

CIS 365
Part II
Lectures 24
Relative File Organization in COBOL
with VSAM

ISAM:

SELECT PERSONNEL-FILE	
ASSIGN	TO INFILE
ORGANIZATION	IS INDEXED
ACCESS MODE	IS RANDOM
RECORD KEY	IS EMPLOYEE-NUMBER
ALTERNATE RECORD KEY	IS EMPLOYEE-AGE WITH DUPLICATES
ALTERNATE RECORD KEY	IS DEPARTMENT-CODE WITH DUPLICATES
FILE STATUS	IS PERSONNEL-FILE-STATUS.

Relative

SELECT PERSONNEL-FILE	
ASSIGN	TO INFILE
ORGANIZATION	IS RELATIVE
ACCESS MODE	IS RANDOM
RELATIVE KEY	IS RELATIVE-ADDRESS
FILE STATUS	IS PERS-FILE-STATUS-CODE.

Relative
File
READ

.....
***** SEQUENTIAL READ FOR SEQUENTIAL ACCESS MODE:

READ PERSONNEL-FILE RECORD
INTO WS-PERS-RECORD
AT END PERFORM INPUT-COMPLETED.

.....
***** SEQUENTIAL READ FOR DYNAMIC ACCESS MODE:

READ PERSONNEL-FILE NEXT RECORD
INTO WS-PERS-RECORD
AT END PERFORM INPUT-COMPLETED.

.....
***** RANDOM RETRIEVAL OF RECORD IN BUCKET 10:

MOVE 10 TO RELATIVE-ADDRESS.

READ PERSONNEL-FILE
INVALID KEY PERFORM ERROR-IN-INPUT.

.....
***** RANDOM RETRIEVAL OF RECORD IN BUCKET 10:

MOVE 10 TO RELATIVE-ADDRESS.

READ PERSONNEL-FILE
INVALID KEY PERFORM ERROR-IN-INPUT.

***** THE FOLLOWING READ STATEMENT RETRIEVES THE RECORD
***** IN BUCKET 11:

READ PERSONNEL-FILE NEXT RECORD
AT END PERFORM INPUT-COMPLETED.

.....
MOVE 2 TO RELATIVE-ADDRESS.

START PERSONNEL-FILE
KEY IS GREATER THAN RELATIVE-ADDRESS
INVALID KEY PERFORM ERROR-IN-START.

READ PERSONNEL-FILE
AT END MOVE "YES" TO END-OF-FILE-FLAG.
.....

START

Relative File
Rewrite

* SEQUENTIAL EXHAUSTIVE UPDATE:

READ PERSONNEL-FILE NEXT RECORD
AT END MOVE "YES" TO END-OF-FILE.

PERFORM INCREMENT-AGE
UNTIL END-OF-FILE = "YES".
.....

* RANDOM UPDATE:

PERFORM MODIFY-EMPLOYEE-NAME.
.....

INCREMENT-AGE.
ADD 1 TO EMPLOYEE-AGE.

REWRITE PERSONNEL-RECORD
INVALID KEY PERFORM ERROR-IN-REWRITE.

READ PERSONNEL-FILE NEXT RECORD
AT END MOVE "YES" TO END-OF-FILE.
.....

MODIFY-EMPLOYEE-NAME.
MOVE 10 TO RELATIVE-ADDRESS.

READ PERSONNEL-FILE
INVALID KEY PERFORM ERROR-IN-INPUT.

MOVE "SHEILA GORDON" TO EMPLOYEE-NAME.

REWRITE PERSONNEL-RECORD .
INVALID KEY PERFORM ERROR-IN-REWRITE.
.....

DELETE

.....
* EXAMPLE OF SEQUENTIAL DELETE TO DELETE THE CONTENT OF FIRST BUCKET:

READ PERSONNEL-FILE NEXT RECORD
AT END MOVE "YES" TO END-OF-FILE.

