之結果應與 LAB5-5 頁相同。
8. 執行 RPG06 輸入日期為 1 月 30 日 1980 年。
9. 選擇發票號碼 923，36，116 作付款，請參考 LAB5-5 頁。
10. 為了確認已正確地修改 DUEDATEL 中的資料，請再 CALL LIST6，列印之結果應與 LAB6-5 頁相同。
11. 您也可以再次輸入日期 1 月 30 日 1980 年查詢資料，其結果應與 LAB6-5 相同。
12. 若需重新設定資料：CALL REFERSH。

EXERCISE 6



[illegible]

FILE LIST AFTER EXERCUTING

EXERCISE 6 TEAM J							
VENDOR NUMBER	INVOICE NUMBER	PO NUMBER	DUE DATE	GROSS AMOUNT	DISCOUNT AVAILABLE	NET AMOUNT	STATUS
10502	872	600050	1/01/80	500.00	50.00	450.00	C
88714	147	600060	1/15/80	600.00	60.00	540.00	C
73013	812	600070	1/30/80	400.00	40.00	360.00	C
56567	923	60080	2/01/80	100.00	10.00	90.00	T
21178	124	60090	2/15/80	120.00	12.00	108.00	C
7733	536	600100	2/28/80	150.00	15.00	135.00	C
612	138	600110	3/01/80	300.00	30.00	270.00	C
7374	36	600120	3/15/80	600.00	60.00	540.00	T
11002	24	600130	3/30/80	500.00	50.00	450.00	C
6242	37	600140	4/01/80	100.00	10.00	90.00	C
84210	116	600150	4/15/80	150.00	15.00	135.00	T
72302	84	600160	4/30/80	50.00	5.00	45.00	C

SUBFILE DISPLAY AFTER EXECUTING

VENDOR INVOICE SELECTION							
TO DISPLAY ALL INVOICES, PRESS ENTER.							
TO DISPLAY INVOICES DUE BEYOND A SPECIFIC DATE, KEY THE YEAR 80 AND MONTH/DAY 0130, THEN PRESS ENTER							
TO END JOB, PRESS CMD KEY 3							
TO UPDATE THE INVOICES, PRESS CMD KEY 5.							
VENDOR NUMBER	INVOICE NUMBER	DUE DATE	GROSS AMOUNT	DISCOUNT AVAILABLE	NET AMOUNT	STATUS	PAY
56567	923	2/01/80	100.00	10.00	90.00	T	
21178	124	2/15/80	120.00	12.00	108.00	C	
07733	536	2/28/80	150.00	15.00	135.00	C	
00612	138	3/01/80	300.00	30.00	270.00	C	
07374	36	3/15/80	600.00	60.00	540.00	T	
11002	24	3/30/80	500.00	50.00	450.00	C	
06242	37	4/01/80	100.00	10.00	90.00	C	
84210	116	4/15/80	150.00	15.00	135.00	T	

LAB EXERCISE 7

THE PURPOSE OF THIS EXERCISE IS TO USE A SUBFILE FOR DATE ENTRY. IT IS BASED ON A PURCHASE ORDER APPLICATION. YOUR PROGRAM WILL REQUIRE THE OPERATOR TO ENTER THE FIRST LINE ITEM THROUGH A NORMAL DISPLAY. THE LINE ITEM IS WRITTEN TO A SUBFILE WHICH IS THEN DISPLAYED. THE REMAINING LINE ITEMS ARE KEYED DIRECTLY INTO THE SUBFILE. THIS EXERCISE DEMONSTRATES HOW TO ENTER DATA DIRECTLY INTO A SUBFILE.

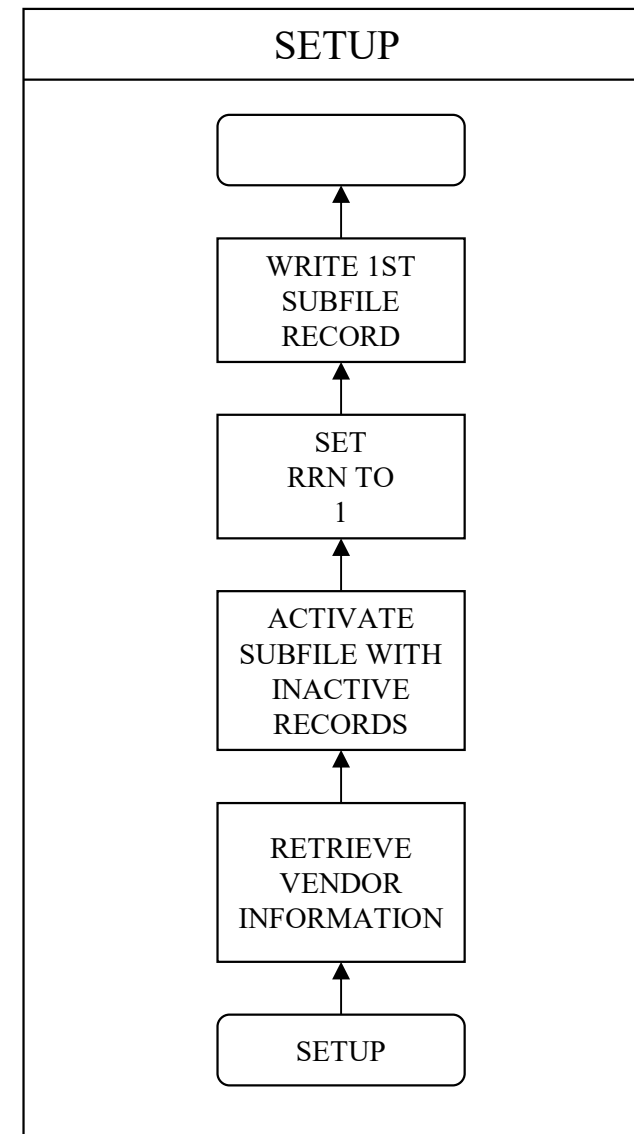
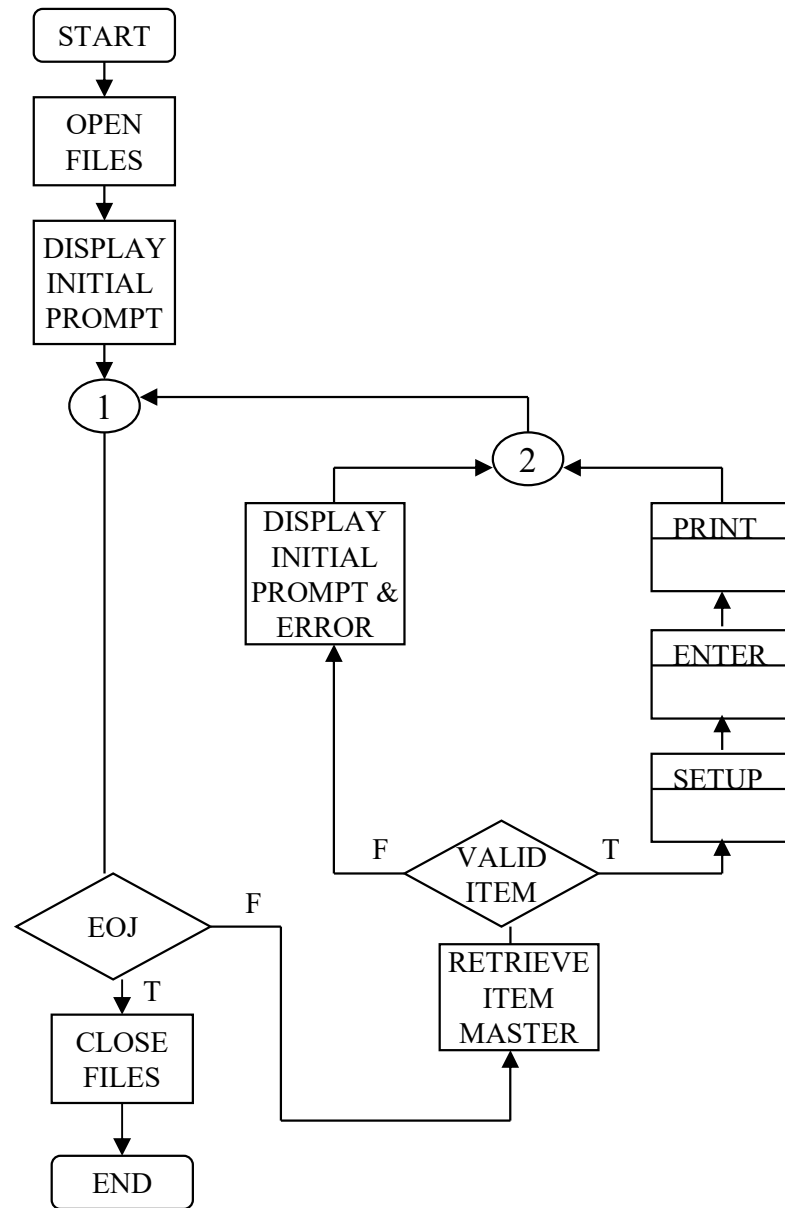
1. THE INITIAL PROMPT SCREEN AND SUBFILE ARE CONTAINED IN ONE DISPLAY FILE, DSP007 ALL OF THE DATA DESCRIPTION KEYWORDS FOR THE SUBFILE CONTROL RECORD AND THE SUBFILE RECORD. THE SCREEN LAYOUTS ARE ON PAGE 35.
2. ADD THE REMATINTING DATA DESCRIPTION SPECIFICATIONS, AND CREATE THE DISPLAY FILE IN YOUR LIBRARY.
3. YOUR PROGRAM WILL ACCESS THE LOGICAL VENDOR MASTER FILE, VENDORL, AND THE LOGICAL ITEM MASTER FILE, ITEML. DDS FOR THESE FILES ARE FOUND IN YOUR SOURCE FILE QDDSSRC.
4. THE PRINTER OUTPUT SPECIFICATIONS ARE PROVIDED FOR YOU IN THE SOURCE MEMBER RPG07. THE PURCHASE ORDER LAYOUT IS ON PAGE 37.
5. CODE YOUR PROGRAM FORM THE STRUCTURED FLOWCHART ON PAGES 33 AND 34, AND ENTER INTO THE SOURCE MEMBER RPG07 IN QRPGRSRC.
6. COMPILE YOUR PROGRAM AND PLACE IT IN YOUR LIBRARY.
7. EXECUTE YOUR PROGRAM AND ENTER THE FOLLOWING PURCHASE ORDERS:

