AS/400 RPG高階系統規劃與設計 AS/400 RPG (Advanced)Programming Workshop (91年2月修訂)

時間表	
課程大綱	
第一章	檔案處理-格式介紹1-1~1-12
	補充資料1~3
第二章	特殊資料結構2-1~2-24
第三章	程式例外及錯誤3-1~3-30
第四章	副程式檔案資料共享4-1~4-16
第五章	次檔案之資料輸入5-1~5-27

第八章 檔案記錄鎖控......8-1~8-26

實例研討......6-1~6-17

進階RPG撰寫技巧......9-1~9-65

自我介紹

第六章

第九章

補充資料	1~26
案例研討(1)	1~64
案例研討(2)	1~31
LAB A	A-1~A-2
LAB B	B-1~B-7
LAB C	C-1~C-9

自我介紹



姓名 工作職責 公司節機

· 時間表 · · · ·

時間	上午(9:00~12:00)	下午(13:30~16:30)
第一	1.檔案處理格式介紹	3.程式例外及錯誤處理
天	2.特殊資料結構	4.副程式檔案資料共享
第	5.次檔案之資料處理 6.實例研討	8.檔案記錄鎖控
二 天	7. 應用系統資料回復	9.進階RPG撰寫技巧

· 課程大綱 · · · ·

第一章:檔案處理--格式介紹

檔案描述

報表檔處理

第二章:特殊資料結構

資料結構多重處理

印表控制

檔案執行訊息的資料結構

程式狀態的資料結構

第三章:程式例外及錯誤處理

實例與方法論

預設之錯誤管理

結果欄燈號管制方法

檔案資訊資料結構

内含式程式子程序(SUBROUTINE)的方法

第四章:副程式檔案資料共享

資料開啟路徑(ODP)概念 資料開啟路徑(ODP)之分享(SHARED)

程式交互影響之比較

第五章:次檔案之資料處理

次檔案輸入資料

錯誤處理選擇

次檔案一般顯示行輸入

第六章:實例研討

實例研討(一)

實例研討(二)

實例研討(三)

第七章:.應用系統資料回復

資料儲存確認管制的益處

建立一個資料儲存確認管制的環境

異動處理

定義檔案

實例

第八章:.檔案記錄鎖控

沒有使用COMMITMENT CONTROL的資料鎖定

使用COMMITMENT CONTROL的資料鎖定

第九章:.進階RPG撰寫技巧

雜項撰寫技巧

非同步處理

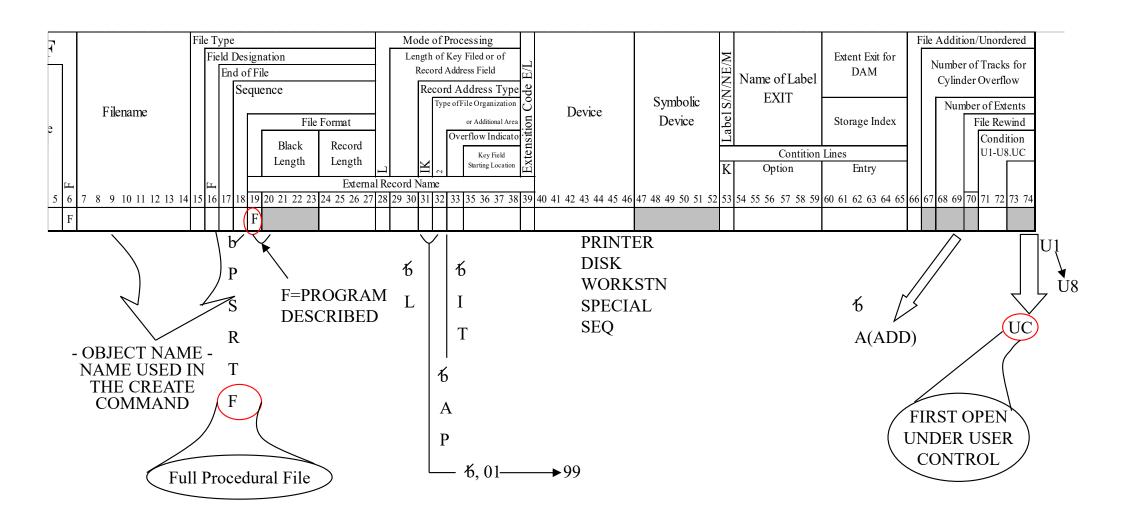
PERFORMANCE相關程式撰寫:檔案處理

PERFORMANCE相關程式撰寫:程式邏輯

PERFORMANCE相關程式撰寫:CL考量

第一章 檔案處理--格式介紹 1-1檔案描述

檔案描述:程式內定義檔案(PROGRAM DESCRIBED FILES)



RPG INPUT SPECIFICATIONS

(SEE OVER FOR RPG EXTENSION AND LINE COUNTER SPECIFICATIONS)

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1-2報表檔處理

報表輸出欄位的相關終止位置

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就報表輸出而言,兩欄位之間的空白,皆是以次欄位的終止位置起算。以上的例子說明如下:

從報表的第一個位置開始。

FLD5從FLD4後空三格的位置開始印。

FLD6從FLD5後空三格的位置開始印。

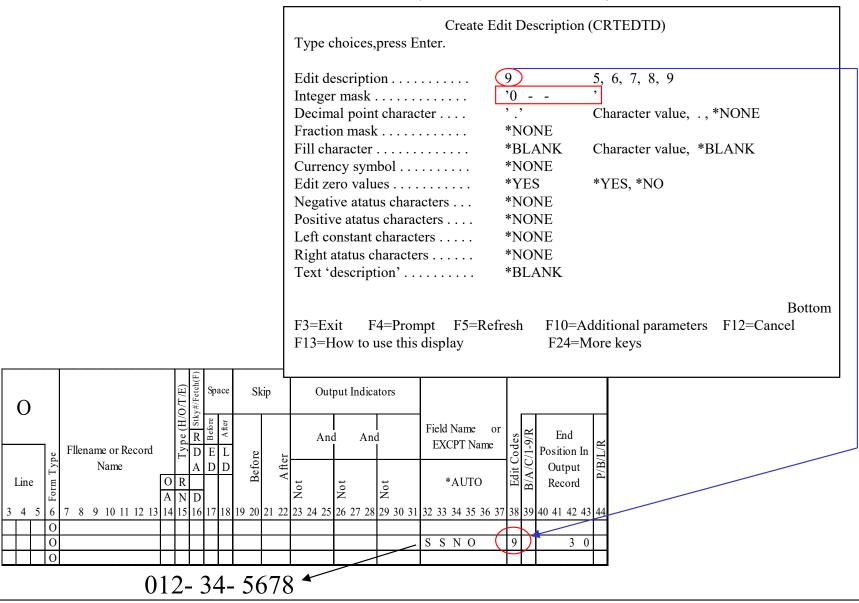
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外部宣告檔案的輸出表格定義

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使用者設定的編輯碼(EDIT CODE)





外部宣告檔案的輸出表格定義 Edit Codes For Printed Output

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Combination Edit Codes

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Prints with grouping separator Characters, zero balance suppressed	4	D	M	Q
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補充資料

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檔案控制 (FILE CONTROL) 第二章 特殊資料結構 (SPECIAL DATA STRUCTURE)

單元內容

接續基本課程,我們繼續討論資料結構多重處理(MULTIPLE OCCURRENCE)的定義及起始設定,並用實例加以詮釋二維陣列撰寫的方法,接下來......我們會討論數種不同的特殊資料結構,如:印表控制、程式狀態資訊、檔案資訊、前例後種資料結構在程式例外管理有更進一步的解釋。

單元目標

- 1.使用資料結構特的多重處理功能(MULTIPLE OCCURRENCE)來模擬二維陣列的功能。
- 2.修改程式->使用資料結構來接收系統傳回的程式狀態及檔案狀態。

2-1 資料結構多重處理

資料結構多重處理 (MULTIPLE OCCURRENCE DATA STRUCTURES)

定義

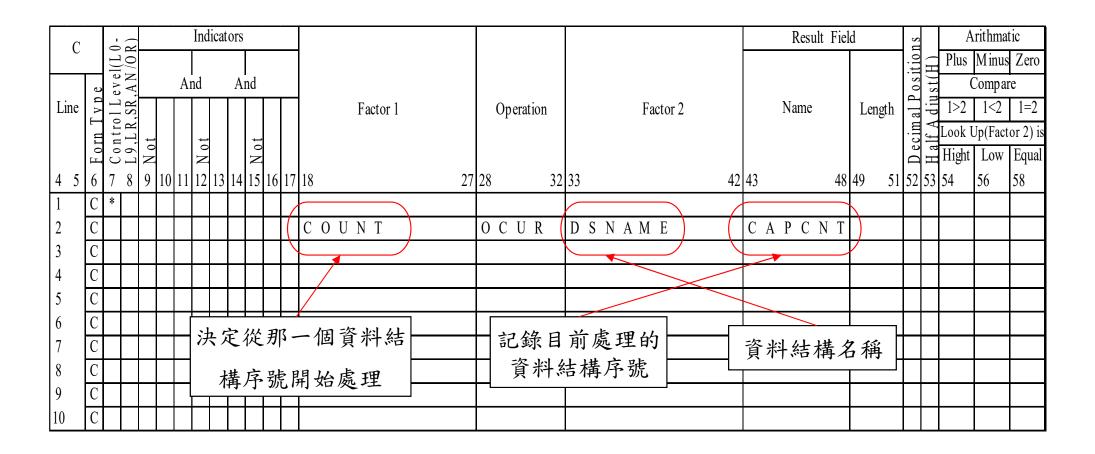
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二維陣列

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使用資料結構多重處理方式做二維陣列之一

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使用資料結構多重處理方式做二維陣列之二

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資料結構多重處理的初值設定

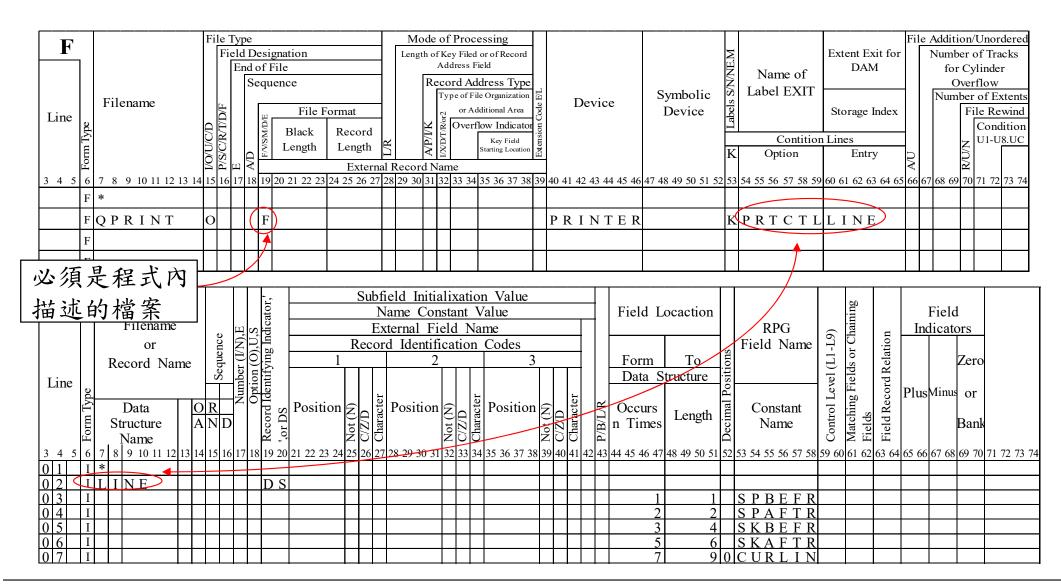
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2.所有多重資料結構初值設定

2-2 列表控制

使用資料結構控制印表之一



使用資料結構控制印表之二

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2-3 檔案執行訊息的資料結構

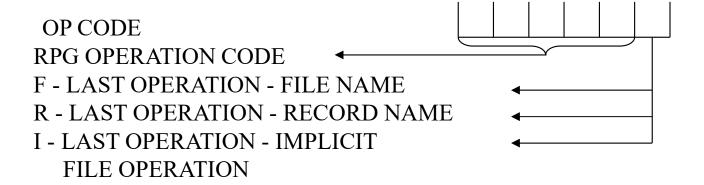
檔案執行訊息的資料結構

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檔案執行訊息的資料結構

FILE - FILE NAME

RECORD EXTERNAL FILE - RECORD FORMAT PROGRAM FILE - RECORD I.D.



STATUS - ERROR CODE

ROUTINE - NAME OF RPG ROUTINE WHERE ERROR OCCURRED

部份檔案狀態碼 SOME FILE STATUS CODES (*STATUS)

00000	No. Exception/Error
00013	Subfile full
01021	Dupliate key - Not allowed
01041	Array/Table sequence error
01211	I/O operation to closed file
01215	OPEN issued to a file already opened
01218	Unable to allocate record
01241	Record number not found
01331	Wait time exceeded for READ from WORKSTN file

ROUTINE

INIT Program Initiation

GETIN Get Input Record Routine

DETC Detail Calcs

TOTC Tatal Calcs

DETL Detail Output Lines

OFL Overflow Lines

TERM Program Termination

pgmname Name of CALLed Program

我還能從檔案訊息資料結構INFDS中看到那些訊息?

```
30 - 37 RPG Source Sequence Number
46 - 52 MCH or CPF Error Message ID
93 - 102 Library Containing File
103 - 112 Name of Spooled File
129 - 138 File Member Name
149 - 151 Diskette Location
152 - 153 Rows(DSPF) or Line Length (PRTF)
154 - 155 Columns(DSPF) or Line Length(PRTF)
188 - 189 Overflow Line Number
197 - 206 Name of Requester Device
401 - 402 Major Return Code
403 - 404 Minor Return Code
```

Plus Much More.....

我還能從檔案訊息資料結構INFDS中看到那些訊息?

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2-4 程式狀態的資料結構

程式狀態的資料結構 PROGRAM STATUS DATA STRUCTURE

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部份程式狀態碼(*STATUS)

- 00121 Invalid Array Index
- 00202 CALLed Program Failed
- 00211 CALLed Program Failed
- 00231 CALLed Program Halt
- 00333 Error on DSPLY Operation
- 00414 Not Authorized to Use Data Area
- 00415 Not Authorized to Update Data Area
- 00431 Data Area previously locked
- 00907 Decimal Data Error
- 09999 CPF Program Exception Error

我還能從程式狀態(PROGRAM STATUS)資料結構中看到那些資料?

- 16 20 Previous Status Code
- 21 28 RPG/400 Source Sequence Number
- 40 46 Exception Error ID (MCH or CPF)
- 201 208 Name of File Last Used
- 244 253 Job Name
- 254 263 User Name
- 264 269 Job Number
- 276 281 System Date in UDATE Format
- 288 293 Date Compiled
- 304 333 Source File/Library/Member

Plus Much More.....