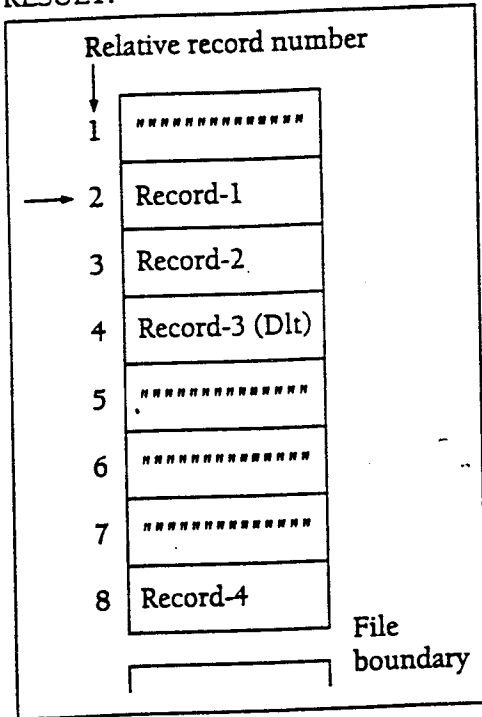
DELETE PERSONNEL-FILE
INVALID KEY PERFORM ERROR-IN-DELETE.
.....

* EXAMPLE OF RANDOM DELETE TO DELETE THE CONTENT OF 10TH BUCKET:

MOVE 10 TO RELATIVE-ADDRESS.

DELETE PERSONNEL-FILE
INVALID KEY PERFORM ERROR-IN-DELETE.
.....

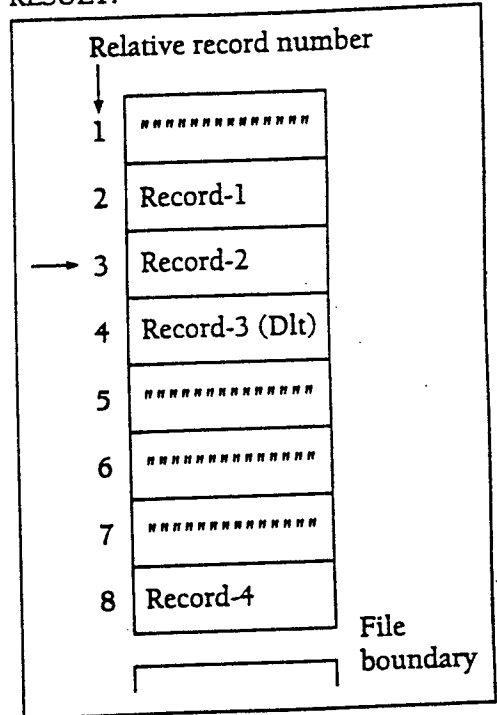
(a) INITIAL STATE: A relative VSAM file of eight buckets
 Access mode: SEQUENTIAL or DYNAMIC
 ACTION: OPEN INPUT or I-O
 RESULT:



Current record pointer = 2

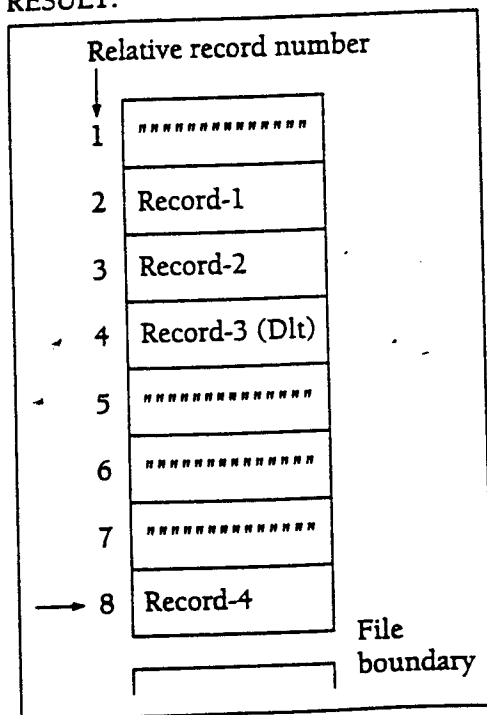
(b) ACTION: Sequential READ

RESULT:



