CHAPTER 13

File Structures

(Solutions to Review Questions and Problems)

Review Questions

Q13-1. The two access methods are sequential and random.

Q13-3. The transaction file contains changes that should be made to the old master file.

Q13-5. The index is a table that relates the keys of the data items to the addresses in the file where the data are stored.

Q13-7. In modulo division hashing, the key is divided by the file size. The remainder plus 1 is used as the address of the record in the file.

Q13-9. A collision occurs when two hashed record have the same address. The three collision methods are open addressing, linked list resolution, and bucket hashing. In open addressing, the prime area is searched for an unoccupied address. In linked list resolution, the first record is stored in the home address, but it contains a pointer to the second record. In bucket hashing, a group of records are stored in a buckets which are locations that can accommodate more than one record.

Problems

P13-1. The files are shown in Figure 13.1.

Figure 13.1 *Solution to P13-1*

New Master File

Key	Name	Pay Rate
14	John Wu	17.00
16	George Brown	18.00
17	Duc Lee	11.00
26	Ted White	23.00
31	Joanne King	28.00
89	Mark Black	19.00
90	Orva Gilbert	20.00
92	Betsy Yellow	14.00

Error File

Action	Key	Name	Pay Rate
A	17	Martha Kent	17.00

P13-3.

a. (14232 **mod** 41) + 1 = 5 + 1 = 6

b. (12560 **mod** 41) + 1 = 14 + 1 = 15

c. (13450 **mod** 41) + 1 = 2 + 1 = 3

d. (15341 **mod** 41) + 1 = 7 + 1 = 8

P13-5.

a. 14 + 22 = 36

b. 12 + 57 = 69

c. 13 + 49 = 62

d. 15 + 32 = 47

P13-7. The result of open addressing resolution is shown in Figure 13.2. Because of the collision the third record is stored at address 5 instead of address 4. .

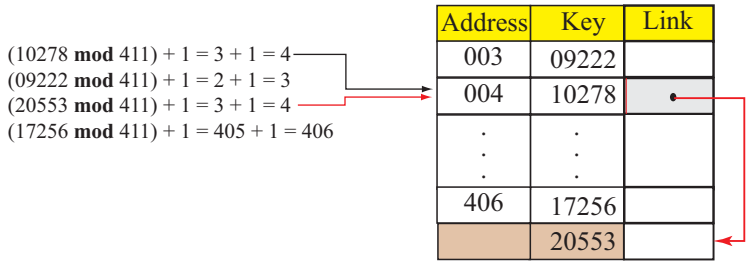
a. (10278 **mod** 411) + 1 = 3 + 1 = 4

b. (08222 **mod** 411) + 1 = 2 + 1 = 3

c. (20553 **mod** 411) + 1 = 3 + 1 = 4 (collision) → change to 5

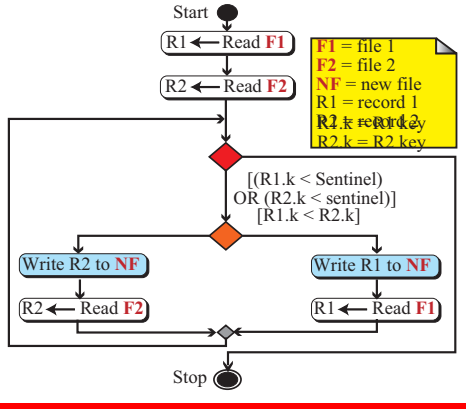
d. (17256 **mod** 411) + 1 = 405 + 1 = 406 .