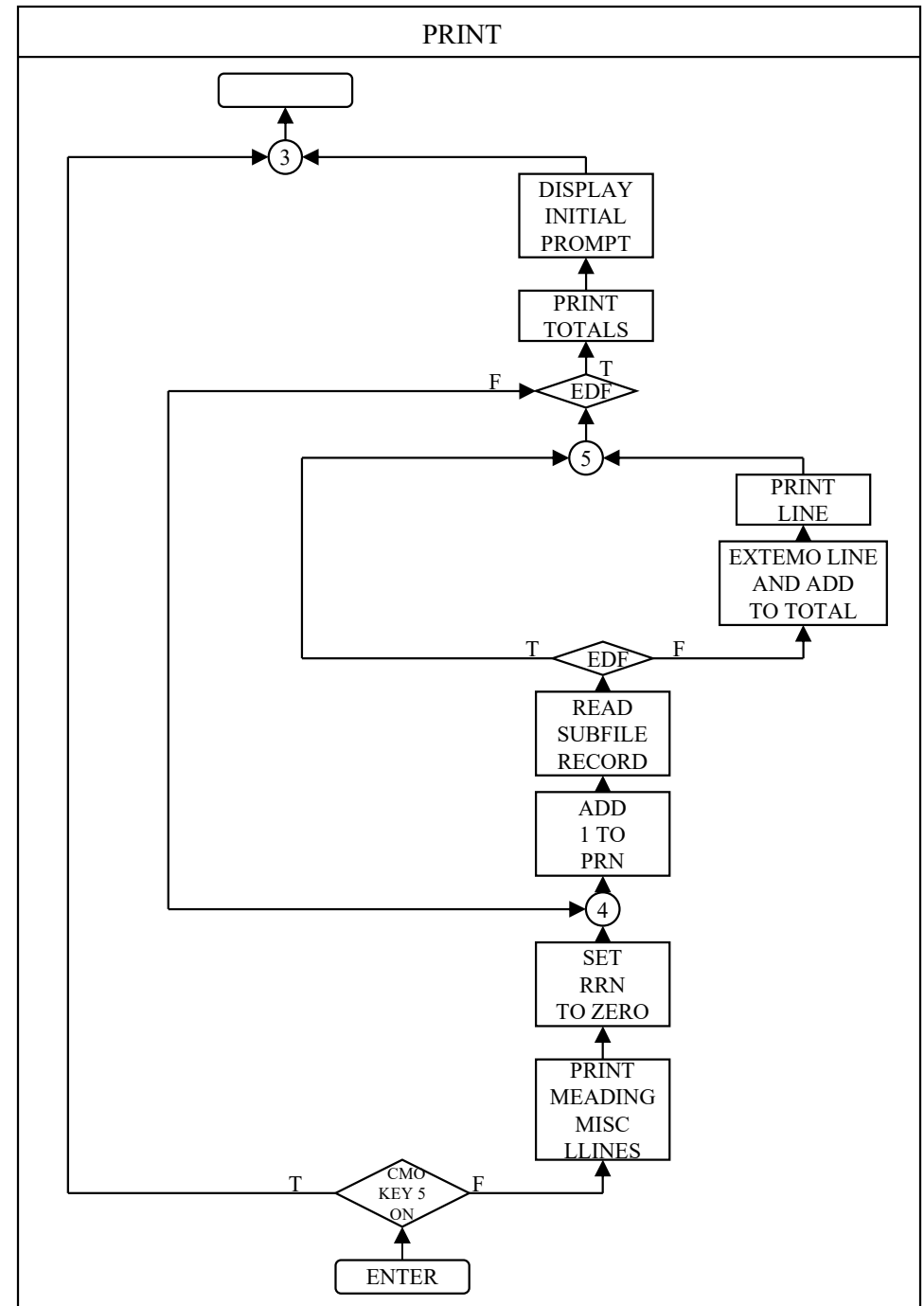
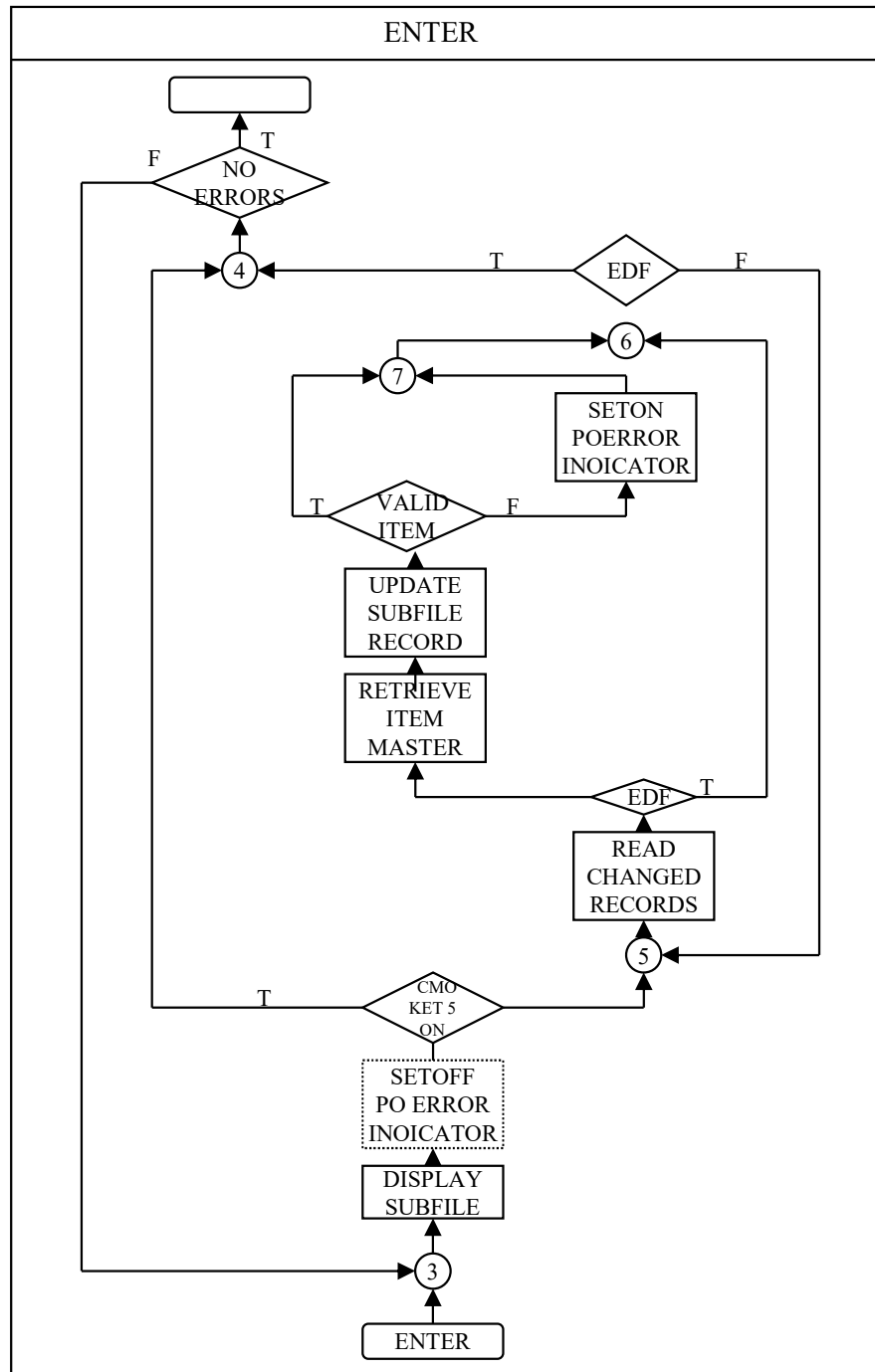
PURCHASE ORDER	ITEM NUMBER	QUANTITY	DEPARTMENT NUMBER
1	75	50	10
	225	15	12
	450	5	10
2	400	2	50
	200	4	10
	100	25	50
	50	25	12

REMEMBER TO TEST FOR AN INVALID ITEM NUMBER (999999).

