SNS COLLEGE OF TECHNOLOGY

Coimbatore-35.
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COURSE NAME : OPERATING SYSTEMS

II YEAR/ IV SEMESTER

UNIT – IV FILE SYSTEMS

Topic: Allocation Methods

Dr.B.Vinodhini
Associate Professor
Department of Computer Science and Engineering

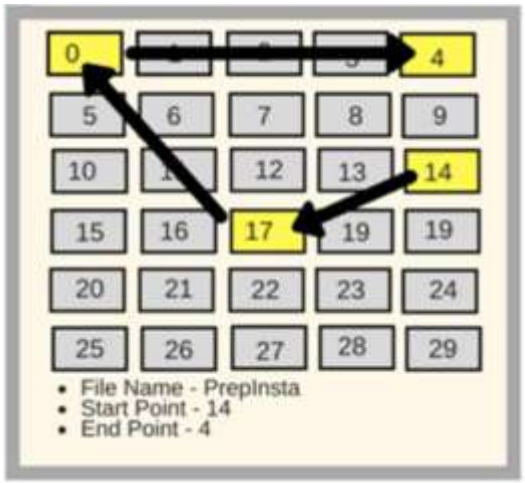
Allocation Methods

Allocation Methods

Contiguous Allocation

Linked Allocation

Indexed Allocation



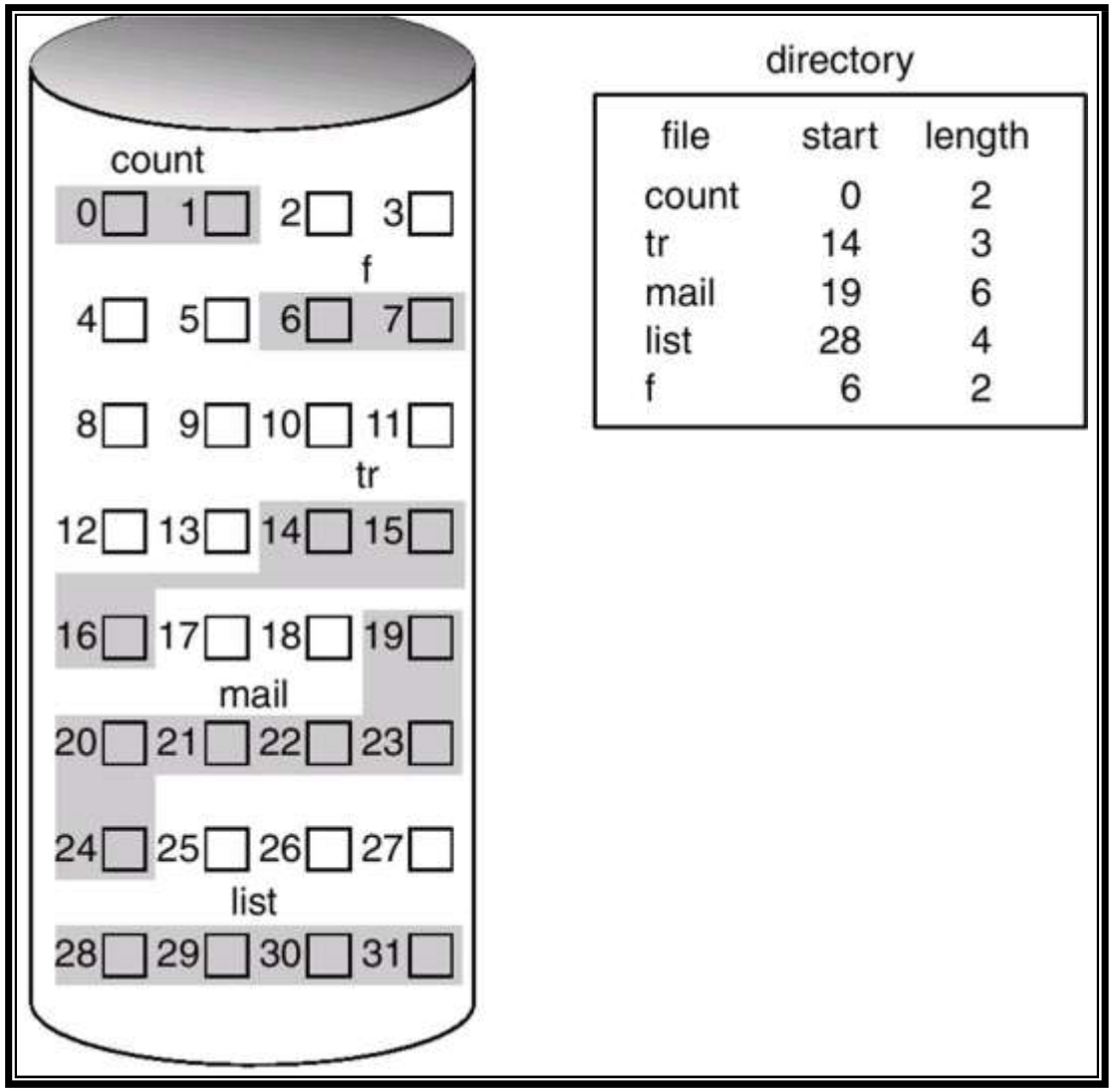
Allocation Methods

- An allocation method refers to how disk blocks are allocated for files:
- Contiguous allocation
- Linked allocation
- Indexed allocation

Contiguous Allocation

- Each file occupies a set of contiguous blocks on the disk.
- Simple – only starting location (block #) and length (number of blocks) are required.
- Random access.
- Wasteful of space (dynamic storage-allocation problem).
- Files cannot grow.