我還能從程式狀態(PROGRAM STATUS)資料結構中看到那些資料?

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第三章 程式例外及錯誤處理

單元內容

本單元將研究RPG/400程式中三種不同的例外管理方法。首先我們看利用預設錯誤管制方法時,當錯誤發生而又沒有用其他方法處理下會發生什麼事,接著我們看看如何在錯誤發生時,由C卡使用結果欄燈號控制,直接跳到某一子程式處理,最後我們再測試一種技巧:使用F卡接續行定義偵錯子程序(SUBROUTINE)或定義特殊名稱子程序(*PSSR)處理錯誤。

本單元另外延伸解釋檔案訊息、程式狀態訊息、資料架構的利用,往後 有許多實例解釋如何運用第二、三兩種方法。

單元目標

- 1.選擇適當的錯誤處理方法用於RPG程式中。
- 2.描述三種錯誤處理方法的邏輯。
- 3.撰寫接收必須訊息所需的特殊需求程式,並且利用檔案訊息或程式 狀態資料方法指示到某一子程序(SUBROUTINE)專門處理。

3-1 實例和方法論

實論和方法論

可能發生狀況

關鍵值重複(DUPLICATE KEYS) 數值資料的錯誤(DECIMAL DATA ERRORS) 呼叫程式找不到(CALLED PROGRAM NOT FOUND)

可能的處理方式

總數量儲存 判別最後處理的記錄 顯示訊息給操作者或程式設人員 除錯時原始程式訊息顯示 關閉資料區

管理例外錯誤的三種方法

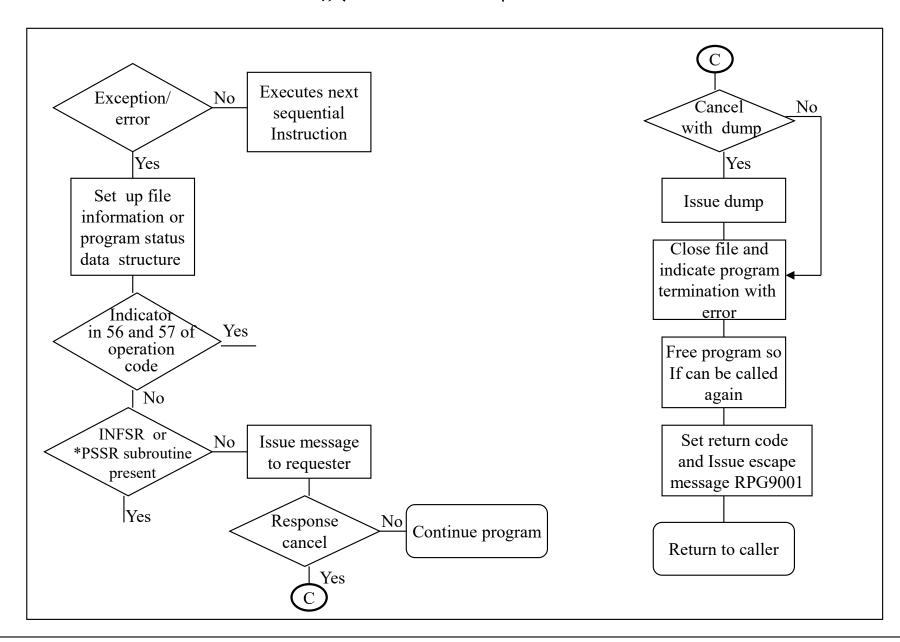
預設的錯誤管理 (DEFAULT ERROR HANDLER)

結果欄燈號管制方法 (RESULTING INDICATOR METHOD)

程式內部自行跳到特定子程序中(SUBROUTINE)處理

3-2 預設之錯誤管理

預設之錯誤管理



以下對訂單輸入人員有何意義?

RPG1299 ORDENT 3700 CUSMST

*N I/O ERROR DETECTED

(C D G S)

以下對訂單輸入人員有何意義?

THE SYSTEM HAS DETECTED AN UNEXPECTED ERROR AND IS CURRENTLY RECORDING THE ERROR DATA.

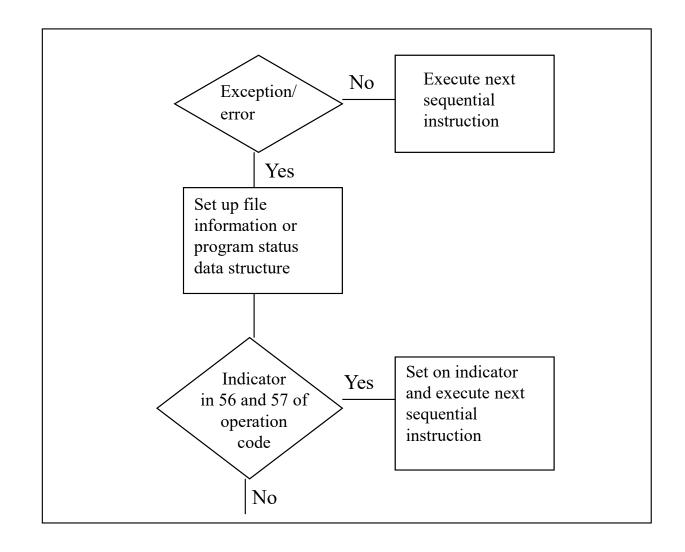
THE LAST SUCCESSFUL TRANSACTION COMPLETED WAS ORDER #12345 FOR ABC CO.

BY PRESSING THE ENTER KEY YOU WILL RETURN TO THE ORDER PROCESSING MENU.

CALL ME IF YOU NEED HELP.

3-3 結果欄燈號管制方法

結果欄燈號管制方法



使用結果欄燈號於輸出/入的操作中

	COL.	COL.	COL.
	54-55	56-57	58-59
CHAIN	NF	ER	_
READ	-	ER	EOF
READC	_	ER	EOF
READE	_	ER	NE/EOF
READP	-	ER	BOF
SETLL	NF	ER	EQ
SETGT	NF	ER	-
UPDAT	-	ER	-
WRITE	-	ER	SF
DELET	NF	ER	-
OPEN	-	ER	-
CLOSE	-	ER	-
FEOD	-	ER	-
EXCPT	-	-	-
EXFMT	-	ER	-
NF = NOT FOUND			NE = NOT EQUAL
ER = ERROR (OP-N	NOT COMPLE	TE)] I	BOF = BEGIN OF FILE
EOF = END OF FIL	E]	EQ = EQUAL
		S	SF = SUBFILE FULL

注意:本方法不能用於 'EXCPT'操作指令上。

3-4 檔案資訊資料結構

檔案資訊資料結構

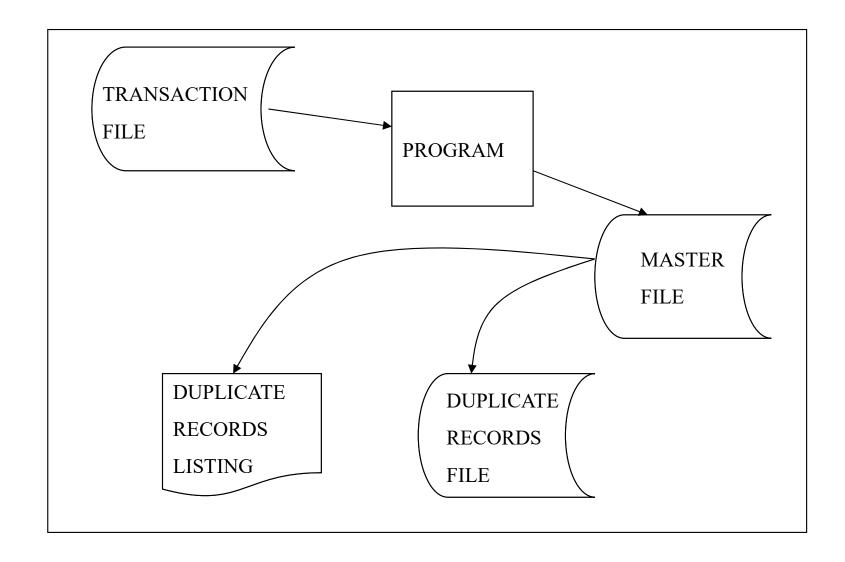
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結果欄燈號管制方法-關鍵值(KEY)重複



結果欄燈號處理方法-關鍵值 (KEY)重複

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工作站 (WORK SATION) 螢幕檔讀取逾時之一

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工作站 (WORK SATION)螢幕檔讀取逾時之二

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工作站 (WORK SATION)螢幕檔讀取逾時之三

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程式狀態資料結構

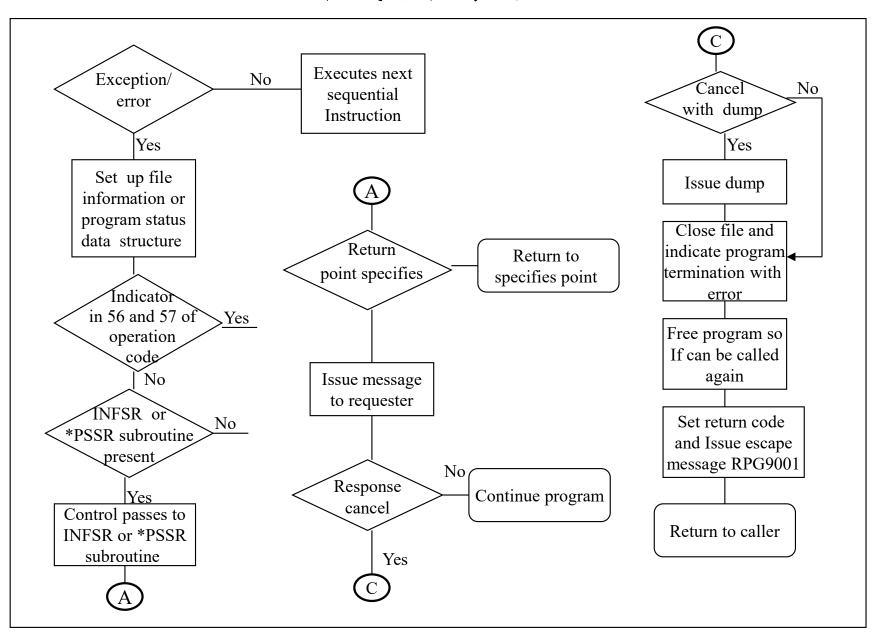
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結果欄燈號管制方法

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3-5 內含式程式子程序 (SUBROUTINE)的方法

内含式子程序的方法



程式例外錯誤處理一錯誤處理子程序 (SUBROUTINE)

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程式例外錯誤處理一錯誤處理子程序 (SUBROUTINE)

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除錯子程序結尾字義(FACTOR2)

(ENDSR OPTIONS)

*GETIN Get Input Record Routine

*DETC Beginning of Detail Calcs

*TOTC Beginning of Total Calcs

*DETL Beginning of Detail Output lines

*TOTL Beginning of Total Output lines

*OFL Beginning of Overflow Lines

*CANCL Cancel Program Execution

blanks RPG Default Error Handler

定義上列中的一個於除錯子程序(SUBROUTINE)尾, 'ENDSR'

的FACTOR2欄位,指定當除錯子程序結束時,將執行點回歸到RPG程式邏輯中的特定位置。假如沒有除錯子程序設定,控制權將交到預設的錯誤管制方式中,而且功能檢查將經常發生(即程式當掉)。

程式例外錯誤處理一錯誤處理子程序 (SUBROUTINE)

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程式例外錯誤處理一錯誤處理子程序 (SUBROUTINE)

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檔案/程式例外錯誤處理 File Type Mode of Processing File Addition/Unordered File Designation Length of Key Field or Extent Exit Number of Tracks End of File of Record Address Field for DAM for Cylinder Name of Filename Sequence Record Address Type Label Exit Overflow Number of Extents Type of File Organiza-File Format ion or Additional Area Device Symbolic Storage Index File Overflow Indi-Rewind cator Kev Field Block Record Device Condition Continuation Lines U1-U8.UC Length Length Starting Option Entry Location External Record Name 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 FFILEA K D I S K K I N F S R * PSSR KINFDS FLEAD FFILEB WORKSTN **K**INFSR * PSSR F KINFDS S C R N D S KNUM Subfield Initialization Value Matching Fields or Chaining Filename Name Constant Value Field Locaction Field Number (I/N),E

Option (O),U,S

Record Identifying
Indicator,', or DS External Field Name RPG Indicators Control Level (L1-L9) Field Record Relation Record Identification Codes Field Name Record Name Form Zero Data Structure Line Plus Minus or Position Position Position Data Occurs Constant Length Structure n Times Name Bank Name 21 22 23 24 26 27 28 29 30 31 STATUS ERROR * P A R M S PARMCT * PROGRAM PGMNAM

若程式邏輯上需要的話,你也可以直接用系統提供的子程序名稱*PSSR子程序(SUBROUTINE)處理,(以操作指令 'EXSR')。這個程式也可和結果欄位燈號方法聯用。

第四章

副程式檔案資料共享

4-1 資料開啟路徑(ODP)概念

資料開啟路徑(ODP)內容 (OPEN DATA PATH (ODP) CONTENTS)

Open file information

File, library and member names

Record length

Access type

Cursor location

I/O Record buffer

Feedback area

Control Area

Work Areas

Field Mapping Code

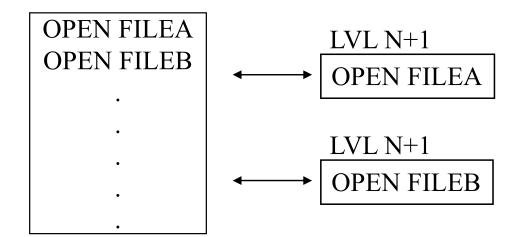
FILEA

4-2 資料開啟路徑(ODP)之分享(SHARE)

資料開啟路徑的分享(SHARE) (SHARING THE OPEN DATA PATH)

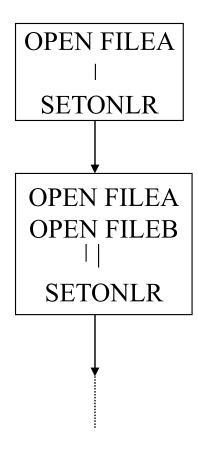
在一個工作(JOB)裡,於下列應用架構中使用ODP分享方式





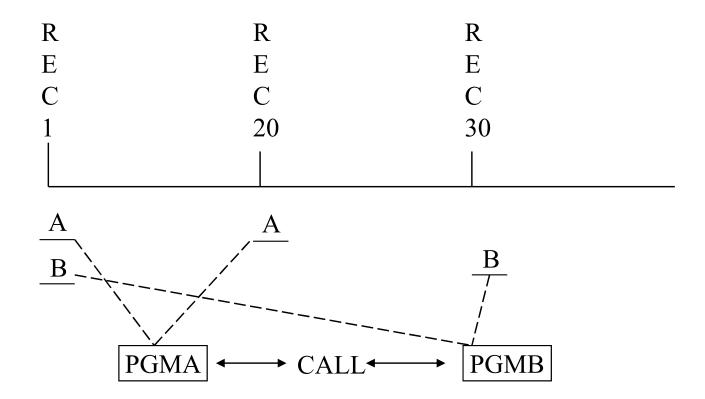
資料開啟路徑分亨 (SHARING THE OPEN DATA PATH)