SAMPLE DISPLAYS ARE LISTED ON PAGE 36. EXAMPLES OF YOUR PURCHASE ORDERS ARE ON PAGE 38.

EXERCISE 7





Lab7-4A

Display Screen Layout Sheet

AS/400 RPG Interactive Programming Workshop

PAN PACIFIC

SUBFILE DISPLAY

Display Screen Layout Sheet

ROW	COLUMN																																																																															
	1-10										11-20										21-30										31-40										41-50										51-60										61-70										71-80									
01	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
	PURCHASE ORDERS																																																																															
02																																																																																
03	VENDOR :																																																																															
04	BRAND Y BEER																																																																															
05	00016 TALLMAN BLD 6 .																																																																															
06	385 GRAND ST .																																																																															
07	MINNEAPOLIS , MN 64538																																																																															
08																																																																																
09	TO COMPLETE AN ORDER , YOU MUST PRESS CMD KEY 5																																																																															
10																																																																																
11	TO END JOB , PRESS CMD KEY 3																																																																															
12																																																																																
13	ITEM NUMBER QUANTITY DEPT . NUMBER																																																																															
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24	ERROR MESSAGES																																																																															
	1-10										11-20										21-30										31-40										41-50										51-60										61-70										71-80									
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0										

SAMPLE DISPLAYS OF EXERCISE 7

PURCHASE ORDERS		
VENDOR:		
	FETZNER & FETZNER	
00011	34 MILL ELLFF ROAD	
	SYRACUSE, N.Y.	
		17625
TO COMPLETE AN ORDER, YOU MUST PRESS ENTER		
TO END JOB, PRESS CMD KEY 3		
ITEM NUMER	QUANTITY	DEPT.NUMBER
00400	00002	050
200	4	10
100	25	50
50	25	12
00000	00000	000

PURCHASE ORDERS		
VENDOR:		
	BRAND X BEER	
00016	TALLMAN ELCG.	
	385 GRAND ST.	
	MINNEAPOLIS, MN.	64538
TO COMPLETE AN ORDER, YOU MUST PRESS ENTER		
TO END JOB, PRESS CMD KEY 3		
ITEM NUMBER	QUANTITY	DEPT.NUMBER
00075	00050	010
225	15	12
450	5	10
00000	00000	000
00000	00000	000

SAMPLE PURCHASE ORDERS FOR EXERCISE 7

BRAND X BEER TALLMAN BLOG. 385 GRAND ST. MONNEAPOLIS, MN.						
TEAMJ			64538			
ORDER NUMBER	ORDER DATE	VENDOR NUMBER		SALESPERSON		
	3/02/81	16		DAVID TEEHAN		
CATALOG NO	OUR NO	DESCRIPTION		QTY	COST	AMOUNT
	75			50	.50	25.00
	225			15	10.00	150.00
	450			5	4.00	20.00
					TOTAL	195.00

FETZNER & FETZNER 34 MILL BLUFF ROAD SYRACUSE, N.Y.						
TEAMJ			17625			
ORDER NUMBER	ORDER DATE	VENDOR NUMBER		SALESPERSON		
	3/02/81	11		TOM WOOLEY		
CATALOG NO	OUR NO	DESCRIPTION		QTY	COST	AMOUNT
	400			2	4.50	9.00
	200			4	5.00	20.00
	100			25	2.00	50.00
	50			25	1.50	37.50
					TOTAL	116.50

LAB 8

本習題主要目的在於練習使用簡單的資料結構 (DATA STRUCTURE) 來進行欄位切割作業。

請利用 RPG02 來修改：將原有的刪除功能再加條件控制；條件如下：

1. 檢查一筆要刪除的資料，收貨日期月份必須等於當月份才可刪除，為了練習方便，我們假設當月份 = 02。

請使用 DATA STRUCTURE 將收貨日期 (DATREC) 之月份切割出來，以備進行檢查；檢查之錯誤訊息已在 DSP008 中提供，請參考。

練習步驟如下：

1. 編譯 DSP008。
2. COPY RPG02 成 ROG08，並進程式修改→增加 DATA STRUCTURE 及刪除條件。
3. 編譯 RPG008。
4. 重新設定檔案資料：CALL REFRESH。
5. 執行前檔案資料列印：CALL LIST8 (報表同 LAB-8-3)。
6. 依下列資料執行你（妳）的程式。

MAINTAIN	PURCHASE	ITEM
CODE	ORDER NO	NO
2	400001	375
2	400001	475
2	400015	275
2	400015	250

RECORD DATE IS NOT CURRENT MONTH

RECORD DATE IS NOT CURRENT MONTH

7. 執行後資料列印：CALL LIST 8（報表同 LAB-8-4）。
8. 檔案如要重新設定：CALL REFRESH。

BEFORE EXECUTING

EXERCISE 8 TEAM J

PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00		25	LINED PAPER	25		0/00/00
					150	BEAKERS	100		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00		50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00		75	BOTTLES	500		0/00/00
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00						
				C	175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2		0/00/00
400020	5075	PETER VAN ROTH CORP.	169.50						
				C	300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50						
				C	500	PICTURES	13	13	2/05/80

AFTER EXECUTING

EXERCISE 8 TEAM J

PO NUMBER	VENDOR NUMBER	VENDOR NAME	ORDER AMOUNT	STATUS	ITEM NUMBER	ITEM DESCRIPTION	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED
400001	10	JOHN M. SMITH & SONS	500.00		25	LINED PAPER	25		0/00/00
					150	BEAKERS	100		0/00/00
				C	375	EDGERS	30	30	3/15/80
				C	475	RIBBONS	100	100	2/26/80
400005	11	FETZNER &FETZNER	110.00		50	SPOOLS	10	5	2/02/80
				C	100	INVITATIONS	15	15	2/12/80
				C	200	LADDERS	6	6	2/24/80
				C	400	FILES	8	8	2/16/80
400010	16	BRAND X BEER	350.00		75	BOTTLES	500		0/00/00
					450	CANS	25		0/00/00
400015	431	MARGARET MART INC.	121.00		175	CARPETS	3	3	2/22/80
				C	250	SPINDLES	5	5	2/17/80
					275	MOLDS	2		0/00/00
400020	5075	PETER VAN ROTH CORP.	169.50		300	DISPLAYS	6	6	1/23/80
					425	CABINETS	9		0/00/00
400025	7374	PHOTO LABS INC.	45.50		500	PICTURES	13	13	2/05/80

補充教材

H

Control Specification Summary Chart

Control Specification Summary Chart			
Positions	Name	Entry	Explanation
1-2	Page	Page number	Entry assigns a page number to each specification.
3-5	Line	Line number	Entry numbers the specification line.
6	Form type	H	Identification for a control (or header) specification.
7-14		Blank	
15	Debug	Blank	DEBUG and DUMP operations are not used. Compiler-generated symbols are not placed in the symbol table.
			DEBUG and DUMP operations are used. Compiler-generated symbols are placed in the symbol table.
16-17		Blank	

H

Control Specification Summary Chart			
Positions	Name	Entry	Explanation
19	Date format (user dates)	Blank	Month / day / year format (mmddyy) if position 21 is blank. If position 21 contains a D, I, or J, the day / month / year (ddmmyy) format is used.
		M	Month / day / year (mmddyy). The separator character used depends on the entry in position 20 or position 21.
		D	Day / month / year (ddmmyy). The separator character used depends on the entry in position 20 or position 21.
		Y	Year / month / year (yymmdd). The separator character used depends on the entry in position 20 or position 21.
20	Date edit (Y edit code)	Any character	Separator character used between the fields of the date. If this position is blank, the separator is specified by the entry in position 21.
		&	Blank is used as separator character.
21	Decimal Notation	Blank	Numeric fields and edit codes use a period as decimal notation and a comma for separators. If position 19 is blank, uses mmddyy format. If position 20 is blank, uses a slash (/) as separator for date.
		I	Numeric fields use comma as decimal notation and a period as a separator. If position 19 is blank, uses ddmmyy format. If position 20 is blank, uses a period (.) as separator for date.
		J	Type J, which is the same as I, except zero is written to the left of the decimal (comma) when the field contains a zero balance.
		D	Numeric fields use a period as decimal notation and a comma as a separator. If position 19 is blank, uses ddmmyy format. If position 20 is blank, uses a slash (/) as separator for date.