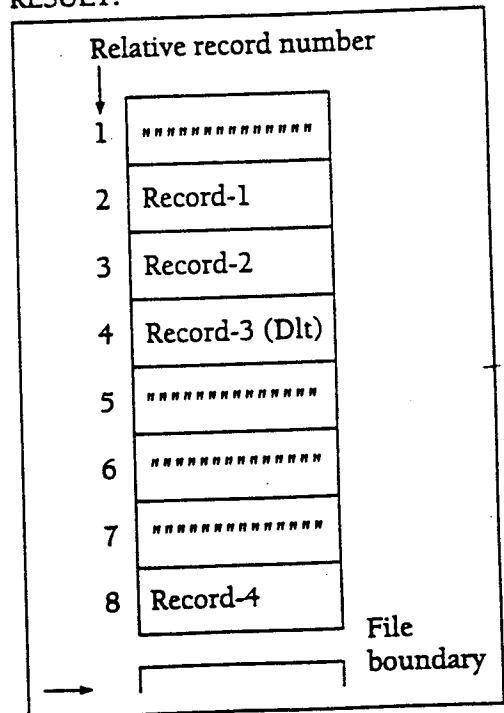
Record-1 brought into memory
 Current record pointer = 3
 RELATIVE-KEY = 2

(c) ACTION: Sequential READ
 RESULT:



Record-2 brought into memory
 Current record pointer = 8
 RELATIVE-KEY = 3

(d) ACTION: Sequential READ (twice)
 RESULT:



END-OF-FILE condition raised

Example 3 The following partial COBOL program inserts new records into a relative file.

```
.....  
ENVIRONMENT DIVISION.  
INPUT-OUTPUT SECTION.  
FILE-CONTROL.  
    SELECT RELFILE ASSIGN TO MASTER  
        ORGANIZATION IS RELATIVE  
        ACCESS MODE IS RANDOM  
        RELATIVE KEY IS BUCKET-NUMBER.  
.....  
DATA DIVISION.  
FILE SECTION.  
FD RELFILE  
    LABEL RECORDS ARE STANDARD  
    DATA RECORD IS REL-RECORD  
    RECORD CONTAINS 29 CHARACTERS.  
01 REL-RECORD.  
    05 REL-ID                PIC XXXX.  
    05 REL-NAME              PIC X(25).  
  
WORKING-STORAGE SECTION.  
01 BUCKET-NUMBER            PIC 9999.  
01 BUCKET-AVAILABLE        PIC XXX.  
01 RECORD-READ              PIC XXX.  
01 TERMINATE-INPUT         PIC XXX.  
  
PROCEDURE DIVISION.  
.....  
    OPEN I-O RELFILE.  
    MOVE "NO" TO TERMINATE-INPUT.  
  
    PERFORM RECORD-INSERTION  
        UNTIL TERMINATE-INPUT = "YES".  
  
    CLOSE RELFILE.  
    STOP RUN.  
.....
```

RECORD-INSERTION.

MOVE "NO" TO BUCKET-AVAILABLE.

PERFORM WHAT-BUCKET-NUMBER

UNTIL BUCKET-AVAILABLE = "YES".

PERFORM INSERT-RECORD.

DISPLAY "RECORD INSERTED.".

DISPLAY "DO YOU WANT TO TERMINATE INPUT? TYPE YES OR NO.".

ACCEPT TERMINATE-INPUT FROM CONSOLE.

WHAT-BUCKET-NUMBER.

DISPLAY "ENTER BUCKET NUMBER FOR THE NEW RECORD:"

ACCEPT BUCKET-NUMBER FROM CONSOLE.

MOVE "YES" TO RECORD-READ.

READ RELFILE

INVALID KEY MOVE "NO" TO RECORD-READ.

IF RECORD-READ = "YES" OR (BUCKET-NUMBER < 1 OR > 999)

DISPLAY "BUCKET " BUCKET-NUMBER " IS UNAVAILABLE"

ELSE

MOVE "YES" TO BUCKET-AVAILABLE.

INSERT-RECORD.

DISPLAY "ENTER ID NUMBER:".

ACCEPT REL-ID FROM CONSOLE.

DISPLAY "ENTER NAME:".

Accept Rel-Name From console

Write Rel-Record

Invalid Key DISPLAY "CAN'T WRITE".