在這個應用架構中,沒有相互的影響

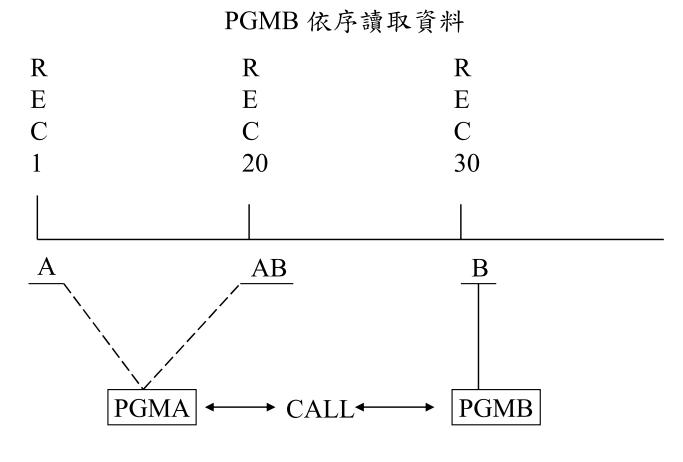


沒有ODP分享時的資料檔指標位置 (DATABASE FILE CURSOR WITHOUT ODP SHARING)

檔案指標位置決定資料記錄順序讀取下一筆資料的位置



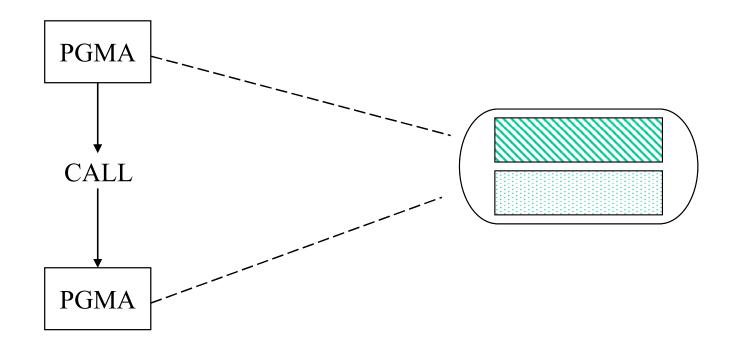
有ODP分享時的資料檔指標位置 (DATABASE FILE CURSOR WITH ODP SHARING)



使用ODP指標位置示意圖

螢幕檔ODP分享 (ODP SHARING FOR DISPLAY FILES)

快速開檔而不考慮檔案指標 一注意使用CLRL(*NO)



ODP分享示意圖

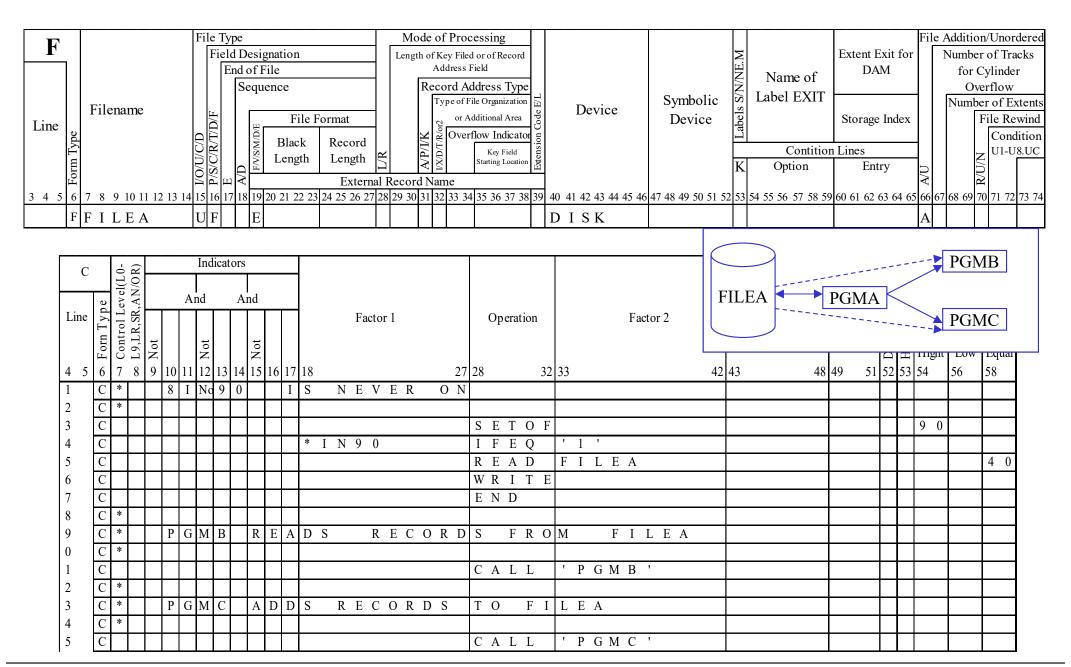
檔案必須設計成SHARE(*YES)

- CRTPF/LF/DSPF
- CHGPF/LF/DSPF
- OVRDBF/DSPF

在工作(JOB)中執行第一次開檔作業檔案必須開檔以利最大使用

- **—** RPG/400
- OPNDBF IN CL (EASIER BUT SLOWER)

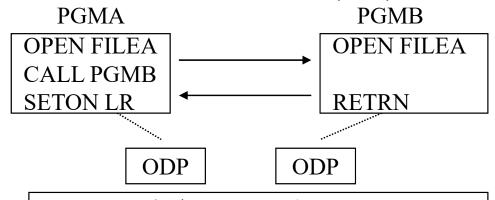
開啟ODP分享檔案



4-3 程式交互影響之比較

程式交互影響圖之一

檔案不分享:SHARE (*NO)



兩支程式第一次開檔為全開 比PAG大的二個ODP(同一檔案) 起始設定的動作(設定檔案讀取位置等)

若FILEA設定為檔案不分享:

PGMA FILEA 做對全開檔。

PGMB被呼叫(CALL)也對FILEA重新全開。

PGMB回轉到PGMA。

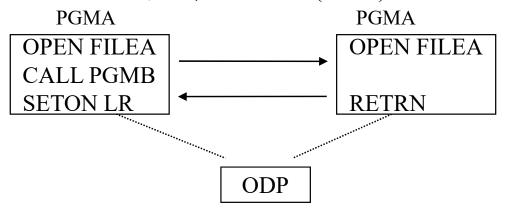
PGMB第二次被呼叫(CALL)就不需開檔。

每一支程式各有一個FILEA的ODP。

假如PGMA打亮LR結束,PGMB沒有打亮LR,那麼PGMB的ODP 仍然會留在系統的暫存區中。

程式交互影響圖之二

檔案分享:SHARE (*YES)



最好的效能(BEST PERFORMANCE)

PGMA全開檔PGMB分享式的開檔--只有第一次被呼叫時執行較小的PAG空間 (只有一個ODP)

PGMB可能需要起始設定動作(清螢幕欄位值等)

若FILEA設定為檔案分享:

PGMA FILEA 全開檔。

PGMB 分享式開檔 (不需重新輸入ODP)。

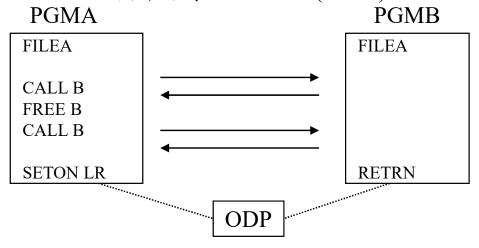
PGMB 被第二次呼叫時,不必再開檔。

二支程式共用一個ODP。

假如PGMA有打亮LR而PGMB沒有,則ODP仍留在暫存區中。

程式交互影響圖之三

檔案分享:SHARE (*YES)



PGMB 程式每一次呼叫都需要分享式開檔(SHARE OPEN)

PAG 比較小(只有一個ODP)

PGMB: 不需要起始設定動作

若FILEA是一個分享檔案,而且計對PGMB使用FREE指令:

PGMA 中的 FILEA 全開檔。

PGMB 被呼叫(CALL)而且FILEA為分享式開檔。

PGMB 回轉控制到PGMA。

PGMA 針對PGMB下FREE指令。

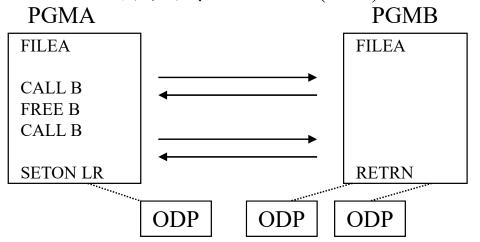
當PGMB第二次被呼叫時仍而再一次分享式開檔。

雨支程式共用一個ODP。

假如PGMA有打亮LR而PGMB沒有,那麼PGMB的ODP部分會在暫存器中。

程式交互影響圖之四

檔案分享: SHARE (*NO)



每次呼叫程式都要全開檔 PGMB每一次被呼叫,就重新建一個ODP 會造成大量的PAG資料及很差的效能 RCLRSC可能有所幫助 最差的個案

若FILEA是一個分享檔案,而且計對PGMB使用FREE指令:

PGMA 中的 FILEA 全開檔。

PGMB 被呼叫(CALL)而且也對FILEA做全開檔。

PGMB 回PGMA。

PGMA 對PGMB下FREE。

當PGMB 第二次被呼叫時,又對FILEA做全開檔。

PGMA有1個ODP, PGMB則此時會有兩個ODP。

假如PGMA打亮LR而PGMB沒有,那麼PGMB的兩個ODP會留在暫存區中。

第五章 次檔案之資料輸入 (Subfiles Used for Data Entry)



本單元將探討如何利用次檔案進行資料輸入。首先我們先瞭解一些觀念,然後再去瞭解如何啟動次檔案,處理便用者鍵入資料等等。由於次檔案資料錯誤的更正在資料輸入時愈來愈難,所以接下來我們再討論有關如何提供操作者錯誤資訊,並且判別那些末修正回資料檔且已更正於次檔案中資料的技術。以上的各個主題本單元將運用幾個實例來逐步討論。另外本單元也會討論下列兩個主題:

- **©HEADS DOWN**
- **◎NORMAL DISPLAY ENTRY**

使用次檔案顯示已輸入資料,並配合單筆輸入處理。

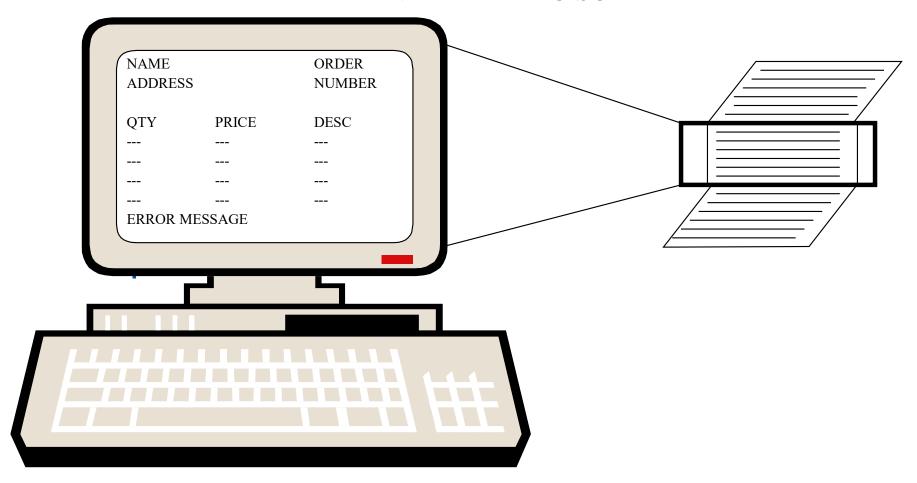


- 1.描述三種啟動次檔案的方法。
- 2.描述兩種讀取操作者利用次檔案輸入資料的方法。
- 3.解釋燈號的狀態如何從程式傳到螢幕上。
- 4.解釋如何使用螢幕檔的關鍵字元:SFLNXTCHG, SFLMSG, SFLMSGID。
- 5.比較兩種資料輸入時錯誤處理的方法。
- 6.比較直接資料處理(DIRECT DATA ENTRY)和一般資料處理(NOMAL DISPLAY ENTRY)使用次檔案的差異。
- 7.利用次檔案撰寫資料輸入程式。

5-1 次檔案輸入資料

次檔案--直接資料輸入

MULTIPLE ORDER LINES ENTERED THRU SUBFILE



直接資料輸入

NAME			
ADDRESS_			
CROER NUM	IDED		
ITEM	QUANTITY	PRICE	
I I Livi	QUANTITI	FRICE	
1085	50		
7542	100	125	

啟動

資料輸入

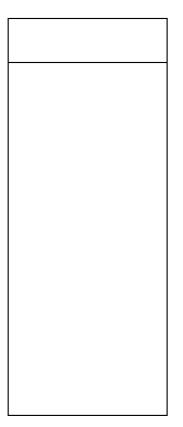
錯誤資料檢核

啟動

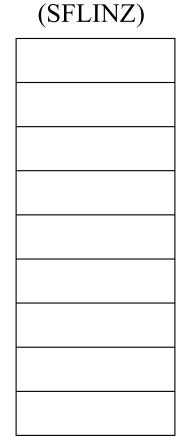
單筆資料寫入 次檔案記錄中

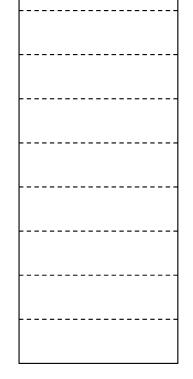
資料寫入次檔案 控制記錄

資料寫入次檔案 控制記錄 (SFLINZ AND SFLRNA)