H

Control Specification Summary Chart			
Positions	Name	Entry	Explanation
22-25		Blank	
26	Alternate collating sequence	Blank S	Normal collating sequence is used. Alternate collating sequence is used.
27-39		Blank	
40	Sign Handling	Blank	The sign is always forced on input and output of zoned numeric fields.
41	Forms Alignment	Blank 1	First line is printed only once. First line can be printed repeatedly.
42		Blank	
43	File translation	Blank F	No file translation is requested. Files are to be translated.
44-56		Blank	
57	Transparency check	Blank 1	No check for DBCS in literals. Check for DBCS in literals.
58-74		Blank	
75-80	program identification		Entry used to assign a unique name to the program. This name can be overridden by the CRTRPGPGM command. If a name is not specified in positions 75 through 80 or on the CRTRPGPGM command, but the source file is a database file, the member name is used as the program name. If the source is not from a database file, the program name defaults to RPGOBJ.

F Main File Description Line Summary Chart

(Page 1 of 5) Main File Description Line Summary Chart			
Positions	Name	Entry	Explanation
1-2	Page	page number	Entry assigns a page number to each specification.
3-5	Line	Line number	Entry numbers the specification line.
6	<u>Form type</u>	<u>F</u>	Identification for a file description specification.
7-14	<u>File name</u>	A valid file name	Every file must have a unique file name that is defined to OS/400. The <u>file name can be from 1 to 8 characters long</u> , and must begin with an alphabetic character.
15	<u>File type</u>	<u>I</u> <u>O</u> <u>U</u> <u>C</u>	Input file. Output file. Update file. <u>Combined (input/output) file.</u>
16	File designation	<u>Blank</u> <u>P</u> S R T <u>F</u>	<u>Output file.</u> Primary file. Secondary file. Record address file. Array or table file (prerun-time arrays or tables). Full procedural file.
17	End of file	<u>F</u> Blank	All records from the file must be processed before the program can end. Not valid for files processed by a record address file. If position 17 is blank for all files, all records from all files must be processed before end-of-program (LR) can occur. If position 17 is not blank for all files, all records from this file may or may not be processed before end-of-program occurs in multfile processing.

(Page 2 of 5) Main File Description Line Summary Chart			
Positions	Name	Entry	Explanation
18	Sequence	A or blank	Match fields are in ascending sequence.
		D	Match fields are in descending sequence.
19	File format	F	Program described file.
		<u>E</u>	<u>Externally described file.</u>
20-23		Blank	
24-27	Record length	1-9999	Specifies the length of logical records contained in a program described file. The device record size constraints may override an excessive record length.
28	Mode of processing	L	Sequential-within-limits processing by a record address file.
		Blank	Random or sequential processing. Random and sequential processing are implied by a combination of positions 16 and 31 of the file description specifications, and the calculation operation specified.
29-30	Length of key field or record address field	1-99	Length of the key field or the length of each entry in a record address file. Valid for program described files only. If the file being defined uses keys for record identification, enter the number of positions to be occupied by each record key. Record key length must be specified for indexed files.
		Blank	<u>These positions must be blank for externally described files.</u> For program described files, a blank entry indicates that keys are not used.

(Page 3 of 5) Main File Description Line Summary Chart			
Positions	Name	Entry	Explanation
31	<u>Record address type</u>	<u>Blank</u> A P <u>K</u>	* Relative record numbers are used to process the file. * Records are read consecutively. * Record address file contains relative record numbers. * Keys in record address limits file are in same format as keys in file being processed. Character keys (valid only for program described file specified as indexed file or as record address limits file). Packed keys (valid only for program described files specified as indexed file or as record address limits file). <u>Key values are used to process this file. Valid only for externally described files.</u>
32	Type of file organization or additional area	<u>Blank</u> I T	Program described file is processed without keys, or file is externally described. Indexed file. Valid only for program described files. Record address file that contains relative record numbers. Valid only for program described files.
33-34	Overflow indicators	Blank OA-OG, OV <u>01-99</u>	No overflow indicator is used. Specified overflow indicator conditions the lines to be printed when overflow occurs. Valid only for program described PRINTER files. Set on when overflow occurs. Valid for both program described and externally described PRINTER files.

(Page 4 of 5) Main File Description Line Summary Chart			
Positions	Name	Entry	Explanation
35-38	Key filed starting location	Blank <u>1-9999</u>	Key files are not used for this program described file, or the file is externally described. Record position in a program described file in which the key filed begins.
39	Extension code	Blank E L	No extension or line counter specifications are used. Extension specifications further describe the file. Line counter specifications further describe the file.
40-46	Device	<u>PRINTER</u> <u>DISK</u> <u>WORKSTN</u> SPECIAL SEQ	The file is a PRINTER file: the printer is used as output device. The file is a disk file: this device supports sequential and random read/write functions. The file is a work station file: input/output is through a display or ICF file. The file is a special file: input or output is associated with a device that is accessed by a user-supplied routine. The name of the routine must be specified in positions 54 through 59. The file must be a fixed unblocked format. The file is a sequentially organized file: the actual device is specified outside the RPG program.
47-52		Blank	
53	Continuation lines	<u>Blank</u> <u>K</u>	This specification is not a continuation line. The following position explanations apply when position 53 is blank. Indicates a continuation line. For an explanation of positions 54-80 when position 53 contains K, see “Continuation Line” on page 5-17.

(Page 5 of 5) Main File Description Line Summary Chart			
Positions	Name	Entry	Explanation
54-59	Name of label exit	Name of user-supplied routine	When SPECIAL is the device entry, the routine named in positions 54 through 59 handles the support for the special I/O device.
60-65		Blank	
66	File addition/un-ordered	<u>Blank</u> <u>A</u>	No additions of records can be made to an input or update file. For output files, a blank is equivalent to A. <u>Add records to a DISK file.</u> Positions 16 through 18 of the output specifications must contain ADD, or a <u>WRITE operation code must be used in the calculation specifications.</u>
67-70		Blank	
71-72	File condition	<u>Blank</u> U1-U8 UC	The file can be used by the program. If it is an input file, it is opened by RPG/400. The file can be used by the program when the indicator is on; it is not used when the indicator is off. <u>Programmer control of first open.</u> If a file is to be opened by an OPEN operation in the calculation specification, a UC entry causes the file not to be opened at program initialization. Not valid for primary, secondary, table, or record address input files, or for output files conditioned by 1P indicator.
73-74		Blank	
75-80		Optional	This space is available for comments.

Extension Specification Summary Chart

(Page 1 of 4) Extension Specifications Summary Chart			
Positions	Name	Entry	Explanation
1-2	Page	Page Number	Entry assigns a page number to each specification.
3-5	Line	Line Number	Entry numbers the specification line.
6	Form type	<u>E</u>	Identification for an extension specification.
7-10		Blank	
11-18	From file name	Blank	The array or table is loaded at compilation time or by input or calculation specifications.
		Record address file name	Name of the record address file.
		Array or table file name	The array or table file loaded at prerun time.
19-26	To file name	Blank	The array or table is not written at the end of the program.
		Name of an input or update file containing data records	File processed with the record address file named in positions 11 through 18.
		Name of an output or combined file	File (output or combined) to which an array or table is to be written.
27-32	<u>Table or array name</u>	Table or array name	The name of array or table used in the program.
33-35	Number of entries per record	Blank	This array is loaded by input or calculation specifications.
		1-999	Number of array or table entries in each array or table input record.