Contiguous Allocation of Disk Space

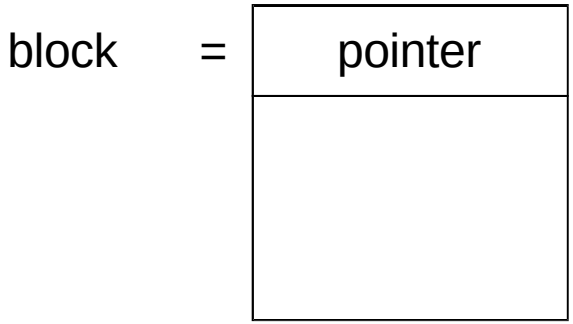


Extent-Based Systems

- Many newer file systems (I.e. Veritas File System) use a modified contiguous allocation scheme.
- Extent-based file systems allocate disk blocks in **extents**.
- An **extent** is a contiguous block of disks. Extents are allocated for file allocation. A file consists of one or more extents.

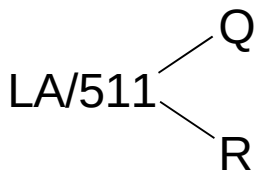
Linked Allocation

- Each file is a linked list of disk blocks: blocks may be scattered anywhere on the disk.



Linked Allocation (Cont.)

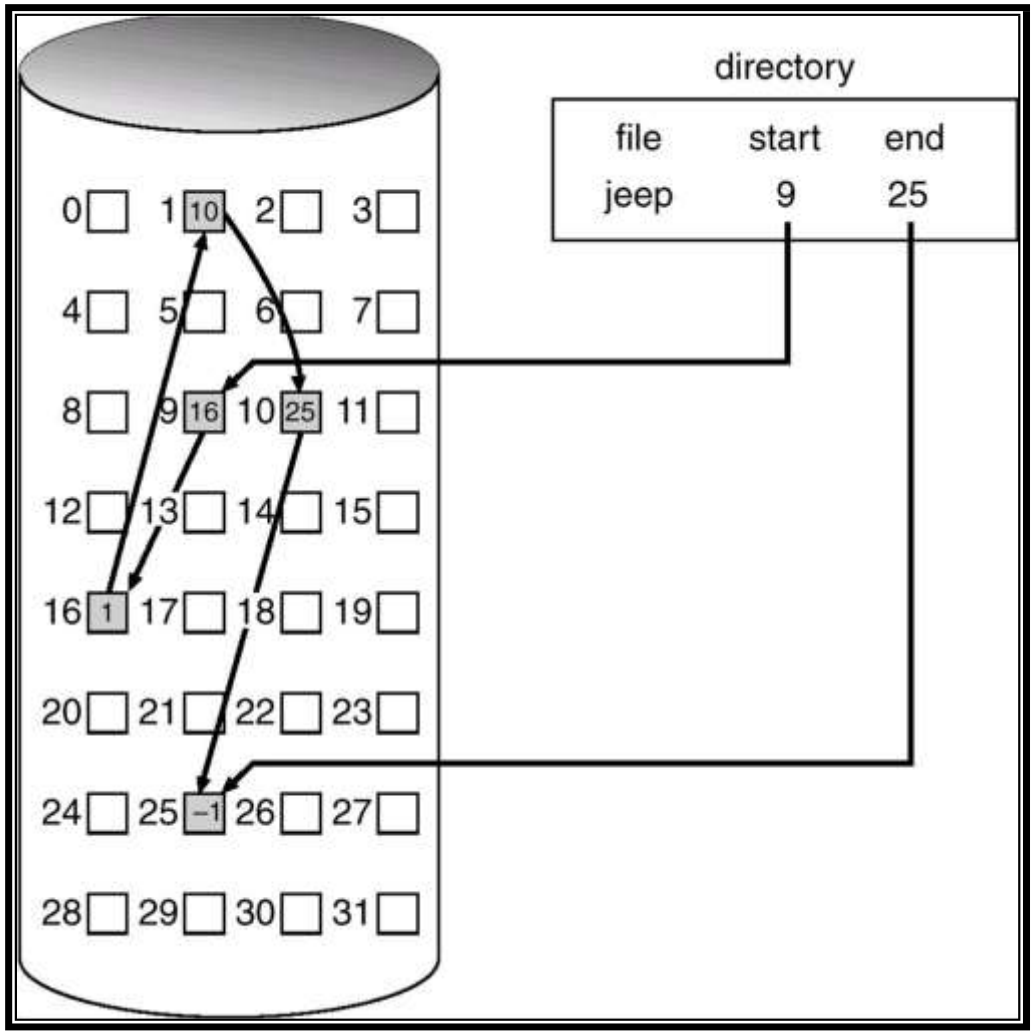
- Simple – need only starting address
- Free-space management system – no waste of space
- No random access
- Mapping