單筆記錄啟動





所有次檔案記錄啟動 所有次檔案記錄未啟動

直接資料輸入

由螢幕畫面輸入資料 定義輸入欄位 所有次檔案記錄欄位皆相同 畫面資料正確性檢查 次檔案記錄用READC讀取 記錄資料修改變更

次檔案SUBFILE中的操作指令--UPDATE

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直接資料輸入

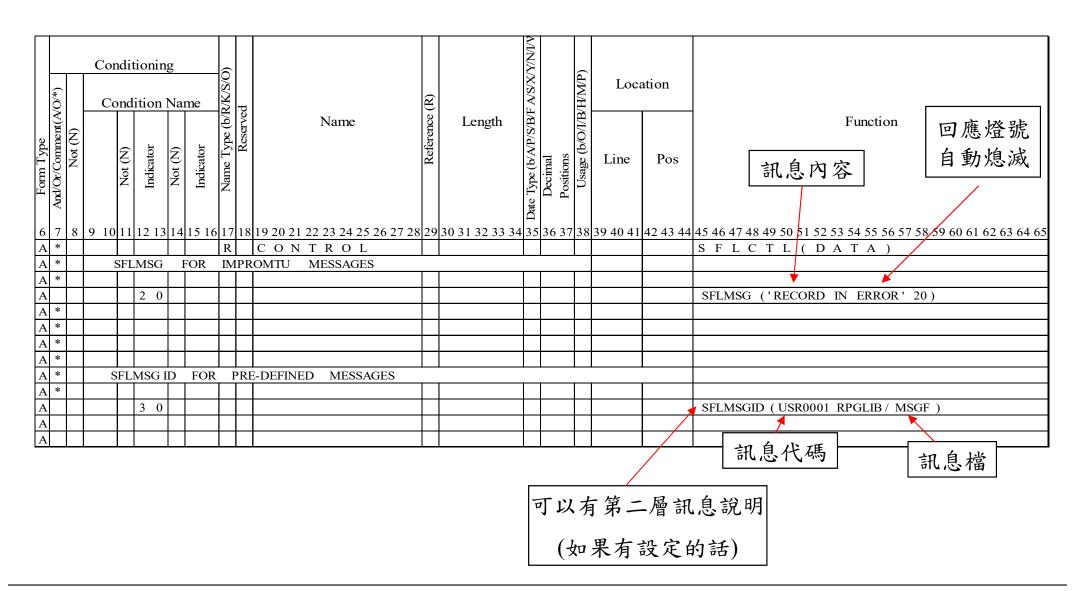
錯誤更正

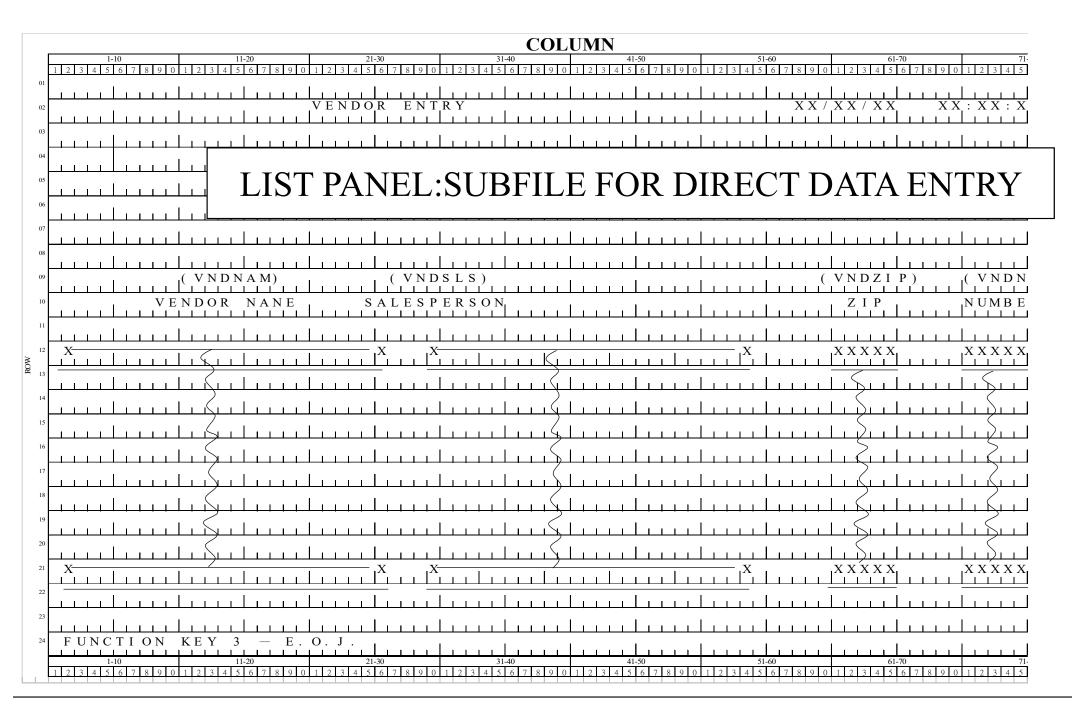
DSPATR

SFLNXTCHG

SFLMSG/SFLMSGID

SFLMSG vs. SFLMSGID





AS/400 DATA DESCRIPTION SPECIRFICATIONS(1 OF 3)

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AS/400 DATA DESCRIPTION SPECIRFICATIONS(2 OF 3)

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AS/400 DATA DESCRIPTION SPECIRFICATIONS(3 OF 3)

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輸入暫存區 (INPUT BUFFER)

次檔案控制記錄:

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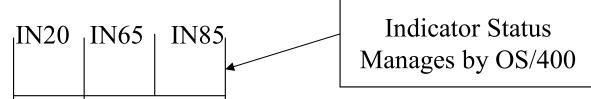
次檔案資料記錄:

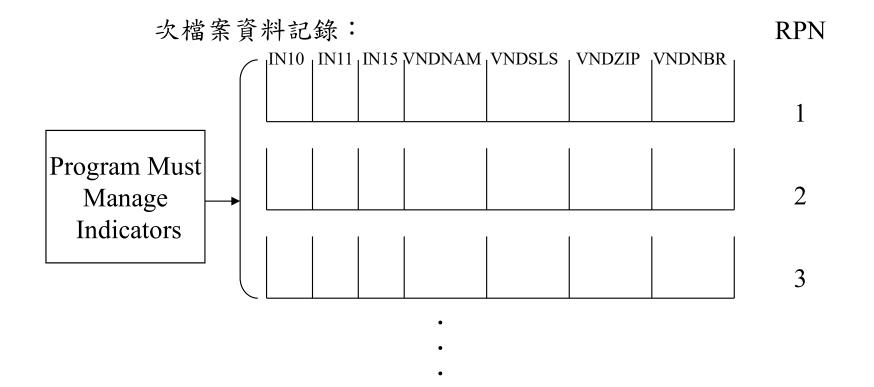
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輸出暫存區 (OUTPUT BUFFER)

次檔案控制記錄:





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SUBFILES-DIRECT DATA ENTRY PROGRAM(3 OF 3)

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5-2 錯誤處理選擇

兩個次檔案

單一次檔案處理兩次

- --編修所有記錄資料
- --新增資料到資料檔

"由上到下" (HEADS DOWN)的輸入,使用批次編輯方式

5-3 次檔案一般顯示行輸入

一般顯示行輸入 SUBFILES WITH NORMAL DISPLAY ENTRY

NAME ADDRESS			
ORDER NUM	1BER		
LINE 1	ITEM 1055	QUANTITY 55	PRICE
LINE 2	ITEM 7642	QUANTITY 100	PRICE

啟動 資料輸入 錯誤檢查

次檔案-一般顯示行輸入

啟動

顯示次檔案資料:將資料寫入次檔案記錄

資料輸入

一般顯示考量

錯誤更正

於一般顯示行處理 必須資料正確後,才能寫入次檔案 當要更正目前已存在的記錄資料時:

- 1.用行數序號,叫入一般顯示行
- 2.執行更正
- 3. 寫回次檔案中

次檔案-一般顯示行輸入



考量點

次檔案大小 SFLRCDNBR 資料鍵入的速度 簡單的錯誤更正 最佳使用時機:即時資料輸入

利用次檔案處理資料輸入

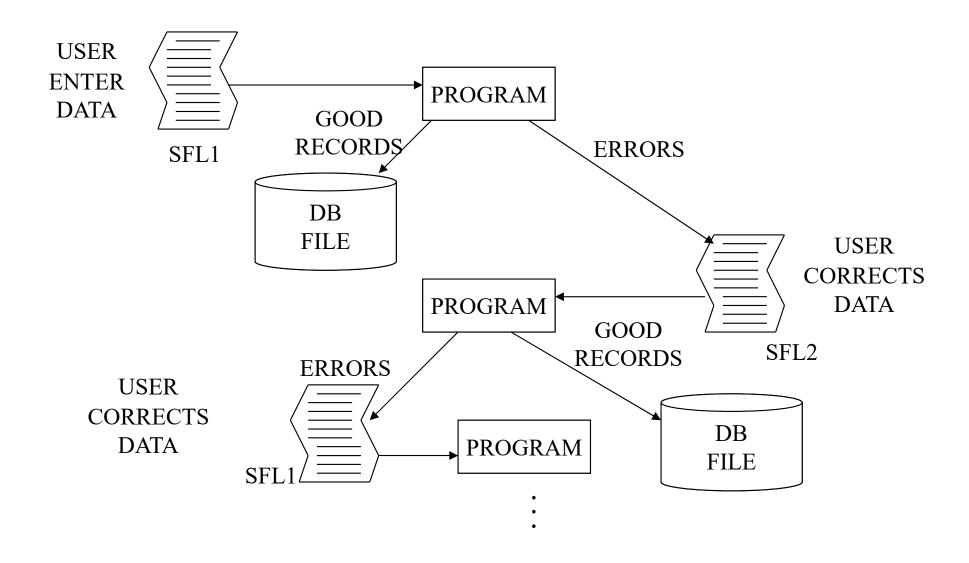
總結

直接輸入 一般顯示行輸入 應用系統的需求 開發的效益

第六章:實例研討

6-1 實例研討(一)

錯誤處理選擇:2個次檔案



錯誤處理選擇:2個次檔案之一

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以下三頁為參考用

錯誤處理選擇:2個次檔案之二

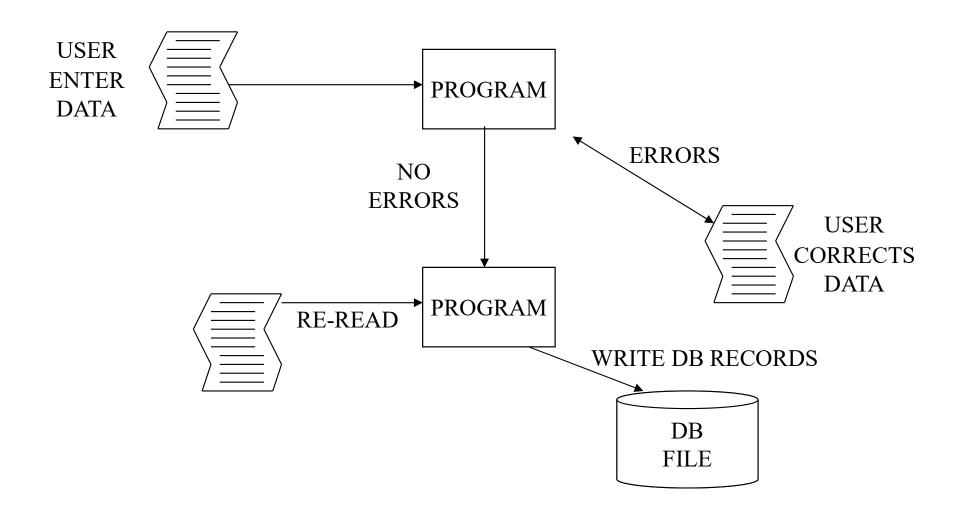
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錯誤處理選擇:2個次檔案之三

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6-2 實例研討(二)

錯誤處理選擇:單一檔案處理兩次



錯誤處理選擇:單一檔案處理兩次之一

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以下三頁為參考用

錯誤處理選擇:單一檔案處理兩次之二

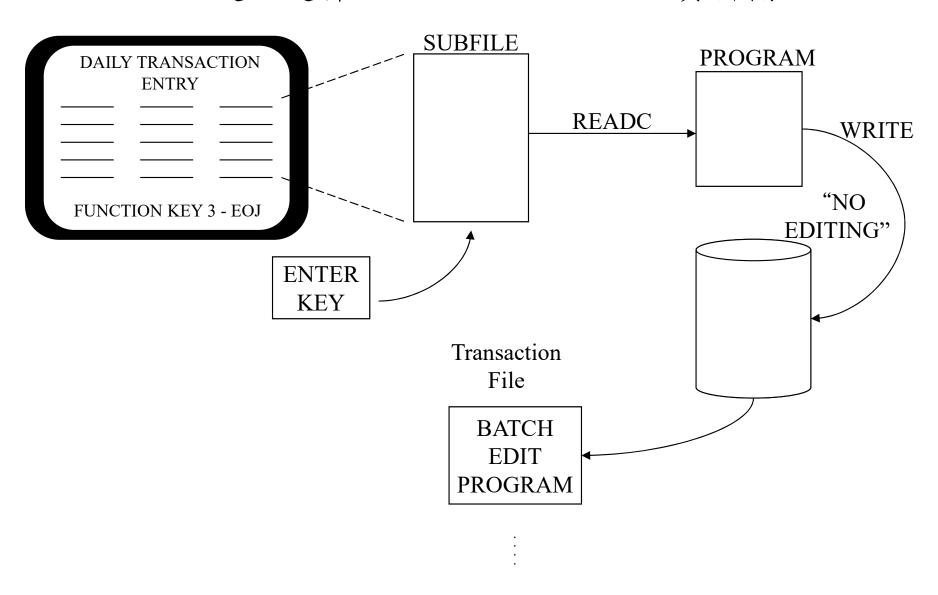
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錯誤處理選擇:單一檔案處理兩次之三

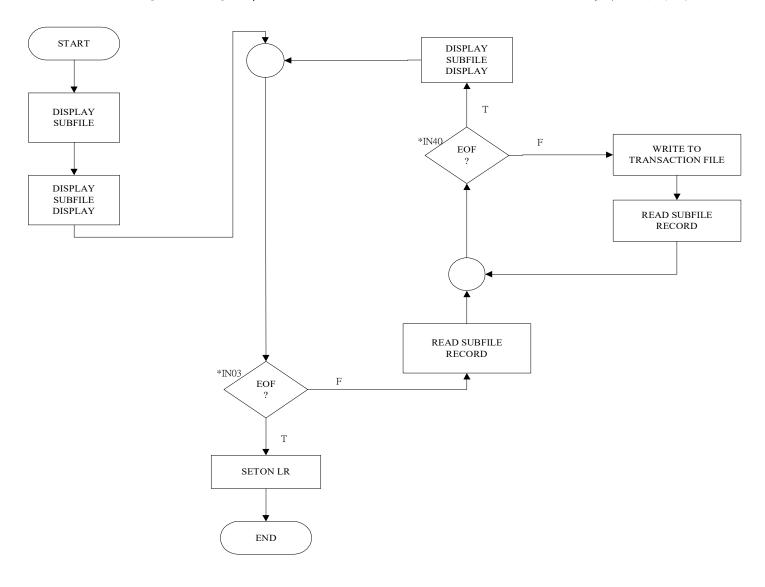
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6-3 實例研討(三)