(Page 2 of 4) Extension Specifications Summary Chart			
Positions	Name	Entry	Explanation
36-39	Number of entries per array or table	1-9999	Maximum number of array or table entries.
40-42	Length of entry	1-256	Length of each element in the array or table named in positions 27 through 32.
43	Packed/ Binary, sign left/right	Blank P B L R	The data for the array or table is in zoned decimal format or in character format. The data for the array or table is in packed decimal format. The data for the array or table is in binary format. The data for a numeric array or table element has a preceding (left) plus or minus sign. The data for a numeric array or table element has a following (right) plus or minus sign.
44	Decimal positions	Blank 0-9	Character array or table. Number of positions to the right of the decimal in numeric array or table elements.
45	Sequence	Blank A D	No particular sequence. Ascending sequence. Descending sequence.
46-51	Table or array name (alternating format)	Table or array name (alternating format)	The name of the table or array used in the program.
52-54	Length of entry	1-256	Length of each element in the array or table named in positions 46-51.

(Page 3 of 4) Program Described Files, Field Description Entries Summary Chart			
Positions	Name	Entry	Explanation
55	Packed/ binary, sign left/right	Blank	The data for the array or table is in zoned decimal format or in character format.
		P	The data for the array or table is in packed decimal format.
		B	The data for the array or table is in binary format.
		L	The data for a numeric array or table element has a preceding (left) plus or minus sign.
		R	The data for a numeric array or table element has a following (right) plus or minus sign.
56	Decimal positions	Blank	Character array or table.
		0-9	Number of positions to the right of the decimal in numeric array or table elements.
57	Sequence	Blank	No particular sequence.
		A	Ascending sequence.
		D	Descending sequence.
61-62	Match fields	Blank	This is not a match field.
		M1-M9	This field is a match field. Match fields are valid only for primary and secondary files.

(Page 4 of 4) Program Described Files, Field Description Entries Summary Chart			
Positions	Name	Entry	Explanation
63-64	Field record relation	Blank 01-99 L1-L9 MR U1-U8 H1-H9 RT	The field is common to all record types. General indicators. Control level indicators. Matching record indicators. External indicators. Halt indicators. Return indicator.
65-70	Field indicators	Blank 01-99 H1-H9 U1-U8 RT	No indicator specified. Field indicator. Halt indicator. External indicators. Return indicator.
71-74		Blank	
75-80		Optional	This space is available for comments.

IX

Externally Described Files, Record Identification Entries

Externally Described Files, Record Identification Entries Summary Chart			
Positions	Name	Entry	Explanation
1-2	Page	Page number	Entry assigns a page number to each specification form.
3-5	Line	Line number	Entry numbers the specification line.
6	Form type	I	Identification for an input specification.
7-14	Record name	Record format name	The RPG/400 <u>name of the record format</u> . A file name cannot be used.
15-18	Sequence	Blank	These positions must be blank.
19-20	Record identifying indicators	Blank 01-99 L1-L9,LR H1-H9 U1-U8 RT	No record identifying indicator. General indicator. Control level indicator used for record identifying indicator. Halt indicator. External indicator. Return indicator.
21-41	Record identification code	Blank	Record format names are used to determine the record types used in the program.
42-74		Blank	
75-80		Optional	This space is available for comments.

JX

Externally Described Files, Field Description Entries

Externally Described Files, Field Description Entries Summary Chart			
Positions	Name	Entry	Explanation
7-20		Blank	
21-30	External field name	Field name	If a field within a record in an externally described field is to be renamed, enter the external name of the field in these positions.
31-52		Blank	
53-58	RPG/400 field name	Field name	The name of the field as it appears in the external record description (if 6 characters or less) or the field name that replaces the externally defined field name in positions 21 through 30.
59-60	Control level	Blank	Field is not a control field.
		L1-L9	This field is a control field.
61-62	Match fields	Blank	Field is not a match field.
		M1-M9	The field is a match field.
63-64		Blank	
65-70	Field indicators	Blank	No indicator specified.
		01-99	General indicators.
		H1-H9	Halt indicators.
		U1-U8	External indicators.
		RT	Return indicator.
71-74		Blank	
75-80		Optional	This space is available for comments.

DS

Data Structure Statement Specifications

(Page 1 of 2) Data Structure Statement Specifications Summary Chart			
Positions	Name	Entry	Explanation
1-2	Page	Page Number	Entry assigns a page number to each specification form.
3-5	Line	Line number	Entry numbers the specification line.
6	Form type	I	Identification for an input specification.
7-12	Data structure name	Blank Valid data structure name	The name of the data structure being defined may be omitted. Enter the name of the data structure being defined.
13-16		Blank	
17	External Description	Blank E	Subfield definitions for this data structure follow this specification. Subfield definitions are defined externally. The entry in positions 7 through 12 references the external definition.
18	Option	Blank <u>S</u> <u>U</u>	Not a program status or data area data structure. A program status data structure. Only one data structure may be designated as the program status data structure. <u>A data area data structure.</u> RPG/400 retrieves the external data area (named in positions 7 through 12) at initialization and rewrites it at the end of the job. If you put blanks in positions 7 through 12, RPG/400 uses the local data area.
19-20	Record identifying indicator	<u>DS</u>	Indicates a data structure.

DS

(Page 2 of 2) Data Structure Statement Specifications Summary Chart			
Positions	Name	Entry	Explanation
21-30	External file name	External name of data structure description	If an externally described data structure is to be renamed, enter the external file name for the subfield definitions and enter the name to be used in the program in positions 7 through 12.
31-43		Blank	
44-47	Number of occurrences	Blank 1-9999	This is not a multiple occurrence data structure. Entry indicates the number of occurrences of this multiple occurrence data structure.
48-51	Data structure length	Blank 1-9999	Length of the data structure is either the length specified on the input field specifications if the data structure is an input field or the highest to position specified for a subfield within the data structure if the data structure is not an input field. Length of the data structure.
52-74		Blank	
75-80		Optional	This space is available for comments

SS Data Structure Subfield Specifications

(Page 1 of 2) Data Structure Subfield Specifications Summary Chart			
Positions	Name	Entry	Explanation
7-20		Blank	
21-30	External field name	Subfield name	If a subfield in an externally described data structure is to be renamed, enter the external name of the subfield in these positions.
31-42		Blank	
43	Packed / binary	Blank	Subfield is in zoned decimal format or character format.
		P	Subfield is in packed decimal format.
		B	Subfield is in binary format.
44-47	From	1-9999	Specifies subfield's beginning position in data structure.
48-51	To	1-9999	Specifies subfield's end position in data structure.
44-51	Keywords	Valid keyword	Special keywords define the location of subfields in the program status data structure or the file information data structure. Keywords for the program status data structure are *STATUS, *PROGRAM, *PARMS, and *ROUTINE. Keywords for the file information data structure are *FILE, *RECORD, *OPCODE, *STATUS, and *ROUTINE.
52	Decimal position	Blank	Character subfield.
		0-9	Number of decimal positions in a numeric subfield.
53-58	Subfield	Valid subfield name	The subfield name or the external name of the subfield or the subfield name that replaces the external subfield name specified in positions 21 through 30.
59-74		Blank	
75-80		Optional	This space is available for comments.

N Named Constant

Named constant Specifications Summary Chart			
Positions	Name	Entry	Explanation
1-5		Blank	
6	Form type	I	Identification for an input specification.
7-20		Blank	
21-42	Constant	Constant	Any valid RPG literal including transparent literals. The character constants may be continued on the next line if needed by coding a hyphen instead of a single quote as the last character. Numeric constants can be continued by coding a hyphen immediately to the right of the constant. The next line must contain only an I in position 6 and the continuation of the literal in positions 21-42.
43	Data Type	C Blank	Indicates type of name is constant. Continuation line.
44-52		Blank	
53-58	Constant Name	Name	Name of constant. The normal rules for RPG names apply. Reserved words cannot be used.
59-74		Blank	

Calculation Specification Summary Chart

(page 1 of 4). Calculation Specification Summary Chart			
Positions	Name	Entry	Explanation
1-2	Page	Page number	Entry assigns a page number to each specifications form.
3-5	Line	Line number	Entry numbers the specification line.
6	Form type	C	Identification for a calculation specification.
7-8	Control Level	Blank	The calculation operation is done at detail calculation time of each program cycle if the calculation is part of a subroutine, or if the calculation is a declarative statement.
		L8	The calculation operation is done at total calculation time of each program cycle.
		L1-L9	The calculation operation is done at total calculation time if the indicator is on (because a control break occurs or because the indicator is set on).
		LR	The calculation operation is done after the last record has been processed or after the LR indicator as been set on.
		SR	The calculation operation is part of an RPG/400 subroutine. Optional.
		AN, OR	Indicators on more than one line condition the calculation.