Figure 13.2 *Solution to P13-7*



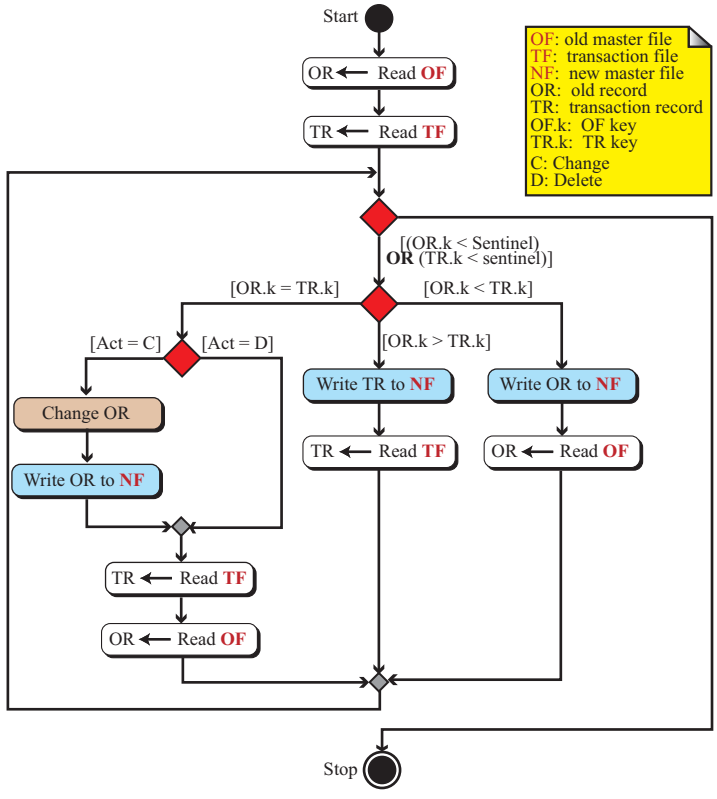
P13-9. The UML is shown in Figure 13.3.

Figure 13.3 *Solution to P13-9*



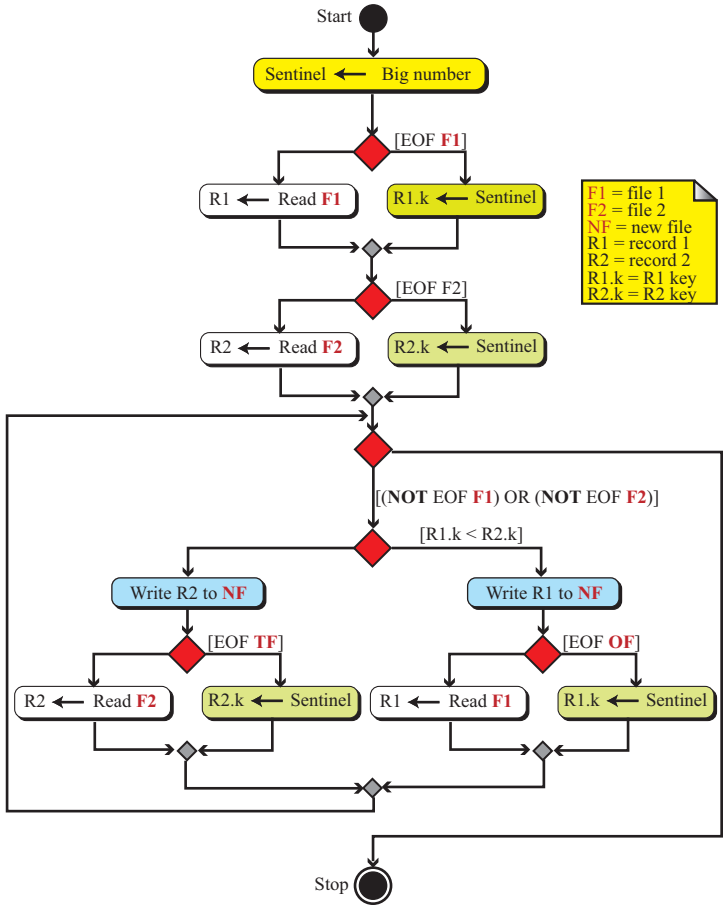
P13-11. The UML is shown in Figure 13.5.

Figure 13.4 *Solution to P13-11*



P13-13. The UML is shown in Figure 13.5. To simplify the diagram we assume that there is no error.

Figure 13.5 *Solution to P13-13*



P13-15. The UML is shown in Figure 13.6. To simplify the diagram we assume there is no error..

Figure 13.6 *Solution to P13-15*