錯誤處理選擇: 'HEADS DOWN'資料輸入



錯誤處理選擇: 'HEADS DOWN'資料輸入



錯誤處理選擇:HEADS-DOWN資料處理

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錯誤處理選擇:HEADS-DOWN資料處理

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直接資料輸入



考量點

次檔案大小

錯誤更正-操作者

錯誤更正-程式設計者

最好的使用方式

HEADS DOWN

較小的次檔案空間

第七章 應用系統資料回復

單元內容

本單元將討論使用COMMITMENT CONTROL的益處,然後再看RPG/400和CL建立COMMITMENT CONTROL環境的詳細步驟。我們將會定義複雜的異動情況,來說明一在COMMITMENT CONTROL環境下如何開啟異動檔並建立異動邊界,以下將用實例說明如何使用RPG/400和CL來建立環境。

單元目標

- 1.區別在COMMITMENT CONTROL下使用複雜異動處理的應用程式和一般的不同。
- 2.描述如何判別RPG/400程式中那些檔案該用COMMITMENT CONTROL的方式開檔。
- 3.描述一筆異動處理,同時說明如何界定RPG/400程式中的異動邊界 (TRANSATION BOUNDARY)。
- 4.描述一筆COMMIT產生的資料,並解釋資料如何被系統及你的程式所使用。
- 5.定義COMMIT和ROLLBACK(確認和取消),並解釋這些功能如何寫在RPG/400程式中。

7-1 資料儲存確認管制的益處

採購訂單處理實例:備份資料顯示每一次明細異動資料會修改兩個檔案的記錄

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21 R		WS3	POCLERK3	14;06:30
22 R	UP POOETP 🕗	ws3 🕗	POCLERK3	14;06:32
23 R	UP POOETP 🖊	WS1 🖊	POCLERK1	14;07:29
24 R	UP ITEMP	WS1	POCLERK1	14;08:00
25 R	•	WS2	POCLERK2	14;08:22
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27 R	UP ITEMP 🦴	WS3	POCLERK3	14;09:11
28 R	UP POOETP 🖊	WS3 🔑	POCLERK3	14;09:13
29 F	CL ITEMP	WS3	POCLERK3	14;09:22
30 F	CL POSUMP	WS3	POCLERK3	14;09:22
31 F	CL POOETP	WS3	POCLERK3	14;09:22
Detailed Entry		HELP-Co	de/Type Help	

多位使用者正在修改多個檔案記錄 那一筆才是回復的節點(RECOVERY POINT)

從序號28筆回復資料會使得WS1針對INPITEM檔修改的資料不完全(序號24筆) 從序號23筆開始回復資料會排除WS2和WS3已經修改完成的記錄資料 所以並沒有好的回復節點。 用回復檔(JOURNAL)回復資料,但沒有用資料儲存確認(COMMIT)方式做

多使用者複雜的異動處理

查詢歷史記錄,找出執行中的工作(JOB)。

顯示回復檔(JOURNAL FILE)資料,找尋正在使用的檔案。

篩選檔案。

判別每個工作(JOB)的最後一次異動處理。

檢查每一筆異動處理是否都完成。

查核使用同一筆記錄的多個工作(JOB)。

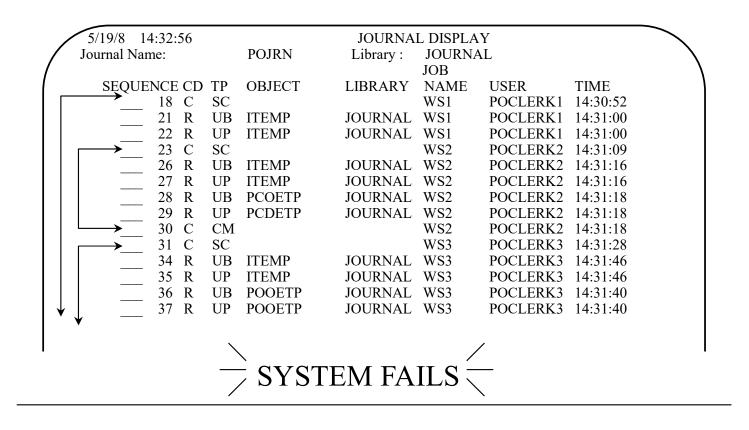
使用回復資料比對命令(COMPARE JOURNAL IMAGES COMMAND)。

輸入更正的異動記錄。

當使用回復功能而沒有用資料儲存確認管制時,回復後往往要重新用人工輸入資料,而且其中包含輸入完成的資料。

採購訂單處理

(使用COMMITMENT CONTROL(資料儲存確認管制)的實例)



大部份的回復都已自動完成,你的程式可以顯示每一個操作者最後 完成的異動記錄處理。

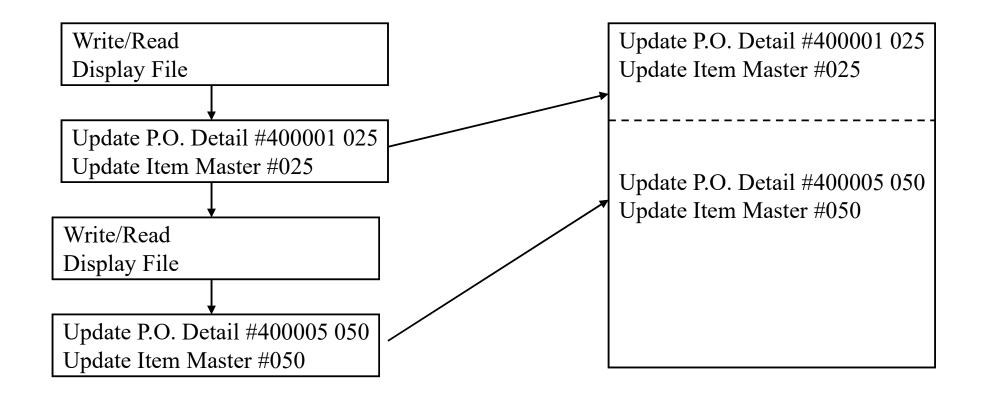
7-2 建立一個資料儲存確認管制的環境

建立一個資料儲存確認管制的環境

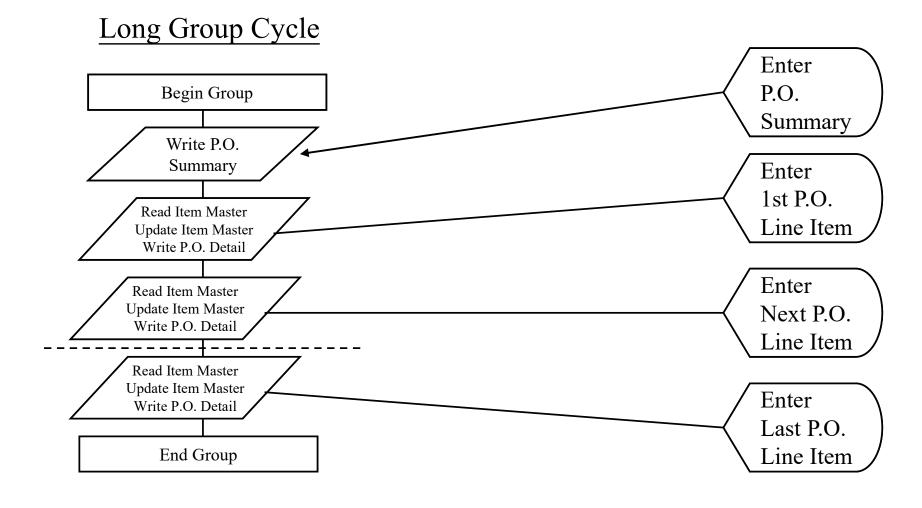
- 1. 區別複雜異動修改的檔案
- 2.RPG程式中的定義
 - -指定用COMMITMENT CONTROL方式開檔的檔案
 - -定義異動邊界
- 3.開始用儲存確認管制的方式將記錄輸到回復實體檔(JOURNALING PHYSICAL FILE)
- 4. 在工作中(JOB):
 - -開檔之前先啟動資料儲存確認管制
 - -當不再使用資料儲存確認管制時,即關閉此功能

7-3 異動處理

區別複雜的異動處理:採購訂單處理



複雜的異動處理:採購訂單輸入實例



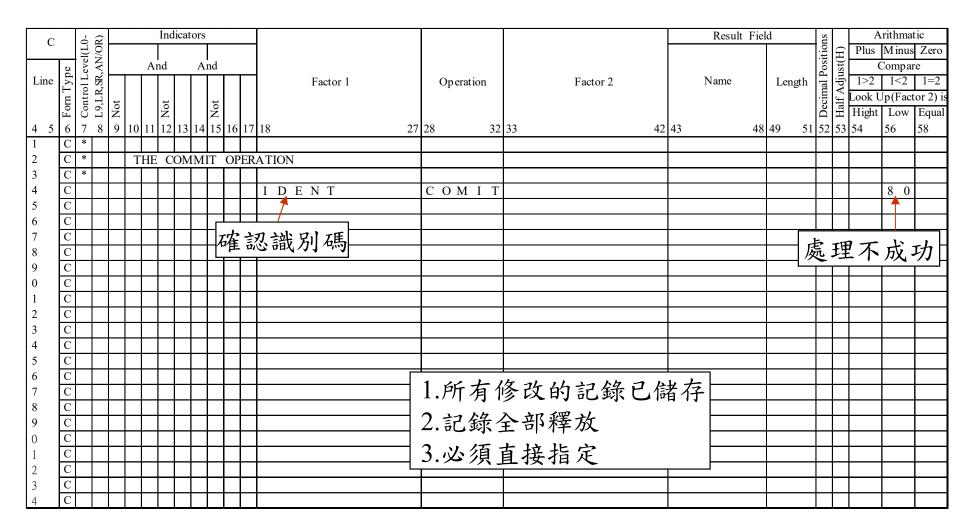
7-4 定義檔案

定義檔案在資料儲存確認環境下開啟:

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接續行輸入,定義檔案使用COMMITMENT CONTROL

確認



異動處理結束 釋放記錄

確認識別碼

重新啟動訊息資料

程式管制內容

最長4096位元

寫入與C/CM JOURNAL ENTRY相同的資料到

"ENTRY SPECIFIC DATA"

寫入提示存體中(NOTIFY OBJECT)

取消儲存

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將原有已鍵入之資料取消,回復到本次輸入之前 結束異動處理 釋放記錄資料

直接取消儲存的發生

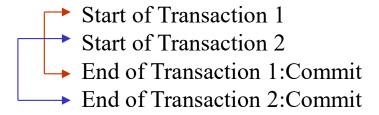
ROLBK in RPG
ROLLBACK in CL

間接取消儲存發生---沒有確認儲存 已修改的資料記錄而且下列之一被執行:

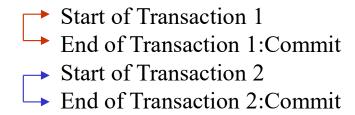
ENDCMTCTL
Normal Return
ENDJOB *CNTRLD
ENDSBS *CNTRLD
IPL after abnormal job or system end

異動邊界 (TRANSACTION BOUNDARIES)

Poor Design:



Good Design:



好的應用系統設計應含明確的異動邊界

7-5 實例

使用資料儲存確認的實例之一

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使用資料儲存確認的實例之二

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COMIT定義異動邊界,並將此筆完成的異動資料回存到檔案中

使用資料儲存確認的實例之四

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當工作結束時ROLBK會自動清除未完成部份的異動記錄

7-6 回復及結果

回復檔建立

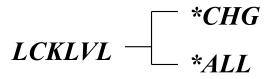
CRTJRNRCV JRNRCV(PORCV0001)

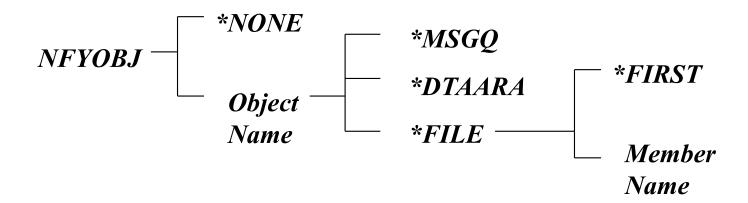
CRTJRN JRN(POJRN) JRNRCV(PORCV0001)

STRJRNPF FILE(ITEMP POSUMP PODETP)

JRN(POJRN) IMAGES(*BOTH)

IN JOB:STRCMTCTL





鎖定層次 LOOK LEVEL *CHG

已讀出等待修改的記錄將會鎖定不讓其他工作使用 修改完的記錄,執行COMMIT或ROLBK就會解決鎖定 未修改的記錄被釋放的情況:

- 1.直接輸出不修改
- 2.繼續讀下一筆

鎖定層次 LOOK LEVEL *ALL

從檔案讀出的記錄將被鎖定

記錄被釋放:

--執行COMMIT或ROLBK

注意:一次異動處理,最多可鎖定4096筆記錄

結束資料儲存確認管制:

ENDCMTCTL

第八章

檔案記錄鎖控 (RECORD LOCKING CONSIDERATIONS)



本單元首先要討論不用COMMITEMENT CONTROL讀取記錄時的記錄資料鎖定狀態,我們將看看導致記錄鎖定的狀況,再來將探究三種可以避免記錄資料索定的方法一

第一:讀取記錄即釋放掉。第二和第三個方法則是幫助你的程式測定當記錄釋放後,是否被其他工作(JOB)修改的技巧。最後我們再簡短及進一步考量使用COMMITMENT時的處理和建議一些可能的技巧來降低影響力。

單元目標

- 1.沒有使用COMMITMENT CONTROL產生記錄鎖定的可能原因探討。
 - 2.描述兩種可能的程式設計技巧來極小化記錄被其他程式使用的問題。
 - 3.描述COMMITMENT CONTROL的更進一步考量。
 - 4.解釋異動區段記錄(TRANSACTION SPAN RECORD)的功能。

8-1 沒有使用COMMITMENT CONTROL的資料鎖定

沒有使用COMMITMENT CONTROL的資料鎖定

一支程式只能針對每一個檔案的一筆記錄鎖定

鎖定的特點:讀取記錄等待修改時

釋放:1.修改後(即儲存回檔後)

2. 關檔



4. 寫入檔案後



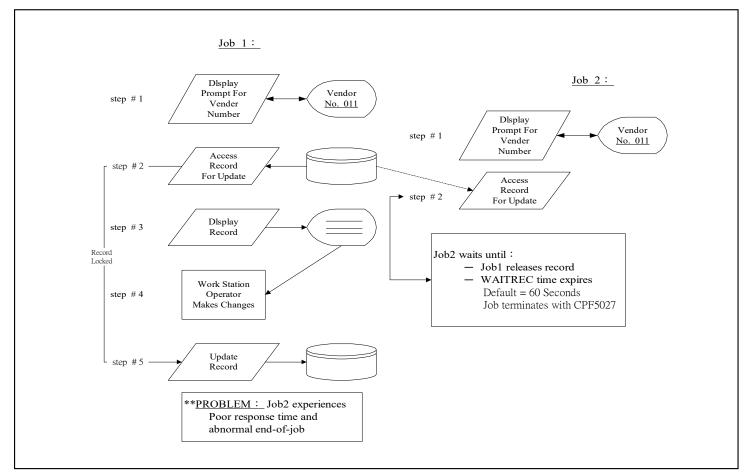
沒有記錄資料鎖定下讀取可更改檔案

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這個觀點意味著COMMITMENT CONTROL未啟動,在COMMITMENT CONTROL鎖定的情況依LCKLVL的參數而定。

第一個工作鎖定記錄時,第二個工作...