(page 2 of 4). Calculation Specification Summary Chart			
Positions	Name	Entry	Explanation
9-17	Conditioning Indicators	Blank	The operation is done if the condition specified in positions 7 and 8 is satisfied.
		An N in positions 9, 12, and 15 is used to check if the indicator is not on (SETOF or containing 0) to decide if calculations will occur. The following indicators are valid in positions 9 through 17:	
		01-99	• General indicator
		KA-KN, KP-KY	• Function key indicator
		L1-L9	• Control level indicator
		LR	• Last record indicator
		MR	• Matching record indicator
		H1-H9	• Halt indicator
		RT	• Return indicator
		U1-U8	• External indicator
		OA-OG, OV	• Overflow indicator
			If the conditions specified in positions 9 through 17 are satisfied, the operation is done.
18-27	Factor 1	Symbolic name or literal	Entry specifies a symbolic name or actual data on which an operation is to be done. Valid entries depend on the operation code.
28-32	Operation	Operation code	Entry specifies the operation to be done.
33-42	Factor 2	Symbolic name or literal	Entry specifies a symbolic name or actual data on which an operation is to be done. Valid entries depend on the operation code.

(page 3 of 4). Calculation Specification Summary Chart			
Positions	Name	Entry	Explanation
43-48	Result field	Field name	The result field names the field that contains the result of the calculation operation specified in positions 28 through 32. The entry cannot be a named constant.
49-51	Field length	Blank	The result field is defined elsewhere.
		1-30	Numeric field length.
		1-256	Character field length.
52	Decimal positions	Blank	The result field is character data or has been defined elsewhere in the program.
		0-9	Number of decimal positions in a numeric result field.
53	Half-adjust	Blank	Half-adjust is not done.
		H	Half-adjust is done.

(page 4 of 4) Externally Described Files, Field Description Entries Summary Chart			
Positions	Name	Entry	Explanation
54-59	Resulting indicators	Blank 01-99 KA-KN,KP-KY H1-H9 L1-L9 LR OA-OG, OV U1-U8 RT	No resulting indicator. General indicators. Function key indicators. Halt indicators. Control level indicators. Last record indicator. Overflow indicators. External indicators. Return indicator. Note: The resulting indicator positions (54 and 55, 56 and 57, and 58 and 59) have different uses, depending on the operation code specified.
60-74	Comments	Comments	These positions can be used for comments to document the purpose of the calculation.
75-80		Optional	This space is available for comments.

RPG 程式限制 - 1

Function	Restriction
AN/OR lines (positions 7 and 8 of calculation specifications)	Maximum of 7 per operation.
Arrays and tables	Maximum of 200 per program.
Array/table input record length for compile time	Maximum length is 80.
Character field length	Maximum length is 256.
Control fields (position 59 and 60 of input specifications) length	Maximum length is 256.
Data structure length	Maximum of 9999.
Data structure occurrences (number of)	Maximum of 9999 per data structure.
Do-groups (nested)	Maximum of 100 per program.
Edit Word	Maximum length of 24 for literals or 115 for named constants.
Elements in an array/table (positions 36 through 39 of extension specifications)	Maximum of 9999 per array/table.
File	Maximum of 50 per program.
Look-ahead	Can be specified only once for a file. Can be specified only for primary and secondary files.
Named constant	Maximum length of 256 for Character named constant and 30 digits with 9 decimal positions for numeric named constant.

RPG 程式限制 - 2

Function	Restriction
Overflow indicator	Only 1 unique overflow indicator can be specified per printer file.
Primary file (P in position 16 of file description specifications)	Maximum of 1 per program.
Printer file (PRINTER in positions 40 through 46 of file description specifications)	Maximum of 8 per program.
Printing lines per page	Minimum of 2; maximum of 112.
Program status data structure	Only 1 allowed per program.
Record address file (R in position 16 of file description specifications)	Only 1 allowed per program.
Record length for program described file (positions 24 through 27 of file description specifications)	Maximum length is 9999.
Subroutines	Maximum of 254 per program.
Tables (see arrays)	
‘Any device record size restraints override this value.	

Examples of Edit Code Usage						
Edit Codes	Positive Number-Two Decimal Positions	Positive Number-No Decimal Positions	Negative Number-Three Decimal Positions	Negative Number-No Decimal Positions	Zero Balance-Two Decimal Positions	Positive Balance-No Decimal Positions
Unedited	1234567	1234567	000125 ³	000125 ³	000000	000000
1	12,345.67	1,234,567	.120	120	.00	0
2	12,345.67	1,234,567	.120	120		
3	12345.67	1234567	.120	120	.00	0
4	12345.67	1234567	.120	120		
5-9'						
A	12,345.67	1,234,567	.128CR	128CR	.00	0
B	12,345.67	1,234,567	.128CR	128CR		
C	12345.67	1234567	.128CR	128CR	.00	0
D	12345.67	1234567	.128CR	128CR		
J	12,345.67	1,234,567	.120-	120-	.00	0
K	12,345.67	1,234,567	.120-	120-		
L	12345.67	1234567	.120-	120-	.00	0
M	12345.67	1234567	.120-	120-		
N	12,345.67	1,234,567	-.120	-120	.00	0
O	12,345.67	1,234,567	-.120	-120		
P	12345.67	1234567	-.120	-120	.00	0
Q	12345.67	1234567	-.120	-120		
X ²	1234567	1234567	000125 ³	000125 ³	000000	000000
Y ³			0/01/20	0/01/20	0/00/00	0/00/00
Z ⁴	1234567	1234567	120	120		

for RPG:

	H	L	E	
• CHAIN	40			40 : not found
• SETLL	41	42		41 : not found 42:equal
• SETGT	43			43 : not found
• READE		44		44 : end of file
• READC		57		57 : end of subfile
• READ		46		46 : end of file
• READP		47		47 : begin of file
• WRITE		53		53 : subfile full

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PAN PACIFIC

DATA DESCRIPTION SPECIFICATIONS

[illegible]

[illegible]

Program		keying Instruction	Graphic	1	2	3	4	5	6	Card Electro Number	Page <div style="display: inline-block; width: 20px; height: 20px; border: 1px solid black; vertical-align: middle;"></div> of	Program Identification	75	76	77	78	79	80
Programmer	Date		Key	1	2	3	4	5	6				75	76	77	78	79	80

[illegible]

[illegible]

Note

The RPG/400 source program must be entered into the system in the order shown. Extension and Line Counter specifications are the only exceptions to this rule. The order can be E L or L E, but the specifications must be placed between the File Description and input specifications. Any of the specification types can be absent, but at least one must be present.

