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DSA Assignment-2

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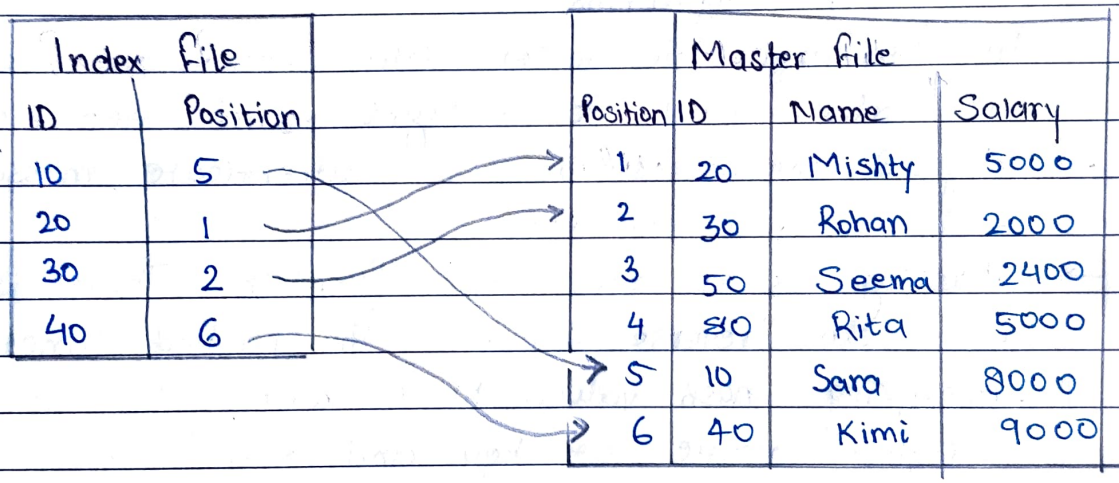
Q1. Explain indexed sequential access scheme for file organization

Ans. Indexed sequential is a concept of how information in a file can be organized, rather than a single defined file structure. In this scheme, an index is created with key field and pointers to various blocks. Basically, there are two files maintained an index file with index and pointers while the masterfile with all records.



Index File

ID	Position
10	5
20	1
30	2
40	6

Master File

Position	ID	Name	Salary
1	20	Mishty	5000
2	30	Rohan	2000
3	50	Seema	2400
4	80	Rita	5000
5	10	Sara	8000
6	40	Kimi	9000

→ Each record has a range of bytes and constitutes a key such as account no., personal ID etc.

→ When file is essentialy loaded, they are sorted by key.

→ There is an index that makes it possible to retrieve up a record by key value.

→ Records can be updated but its key cannot be changed.

→ Records can be read based on index key, by index lookup and retrieval

→ Records can be read sequentially from start to end.

→ After an ~~record~~ indexed read, subsequent records can be read in sequence called - skip sequential access

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Q2. What are the basic file operations?

Ans. A file is an abstract data type. For defining a file properly, we need to consider the operations that can be performed on files. There are six basic file operations within an Operating system. These are :

a) Creating a file : There are two steps necessary to create a file. First, space in file system must be found for a file so to allocate space for file. Second, an entry for new file must be made in directory.

b) Writing a file : To write to a file, you make a system call specify about both the name of the file along with information to be written to file.

c) Reading a file : To read from a file, we use a system call which species the name of the file and where within memory, the next block of file should be placed.

d) Repositioning Inside a file : The directory is searched for suitable entry, and the "current file position pointer" is relocating to a given value. Relocating within a file need not require any I/O. It is also called "file seek".

e) Deleting a file : For deleting a file you must search directory for specific file. Deletion of file releases all file space that can be used by other files.

f) Truncating a file : The user may wish to erase contents of a file but keep the attributes same. Rather than deleting a file and recreate it, this utility allows all attributes of file to remain unchanged — except file length — and allows user to add or edit file content.

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Q3. Explain Hashed Indices

Ans. Hashed Indices uses the concept of hashing. As hashing is used to ~~create~~ compute the address of a record by using hash function on search key value, if at any point of time, hashed value map to same address, then collision occurs and schemes to resolve collisions are applied to generate new address.

The critical to success of this technique is to choose a good hash function i.e. it has two things. First, It should give an average case lookup i.e. small constant, irrespective of number of search key. Secondly, the function distributes records uniformly and randomly among the buckets, (a bucket is a unit of one or more records typically a disk block). Correspondingly, worst hash function maps all the keys to same bucket.

It is recommended to set number of buckets to twice the number of search key values in file. This gives a good space-performance trade off. A hashed file organisation uses hashed indices. Hashing is used to calculate address of disk block where desired record is stored.

In a hashed file organisation, secondary indices needs to be organised using hashing