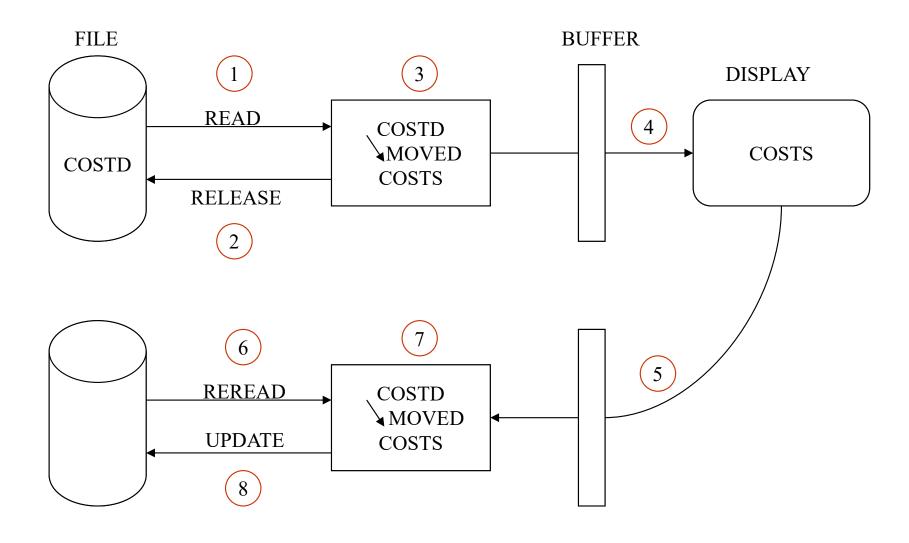
筆 即使使用 'CHAIN'操作指令檢查檔案資料是否存在(檔案為可修改),當檔案存在此資料時仍會被鎖定住直到:

- 1.其他筆資料記錄被讀取或記錄本身已被釋放掉。假如檔案沒有下COMMITMENT CONTROL,或是LCKLVL(*CHG)也會釋放掉。
- 2.一個COMIT或ROLBK操作指令執行時,假如檔案在COMMITMENT CONTROL內且使用LCKLVL(*ALL)。

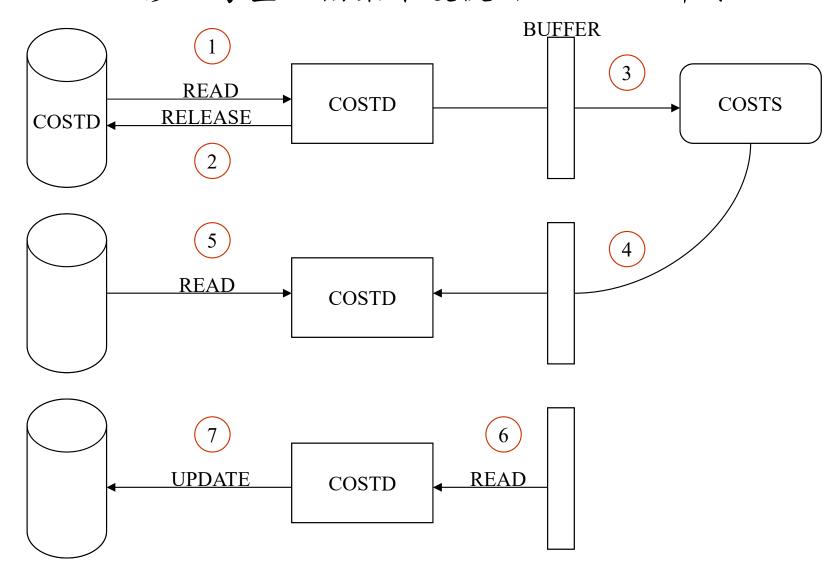
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DDS修改考量:檔案維護



DDS修改考量:檔案維護使用RTNDTA命令



釋放修改記錄的螢幕畫面考量

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釋放記錄三之一

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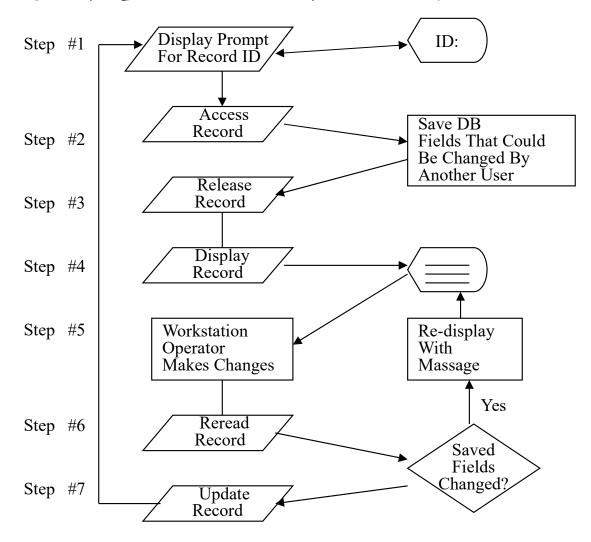
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釋放記錄三之二

(Indicators												Result Field						Arithmatic				
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Indicate	rs			Result Field	Arithmatic
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C		S E T O	V		L R
	/O/T/E) Stky #/Fe tc h(F)	ce Skip	Output Indicators	Field Name or EXCPT Name	
Fllena:	me or Record $\stackrel{\Xi}{\circ}$ D E	T After reference referenc	And And		Edit Cades A/C/1-9/R Bosition In Output Record A/R//R
Line E	Name $\stackrel{\frown}{\vdash} A D$ $\stackrel{\frown}{\mid} A N D$	Before After	Not Not	*AUTO	Output Record
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0 *					
O V E I	V D O R L E			R L S	

釋放後留在畫面上的記錄可能被其他使用者更改



釋放記錄以免記錄資料鎖定,卻可能造成修改中途,檔案資料已被其他使用者改過,而留在螢幕上待修之資料已非正確記錄。

使用已儲存的欄位--螢幕畫面考量

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使用已储存的欄位一

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F	DISPLAY	F C F E			WORKSTN						
Line 4 5	Form type Control Level(LO- L9.LR.SR.AN/OR) Not	nd And Factor 1	27	Operation 28 32	Factor 2	42 43	Name 48	Length	Plus (H) Lositions 1>2 Lositions Lositions 1>2 Lositions Lositions 1>2 Lositions Losit	Minus Zero Compare 1<2 1=2 Up(Factor 2) is t Low Equal 56 58	
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2	C *										
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6	[C]			E X C P T	K L 3						

讀取記錄待修改,並且預先儲存SALES AMOUNT。

使用已儲存的欄位二

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Line	Form type	Control	L9,LR,S	Not		,	10 N		;	Not			1 actor 1		Speration	r actor 2		rume		Lengti	Decimet	Half Adj	Look I Hight	Up(Fact	tor 2) is
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7	С	*			RE	-RI	ΑI) I	REC	OR	RD	T	O BE UPDATED, VERIFY	THAT	TYD SA	LES									
8	С	*					ΗA	١V	ΞN	[O]	[(СН	HANGES, RE-READ UPDATE	PAN	IEL TO										
9	С	*					CA	ŀΡΤ	'UR	Е	CF	IAl	NGES, THEN UPDATE REC	ORD								Т			
0	С	*																							
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重新讀取記錄以備修改,檢查YTD SALES是否被改過,若沒有,重新讀幕值,再修改回資料庫。

使用已儲存的欄位三

	С			<u> </u>		I	ndica	itors																Result Fi	eld				A	rithmat	tic
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	2	C	*				IF		TD		ALES	WI	ERE	CHA	NGE	D, RI	E-DIS	SPLAY U	JPDATE	E P	PANEL										
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家庭作業,不作課堂討論。

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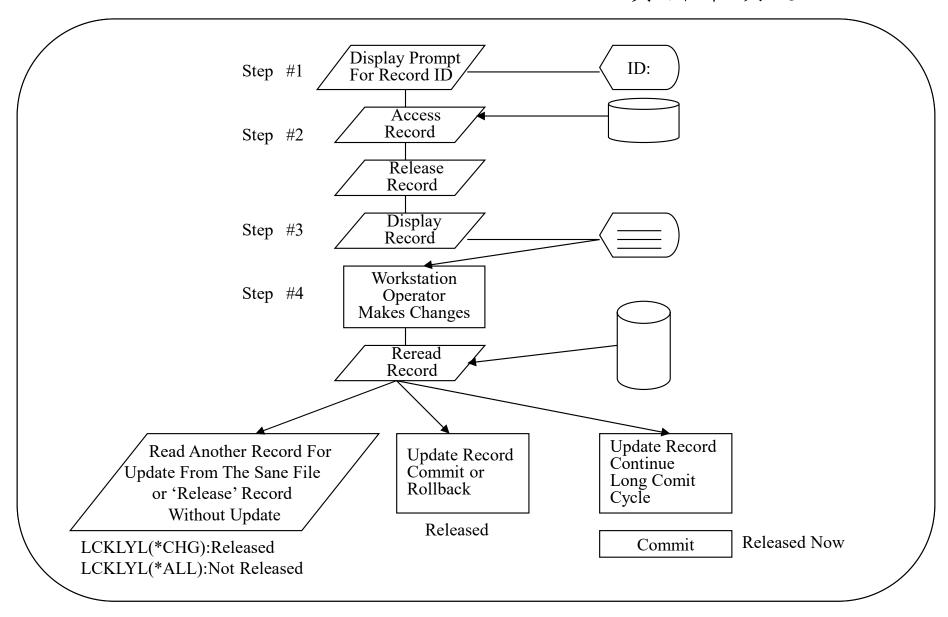
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8-2 使用COMMITMENT CONTROL的記錄鎖定

COMMITMENT CONTROL資料庫鎖定



當檔案使用COMMITMENT CONTROL方式開啟後,記錄資料就鎖定了。

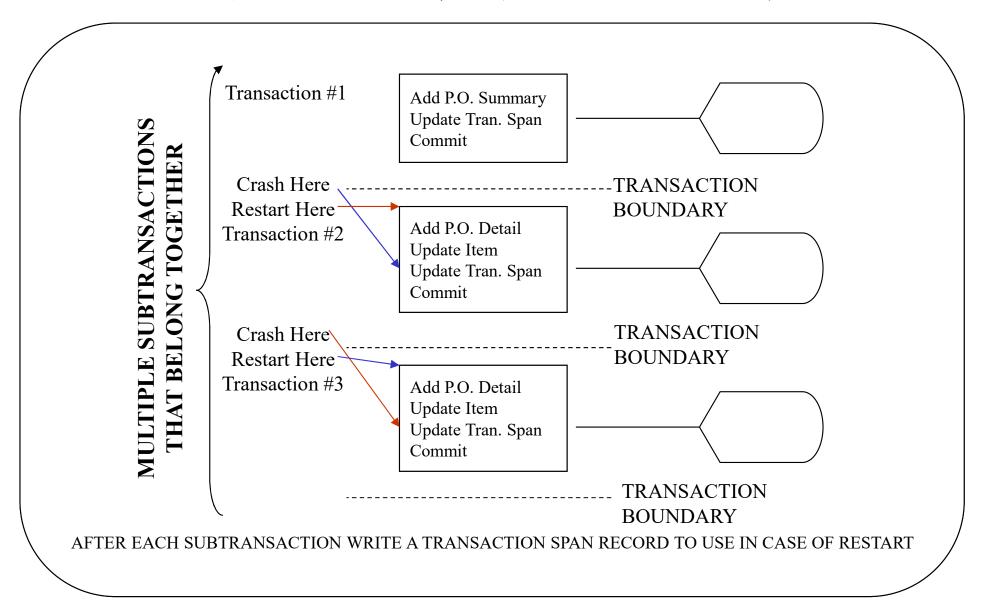
縮減記錄鎖定狀況 By using short commit cycles for most frequent processing

PURCHASE COMMIT ORDER ENTRY START COMMIT CYCLE ADD PURCHASE ORDER SUMMARY **UPDATE TRANSACTION SPAN COMMIT** ADD PURCHASE ORDER DETAIL **UPDATE ITEM MASTER UPDATE TRANSACTION SPAN COMMIT** ADD PURCHASE ORDER DETAIL **UPDATE ITEM MASTER UPDATE TRANSACTION SPAN COMMIT**

異動區塊數記錄於NOTIFY OBJECT

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將異動區塊數記錄內含於COMMIT迴圈中



第九章 進階RPG撰寫技巧

單元內容

本單元將從討論RPG/400中更進一步的操作指令和接續行(F卡)利用開始。我們將看看非同步處理(ASYNCHRONOUSLY)撰寫時的需求,利用SBMJOB開啟一個背景(BACKGROUND)工作→參數由內部資料區(LOCAL DATA AREA)提供或是使用DATA QUEUE→啟動一不中斷(NEVER ENDING)背景程式(BACKGROUND PROGRAM)讀取資料。接下來有三個主題是有關PERFORMANCE的考量。第一個重點在檔案處理撰寫時,如何使PERFORMANCE更好,第二個主題在幫助各位,使各位的程式邏輯跑起來更有效率,最後一個主題將看看CL如何影響你程式的PERFORMANCE。

單元目標

- 1 · 描述功能及撰寫下列六個操作指令:TESTN, DO, DEFN, CAT, SACN, SUBT。
- 2·描述兩種非同步處理啟動背景(BCAKGROUND)工作的方法。
- 3 · 列示兩種能增進處理索引檔 PERFORMANCE 的方法。
- 4 · 列示三種能增進燈號使用效能 (PERFORMANCE)的方法。
- 5 · 列示兩種能增進呼叫副程式 PERFORMANCE的方法。
- 6 · 描述OVRDBF三個(從資料檔讀取記錄資料時)影響程式 PERFORMANCE的參數。



9-1 雜項撰寫技巧

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横註: 結果欄位 (RESULT FIELD)必須包含一個文數字欄位。