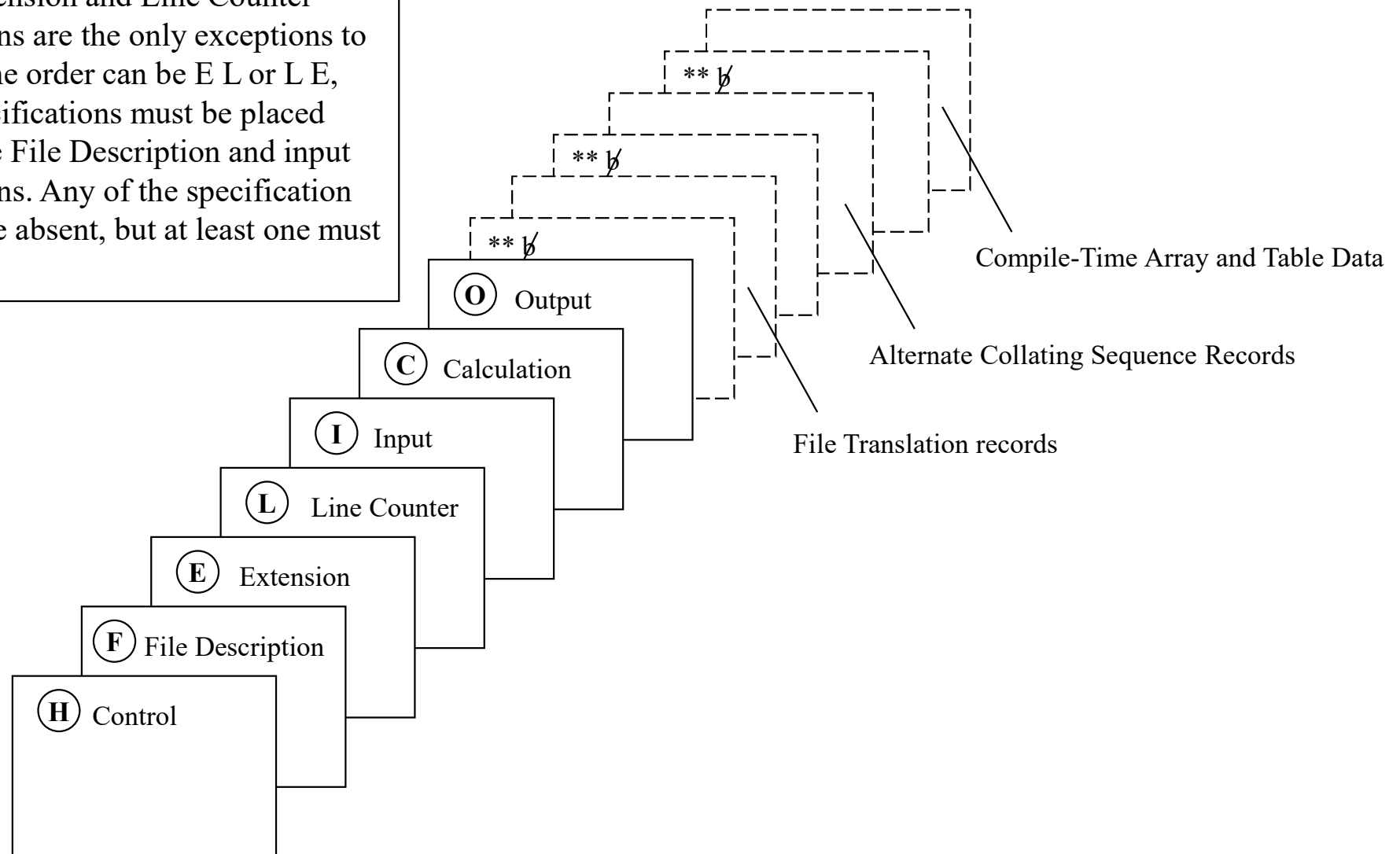


Figure 1. Order of the Types of Specifications in an RPG/400 Source Program

Prompt Selection

Type choice, press Enter.

Prompt type	Values listed below
RPG/400:	H, F, FC, FK, FX, U, E, L, I, X, J (I cont), JX, DS, SS, C, O, P (O cont), N, * (Comment)
COBOL:	CB, C*
REFORMAT/SORT:	RH, RR, RF, RC
DDS:	LF (Logical file), PF (Physical file), BC (Interactive Communications Feature file), DP (Display and Printer file), A* (Comment)
MNU:	MS, MH, MD, MC (MD cont), CC (Comment)
Other:	NC (No syntax checking), ** (Free format)

F12=Cancel F23=User Prompt Selection

```

Columns . . . . : 1 71          Edit          CHPLIB/QRPGSRC
Find . . .                CHR021
FMT FX .....FFilenameIPEAF.....L..I.....Device+.....KExit++Entry+A....U
0015.00      FDJAPCM10IF  E          K          DISK
0016.00      FCMR02P  0   E          39      PRINTER
0017.00      IFAATRC13
Prompt type . . .   F          Sequence number . . . 0016.00

      File      File      End of      File
Filename      Type      Designation      File      Sequence      Format
CMR02P         0
Record      Mode of      Length of      Record
Length      Processing      Key Field      Address Type

      File      Overflow      Key Field      Extn
Organization      Indicator      Start Loc      Code      Device
                        39                        PRINTER

Continuation      Exit      Entry      File      File
                        Addition      Condition

F3=Exit          F4=Prompt          F5=Refresh          F10=Top
F11=Bottom       F12=Cancel          F24=More keys
    
```

Chapter 11. Operation Codes

The RPG/400 programming language allows you to do many different types of operations on your data. Operation codes, which are entered on the calculation specifications, indicate the operation to be done. Usually they are abbreviations of the name of the operation.

Many operation codes can be placed into categories. The first part of this chapter includes general information about these categories. The latter part of the chapter describes each operation code in alphabetical order and shows one or more examples for most of the operations.

The tables on the next few pages are a summary of the specifications for each operation code.

- An empty column indicates that the field must be blank.
- All underlined fields are required.
- An underscored space denotes that there is no resulting indicator in that position.
- Symbols

(1/2)	Half adjust the result.
(n)	No lock.
(p)	Pad the result with blanks.
+	Plus.
-	Minus.
BL	Blank(s).
BN	Blank(s) then numeric.
BOF	Beginning of the file.
EOF	End of the file.

EQ	Equal.
ER	Error.
FD	Found.
HI	Greater than.
IN	Indicator.
LO	Less than.
LR	Last record.
NR	No record was found.
NU	Numeric.
OF	Off.
ON	On.
Z	Zero.
ZB	Zero or Blank.

Table 35 (Page 1 of 4). Operation Code Specifications Summary

Codes	Factor 1	Factor 2	Result Field	Resulting Indicators
ACQ	<u>Device name</u>	<u>WORKSTN file</u>		<u>__ER__</u>
1. At least 1 resulting indicator is required. 2. A found indicator is required if the result field is not specified. 3. You must specify factor 2 or the result field. You may specify both.				

Operation Codes

Table 35 (Page 2 of 4) Operation Code Specifications Summary				
Codes	Factor 1	Factor 2	Result Field	Resulting Indicators
ADD(1/2)	Addend	<u>Addend</u>	<u>Sum</u>	+ - Z
ANDxx	<u>Comparand</u>	<u>Comparand</u>		
BEGSR	<u>Subroutine name</u>			
BITOF		<u>Bit numbers</u>	<u>Character field</u>	
BITON		<u>Bit numbers</u>	<u>Character field</u>	
CABxx	<u>Comparand</u>	<u>Comparand</u>	Label	HI LO EQ
CALL		<u>Program name</u>	Plist name	_ ER LR
CASxx	Comparand	Comparand	<u>Subroutine name</u>	HI LO EQ
CAT(p)	Source string 1	<u>Source string 2</u> :number of blanks	<u>Target string</u>	
CHAIN(n)	<u>Search argument</u>	File name	Data structure	NR ER _
CHECK ²	<u>Comparator String</u>	<u>Base string</u> :start	Left-most Position(s)	_ ER FD
CHEKR ²	<u>Comparator String</u>	<u>Base string</u> :start	Right-most Position(s)	_ ER FD
CLEAR	*NOKEY	<u>Structure</u> or <u>Variable</u>		
CLOSE		<u>File name</u>		_ ER _
COMIT	Boundary			_ ER _
COMP ¹	<u>Comparand</u>	<u>Comparand</u>		HI LO EQ
DEBUG	Identifier	Output file	Debug into	
DEFN	* <u>LIKE</u>	<u>Referenced field</u>	<u>Defined field</u>	
DEFN	* <u>NAMVAR</u>	Internal program area	<u>External data area</u>	
DELET	Search argument	<u>File name</u>		NR ER _
DIV(1/2)	Dividend	Divisor	Quotient	+ - Z
DO	Starting value	Limit value	Index value	
DOUxx	<u>Comparand</u>	<u>Comparand</u>		
DOWxx	<u>Comparand</u>	<u>Comparand</u>		
DSPLY	Message identifier	Output queue	Response	_ ER _

Codes	Factor 1	Factor 2	Result Field	Resulting Indicators
DUMP	Identifier			
ELSE				
END		Increment value		
ENDCS				
ENDDO		Increment value		
ENDIF				
ENDSL				
ENDSR	Label	Return point		
EXCPT		EXCPT name		
EXFMT		<u>Record format name</u>		_ ER _
EXSR		<u>Subroutine name</u>		
FEOD		<u>File name</u>		_ ER _
FORCE		<u>File name</u>		
FREE		<u>Program name</u>		_ ER _
<p>¹ At least 1 resulting indicator is required.</p> <p>² A found Indicator is required if the result field is not specified.</p> <p>³ You must specify factor 2 or the result field. You may specify both.</p>				

Operation Codes

Table 35 (Page 3 of 4) Operation Code Specifications Summary				
Codes	Factor 1	Factor 2	Result Field	Resulting Indicators
GOTO		<u>Label</u>		
IFxx	<u>Comparand</u>	<u>Comparand</u>		
IN	*LOCK	<u>Data area name</u>		_ ER _
ITER				
KFLD			<u>Key field</u>	
KLIST	<u>KLIST name</u>			
LEAVE				
LOKUP ¹ (array) (table)	<u>Search argument</u> <u>Search argument</u>	<u>Array name</u> <u>Table name</u>	<u>Table name</u>	HI LO EQ HI LO EQ
MHHZO		<u>Source field</u>	<u>Target field</u>	
MHLZO		<u>Source field</u>	<u>Target field</u>	
MLHZO		<u>Source field</u>	<u>Target field</u>	
MLLZO		<u>Source field</u>	<u>Target field</u>	
MOVE(p)		<u>Source field</u>	<u>Target field</u>	+ -ZB
MOVEA(p)		<u>Source</u>	<u>Target</u>	+ -ZB
MOVEL(p)		<u>Source field</u>	<u>Target field</u>	+ -ZB
MULT(1/2)	Multiplicand	<u>Multiplier</u>	<u>Product</u>	+ -Z
MVR			<u>Remainder</u>	+ -Z
NEXT	<u>Program device</u>	<u>File name</u>		_ ER _
OCUR	Occurrence value	<u>Data structure</u>	Occurrence value	_ ER _
OPEN		<u>File name</u>		_ ER _
ORxx	<u>Comparand</u>	<u>Comparand</u>		
OTHER				
OUT	*LOCK	<u>Data area name</u>		_ ER _
PARM	Target field	Source field	Parameter	
PLIST	<u>PLIST name</u>			

Codes	Factor 1	Factor 2	Result Field	Resulting Indicators
POST ²	Program device	<u>File name</u>	<u>INFDS name</u>	_ ER _
READ(n)		<u>File name, Record name</u>	Data structure	_ ER <u>EOF</u>
READC		<u>Record name</u>		_ ER <u>EOF</u>
READE(n)	Search argument	<u>File name, Record name</u>	Data structure	_ ER <u>EOF</u>
READP(n)		<u>File name, Record name</u>	Data structure	_ ER <u>BOF</u>
REDPE(n)	Search argument	<u>File name, Record name</u>	Data structure	_ ER <u>BOF</u>
REL	<u>Program device</u>	<u>File name</u>		_ ER _
RESET	*NOKEY	<u>Structure or variable</u>		
RETRN				
ROLBK				_ ER _
SCAN ²	Comparator string:length	<u>Base string</u> :start	Left-most position(s)	- ER FD
SELEC				
SETGT	<u>Search argument</u>	<u>File name</u>		NR ER _
¹ At least 1 resulting indicator is required. ² A found Indicator is required if the result field is not specified. ³ You must specify factor 2 or the result field. You may specify both.				

Arithmetic Operations

Table 35 (Page 4 of 4). Operation Code Specifications Summary				
Codes	Factor 1	Factor 2	Result Field	Resulting Indicators
SETLL	<u>Search argument</u>	<u>File name</u>		NR ER EQ
SFTOF ¹				OF OF OF
SFTON ¹				ON ON ON
SHTDN				ON _ _
SORTA		<u>Array name</u>		
SQRT(1/2)		<u>Value</u>	<u>Root</u>	
SUB(1/2)	Minuend	<u>Subtrahend</u>	<u>Difference</u>	+ - z
SUBST(p)	Length to extract	<u>Base string:start</u>	<u>Target string</u>	_ ER _
TAG	<u>Label</u>			
TESTB ¹		<u>Bit numbers</u>	<u>Character field</u>	OF ON EQ
TESTN ¹			<u>Character field</u>	NU BN BL
TESTZ ¹			<u>Character field</u>	
TIME			<u>Numeric field</u>	
UNLCK		<u>Data area, record, or file name</u>		_ ER _
UPDAT		<u>File name</u>	<u>Data structure</u>	_ ER _
WHxx	<u>Comparand</u>	<u>Comparand</u>		
WRITE		<u>File name</u>	<u>Data structure</u>	_ ER EOF
XFOOT(1/2)		<u>Array name</u>	<u>Sum</u>	+ - z
XLATE(p)	<u>From:TO</u>	<u>String:start</u>	<u>Target String</u>	_ ER _
Z-ADD(1/2)		<u>Addend</u>	<u>Sum</u>	+ - z
Z-SUB(1/2)		<u>Subtrahend</u>	<u>Difference</u>	+ - z
<p>¹ At least 1 resulting indicator is required.</p> <p>² A found indicator is required if the result field is not specified.</p> <p>³ You must specify factor 2 or the result field. You may specify both.</p>				

Arithmetic Operations

The arithmetic operation are:

- “ADD (Add)” on page 177
- “DIV (Divide)” on page 212
- “MULT (Multiply)” on page 268
- “MVR(Move Remainder)” on page 269
- “SQRT (Square Root)” on page 312
- “SUB (Subtract)” on page 313
- “XFOOT (Summing the Elements of an Array)” on page 331
- “Z-ADD (Zero and Add)” on page 334
- “Z-SUB (Zero and Subtract)” on page 335

For examples of arithmetic operations, see Figure 33 on page 164.

Remember the following when specifying arithmetic operations:

- Arithmetic operations can be done only on numeric fields (including numeric subfields, numeric arrays, numeric array elements, numeric table elements, numeric named constants, numeric figurative constants, and numeric literals).
- Arithmetic operations are done on data in packed decimal format. Data maintained in other formats is converted to or from packed decimal format
- Decimal alignment is done for all arithmetic operations. Even though truncation can occur, the position of the decimal point in the result field is not affected.

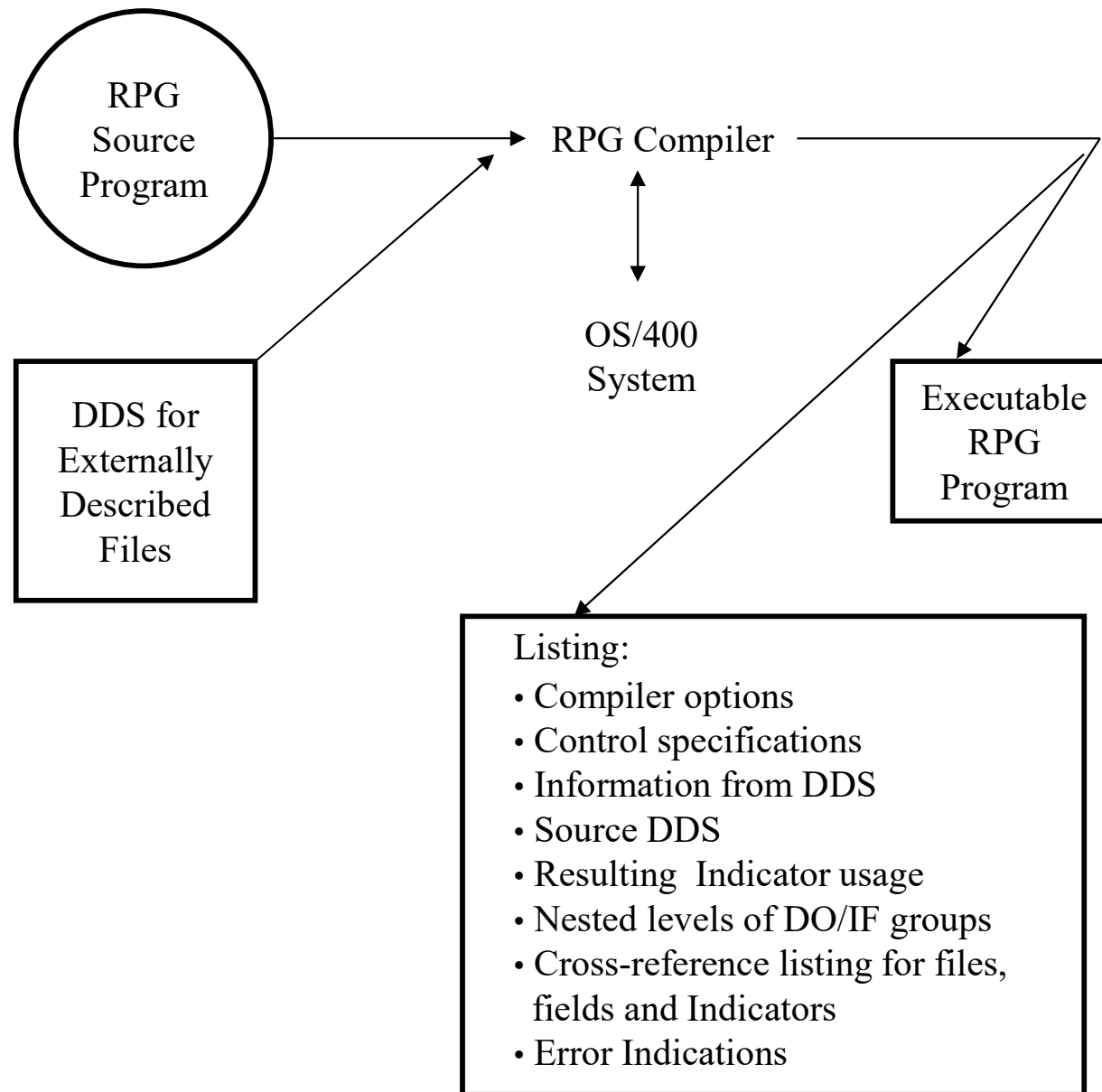


Figure 16. Overview of the Compilation Process

PAG Structure — Sharing In A Job