至少要定義一個燈號

Positions 54 and 55 = 欄位中皆為數字

Position 56 and 57 = 數字之前含有空白

Position 58 and 59 = 欄位皆為空白

若欄位中有不正常的空白(兩數字字元中含有空白)或其他文字 字元,則上列三個燈號皆不亮。

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横註:

6個字元的結果欄 (RESULT FIELD)只能接取時間。

12個字元的結果欄可以擷取時間和日期。

注意:使用UDATE只能抓到工作(JOB)啟動時的日期,所以,有可能使得工作記錄的日期和系統日期不相同(跨日作業時)

DO (1 OF 2)

	6T-					Ind	icat	ors																Re	sult F	ield					A	rithma	tic
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在DO的指令行:

FACTOR 1 是開始的值(預設值為1)

FACTOR 2是終止值(預設值為1)

結果欄如果有定義欄位,則所抓到的值是目前指數 (INDEX)值。

狀態燈號(XX)必須是亮 (ON)才能執行第一次DO迴圈。

在END 的指令行:

FACTOR 2是一增加值的欄位(預設值是1)

狀態燈號令(YY)必須是亮 (ON),才能繼續執行DO的迴圈。

* 備註:所謂增加值即每次迴圈完後,指數增加的值。

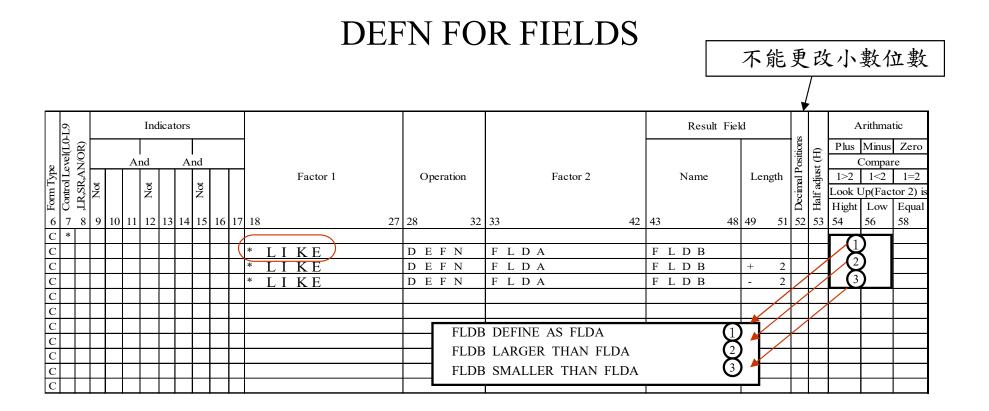
DO 的執行依下列步驟:

- 1·狀態燈號XX必須亮
- 2·搬移STRVAL欄位值到INDEX欄位
- 3·INDEX欄位值必須小於等於終止值
- 4·執行DO迴圈內的所有指令行
- 5·狀態燈號YY必須亮
- 6 · 將INCVAL欄位值加到INDEX欄位並回到步驟3

DO (2 OF 2)

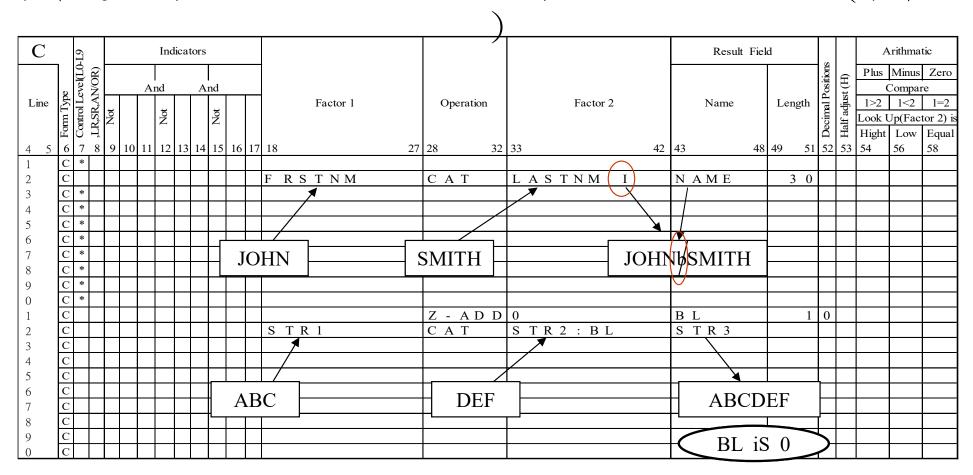
	6T:				Ind	icato	rs											Result	Field	i				Α	rithmat	ic
	Control Level(L0-L9	<u>&</u> _															r					Decimal Positions	£		Minus	
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DO的使用方式和DOW 或DOU相似可以選擇使用或不使用、起始值、終止值、增加值和燈號等指數值、終止值、增加值、燈號可以在DO迴圈內修改值,以便結束DO迴圈DO 迴圈組不能跨越DETAIL TIME 和TOTAL TIME



本操作指令可以增加RPG/400程式資料的獨立性

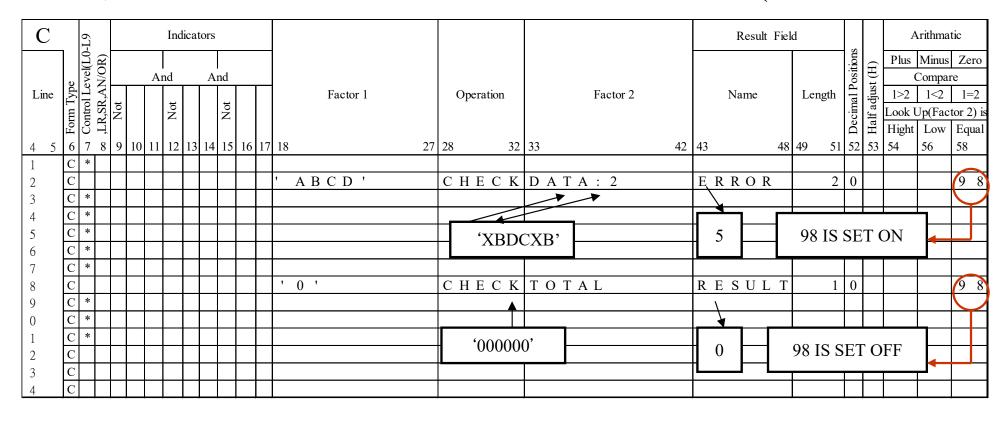
字串處理(STRING PROCESSING): CONCATENATE(字串組合



FACTOR 2 欄位內逗號後的數字代表FACTOR 1和FACTOR 2字串組合後中間空白字元數,不打字元數,系統自動設定為0。

於53欄位放入'P'則每次果欄位在資料放入前會清空。

字串處理(STRING PROCESSING): CHECK(字元比對)



CHECK操作指令會檢查FACTOR 2欄位內的字元是否存在和FACTOR 1欄位內。58-59欄燈號可使用,而且如果FACTOR 2 的字元不完全存放於FACTOR 1內,則此燈號會亮。

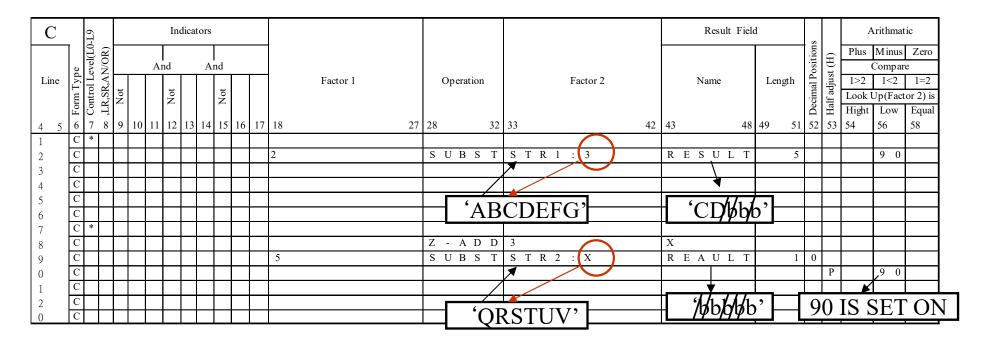
字串處理(STRING PROCESSING): SCAN(掃描)

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FACTOR 1欄位是用來搜尋的欄位。FACTOR 2 是被搜尋的欄位,而且逗號後的數字是開始搜尋的位置。若FACTOR 2 有和 FACTOR 1 完全相同的字元組,燈號58、59欄將會亮。

- 1·53欄位放入'P'則每次結果欄在資料放入前會先清空。
- 2·FACTOR 2 起始位置不打,自動設定為'()'。

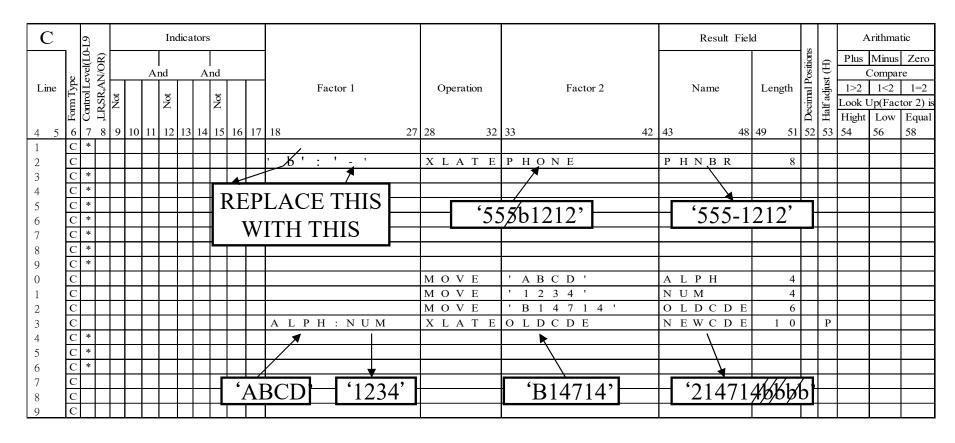
字串處理(STRING PROCESSING):SUBSTRING(字串切割)



FACTOR 1欄位值就是針對FACTOR 2欄位值切割的字元數,FACTOR 2欄位逗號後的數字即切割字元的起始位置,切割後的字元放入結果欄的位置。假如欲切割的字元數(FACTOR 1)大於切割FACTOR 2後的字元數,則56,57欄燈號(90)會ON,而且結果欄位會保留上次切割後之值,本次切割不動作。

- 1·53欄位放入'P'則每次切割後之字元放入結果欄前,會先將結果欄清空。
- 2·FACTOR 2 之起始位置不填,自動設定為'1'。

字串處理(STRING PROCESSING):XLATE(字元替換)



在C卡第53欄放入'P'將會把結果欄位超過FACTOR2欄位長度的字元清空。

*INxx;*IN;*IN,xx(燈號處理)

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陣列排序(ARRAY SORT)

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	6T	Indicators						S													Result Fi	ek	i			Α	rithma	tic
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rm Tvne	itrolL	R,SR,AN Not Not Not Not Not Not Not Not Not No					Not					Factor 1		Oj	peration		Factor 2			Name		Length	Decimal Positions	ılf adjust (H)	1>2 Look U	1<2 Jp(Fact	1=2 tor 2) is	
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陣列元素將會依升幂或降幂方式排列;至於排列方式則依E卡第45欄的定義而定。

A: 升幂 D: 降幂)

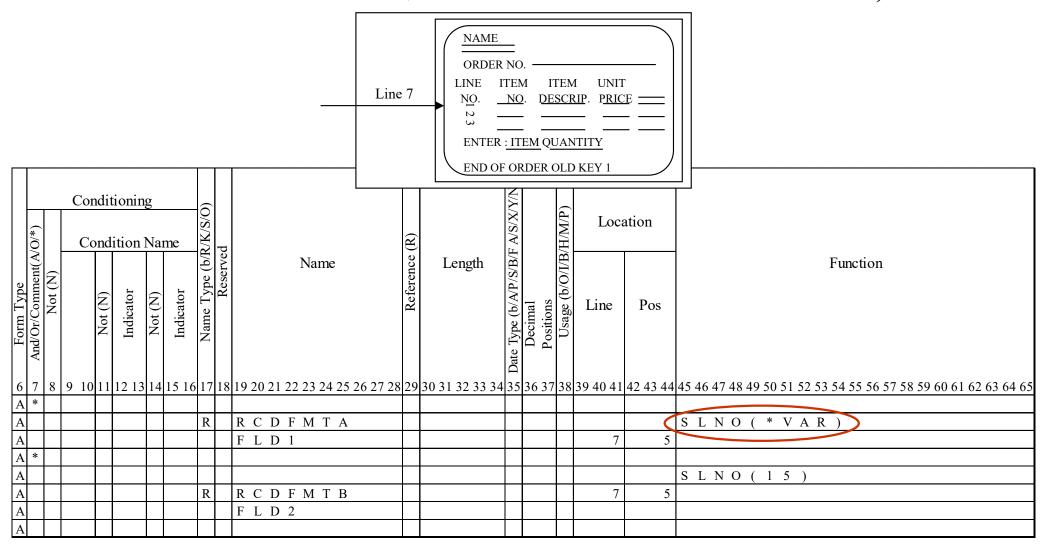
比較與分界點 (COMPARE AND BRANCH)

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FACTOR 1 和 FACTOR 2 比較後,假如測試成立,控制權將會跳到結果欄指定的節點

0

變動的起始行(VARIABLE STARTING LINE)



在螢幕檔的資料描述中:

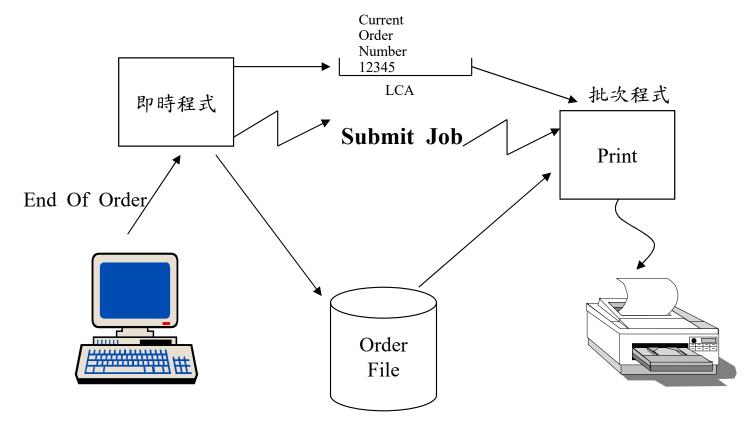
- 3·如上例FLD2將會顯示在螢幕第21行
- 1·*VAR標明螢幕資料起始行由程式內提供 2·程式中傳給螢幕檔數字將和螢幕檔行數1比較
 - $4 \cdot \text{Line on Screen} = \text{SLNO} + \text{Line} 1$

變動的螢幕起始行(VARIABLE STARTING LINE) Mode of Processing File Addition/Unordered File Designation Length of Key Field or Extent Exit Number of Tracks for Cylinder End of File of Record Address Field Name of for DAM Label Exit Overflow Filename Sequence Record Address Type Type of File Organiza-Number of Extents File File Format ion or Additional Are Device Symbolic Storage Index Overflow Indi-Rewind F/V/S/M/D/J cator Key Field 5 Block Record Device Condition Starting Continuation Lines U1-U8.UC Length Length Entry Location Option External Record Name 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 15 16 17 18 19 20 21 22 23 24 25 26 27 6 7 8 9 10 11 12 13 14 DSPFILE WORKSTN KSLN SLNFLD Form Type Control Level(L0-L9 ,LR,SR,AN/OR) Indicators Result Field Arithmatic Decimal Positions Plus Minus Zero Half adjust (H) And And Compare 1>2 1<2 Factor 1 Factor 2 Name Length 1 = 2Operation Not Not Not Look Up(Factor 2) is Hight Equal Low 9 10 11 12 13 14 15 16 17 18 51 52 53 27 28 32 | 33 42 43 48 49 54 56 58 С $Z - ADD\overline{0}$ 2 0 NNBR \overline{Z} - ADD 2 C * I N 0 1 D O W E 0 С A D D NNBR A D D EXFM RCDFMTA E N D

螢幕檔接續行SLN定義的欄位將提供螢幕起始行數。

9-2 非同步處理

使用 QCMDEXC 至 SBMJOB



批次功能在批次環境中執行啟動背景工作 (BACKGROUND JOB)的 一個方法是 SBMJOB命令

注意: 要確實驗證 JOB QUEUE的參數MAXACT和批次環境次系統描述中的MAXJOB是否有差異。

使用 QCMDEXC 至 SBMJOB

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SBMJOB命令它的參數必須定義在RPG/400程式中的某些地方。

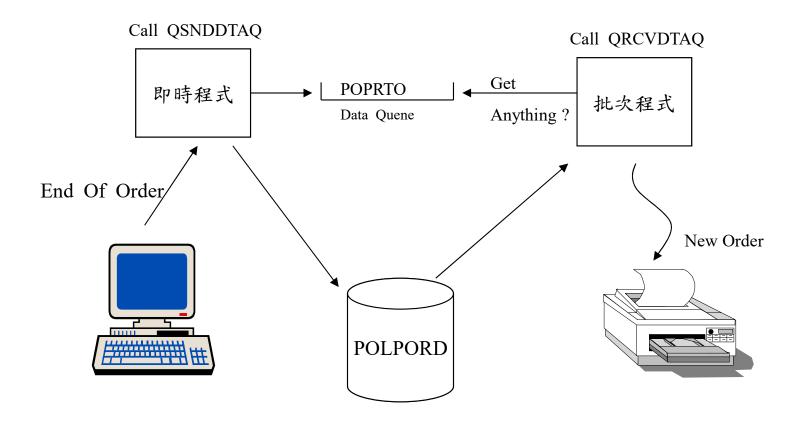
使用QCMDEXC至SBMJOB

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2	С												CALL	' Q CNDEXC'										
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4	С												PARM		L	ENP						,		
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使用特殊程式 QCMDEXC去處理 RPG/400 C 卡中的 SBMJOB命令

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使用 DATAQ



DATA QUEUE 是工作和工作間傳輸資料最有效的方法。

使用 DATA QUEUE

AS/400 OBJECT - *DTAQ

提供工作和工作間高速度的資料傳輸,比檔案MESSAGE QUEUE快。每一筆資料都被CPF管制成如同一個欄位(1到1024文字元)。每接收到一筆資料後就自動將此筆資料從 DATA QUEUE 中移除。如同所有的QUEUE 一樣,只有存體描述 (OBJECT,DESCRIPTION)被儲存。

DATA QUEUE專門用來做資料傳輸 一 使用資料檔儲存訊息。

使用DATA QUEUE

С		6T:																Result Fi	ield				Α	Arithmat	tic					
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DATA QUEUE必須用CRTDTAQ建立。

使用 QSNDDTAQ將資訊寫入 DATA QUEUE。

4個必需參數如下:

第一個:DATA QUEUE 名稱。

第二個:DATA QUEUE所在的LIBRARY。

第三個:寫入DATA QUEUE 的資料串長度(最長的長度在

CRTDATAQ的參數MAXLEN中定義)。

第四個:實際資料。

使用DATA QUEUE

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背景工作必須用SBMJOB或其他自動啟動的工作來啟動,資訊則使用QRCVDTAQ程式從QUEUE中讀取,以下是QRCVATAQ的5個參數:

參數1:DATA QUEUE的名稱。

參數2:DATA QUEUE所在LIBRARY名稱。

參數3:讀取資料的實際長度。

參數4:寫入QUEUE 的實際資料。

參數5:當程式將DATA QUEUE中的資料讀完時,控制等候多久才真正結束

0

WAIT=0,不等候即結束。

WAIT > 0,即等候指定的移數。

WAIT<0,一直等到下一筆新的資料被寫入DATA QUEUE中。

SHTDN操作指令

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程式的設計應允許將背景工作有規則的中斷。

SHTDN操作指定將會偵側*CTRLD 中PWRDWNSYS, ENDSYS或ENDSBS並且打亮54,55欄的燈號。

結束非同步處理的程式

[即時程式]

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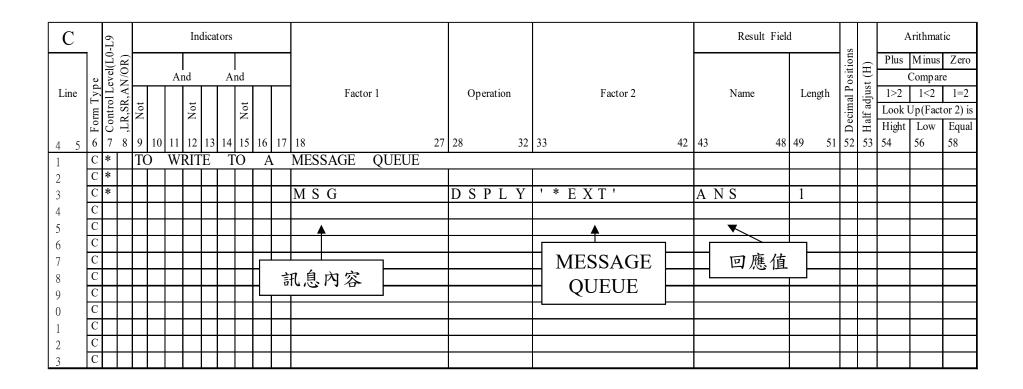
結束非同步處理的程式

批次程式

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9-3 PERFORMANCE 相關程式撰寫:檔案處理

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使用DSPLY操作指令比呼叫CL程式QCMDEXC送訊息快。

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忽略掉未使用的記錄格式 (RECORD FORMAT)

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從一個有多個記錄格式 (MYLTIPLE RECORD FROMAT) 檔案中選擇某幾個格式,則您必須將不用的記錄格式用IGNORE排除掉。

PS: COMPILE 程式時,就不會將 IGNORE的記錄格式之資料欄位帶入。

控制資料庫存取的數目 用共享式(Shared Open)開檔方式預先開檔 使用資料區控制資訊 依程式需要開關檔案 檔案依使用順序在程式中排列 儘量降低檔案和記錄的鎖定 用批次方式處理大量資料 9-4 PERFORMANCE 相關程式撰寫:程式邏輯

PCAK NUMBER FIELDS

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數字欄位必須被定義成單數位長度,並且 PACKED (壓縮原資料長度成一半)。

燈號使用考量

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燈號使用考量

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TOTAL TIME 燈號每次的程式迴路都必須測試。

使用新的操作指令偵

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排列你的子程序(SUBROUTINE) 常用的擺前面 不常用的擺後面 其他依使用順序排列

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使用陣列中的元素(ELEMENTS)運算或其他處理時,最好先將元素資料搬入 一個程式變數中,再用此程式變數處理。

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當副程式會被再呼叫時,使用RT燈號較好。

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如果此資料結構在系統中常使用到,可以考慮使用外部定義的方式。

PERFORMANCE 相關程式撰寫:程式邏輯

使用多重功能的結構化程式 使用從頭到尾功能化子程式 (SUBROUTINE)的程式邏輯 依經常使用的頻率排列子程式 不常使用的程式碼用分割程式處理 使用DATA QUEUE和背景程式做非同步處理 使用多重處理的資料結構或是陣列 9-5 PERFORMANCE 相關程式撰寫:CL考量

縮短編譯時間

CRTRPGPGM OPTION(*NOXREF)
沒有CROSS REFERENCE 報告產生

CRTRPGPGM OPTION(*NOSOURCE)

沒有原始程式或CROSS REFERENCE報告產生

程式的有效運用

CRTRPGPGM GENOPT (*OPTIMIZE)

OPTIMIZE

- 較小的程式
- 大而複雜程式執行時間的增進
- 可以在程式建立後用CHGPGM命令更改之

除錯 (DEBUG)

使用OS/400外部CL命令 - STRDBG PROG1 ADDBKP... CALL PROG1

不要用RPG內部的除錯操作指令

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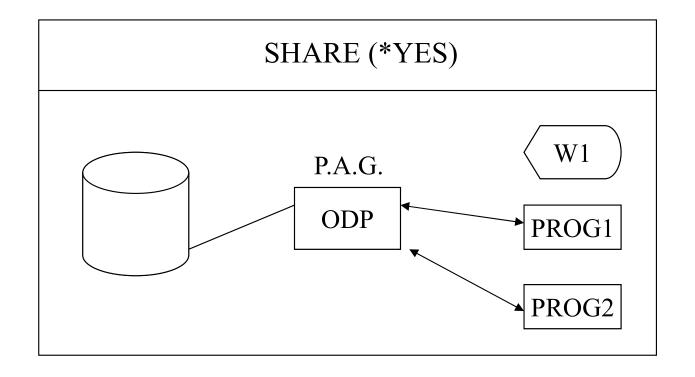
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OVRDBF

SHARE(*YES)

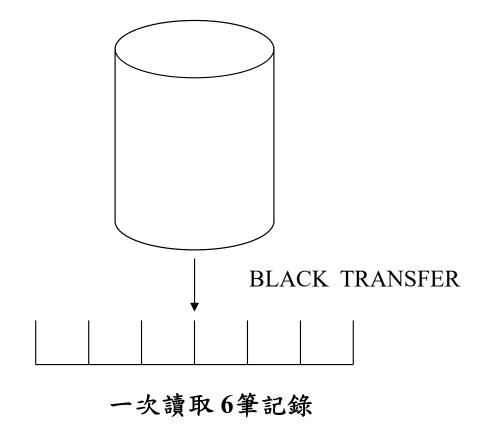
NBRRCDS(xxx)

SEQONLY(*YES xxx)



較小的 PAG 更快的檔案開啟 螢幕檔和資料檔

NBRRCDS (6)



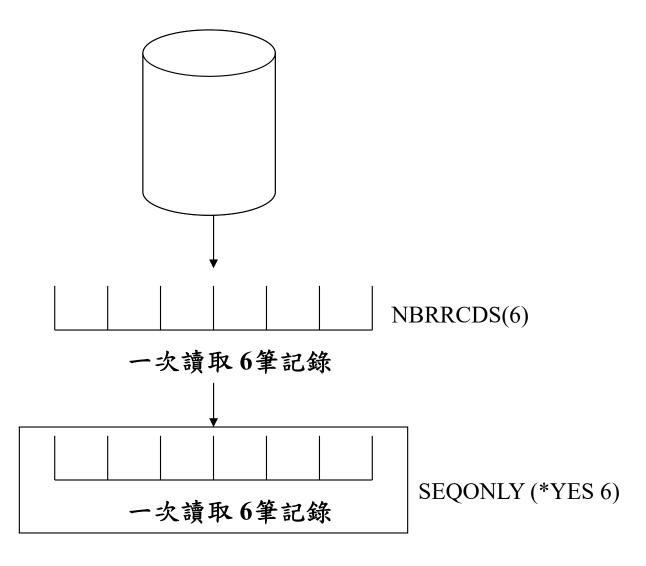
NBRRCDS

可允許被用於所有存取方法

假如 NBRCDS > 0而且資料依實際存取順序處理, OS/400

會預設兩倍的暫存區。

SEQONLY (*YES 6)



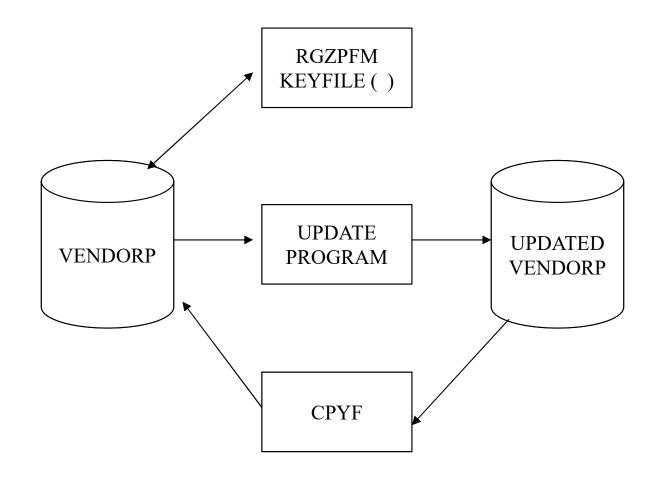
SEQONLY

不可使用在下列三種狀況

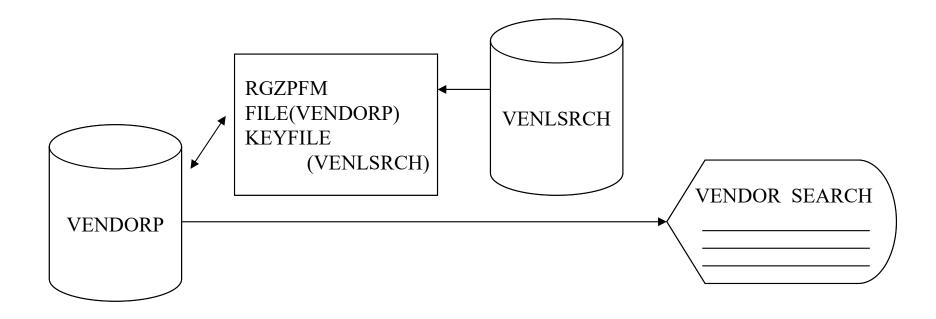
- 檔案開啟於修改作用中
- 含有多個實體檔的邏輯檔
- 一些OUTPUT的檔案中

假如檔案是用非隨機(RANDOM)方式處理輸入或輸出,RPG預設值SEQONLY(*YES),並給予4K的暫存的位置。

修改資料的順序處理



RGZPFM



最常使用順序處理的檔案要定期重整