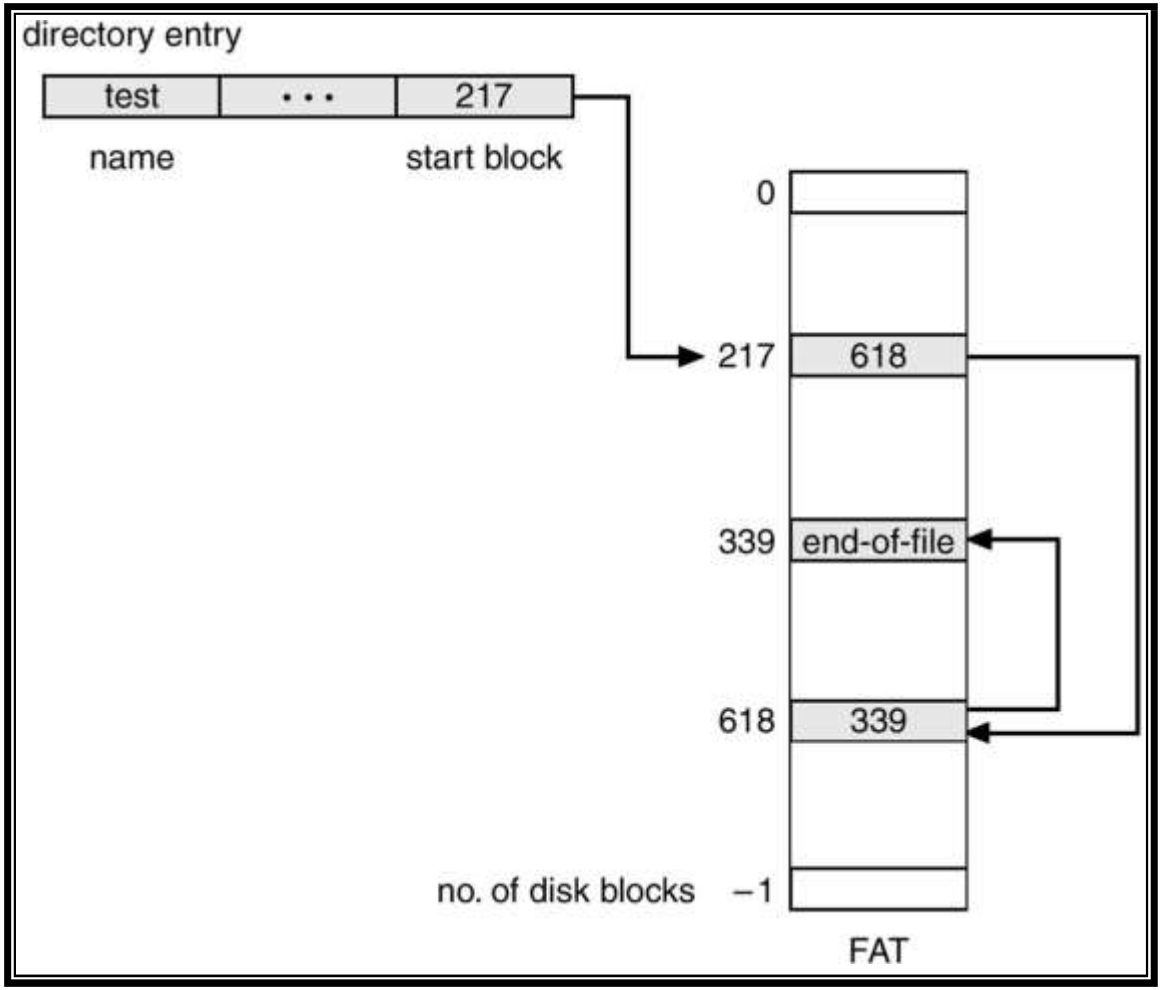
Block to be accessed is the Qth block in the linked chain of blocks representing the file.
Displacement into block = R + 1

File-allocation table (FAT) – disk-space allocation used by MS-DOS and OS/2.

Linked Allocation

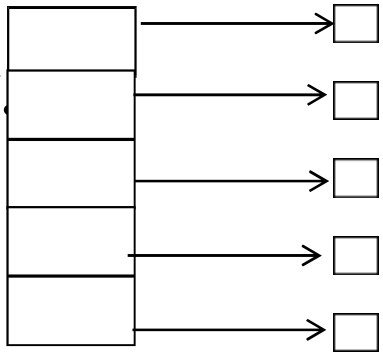


File-Allocation Table



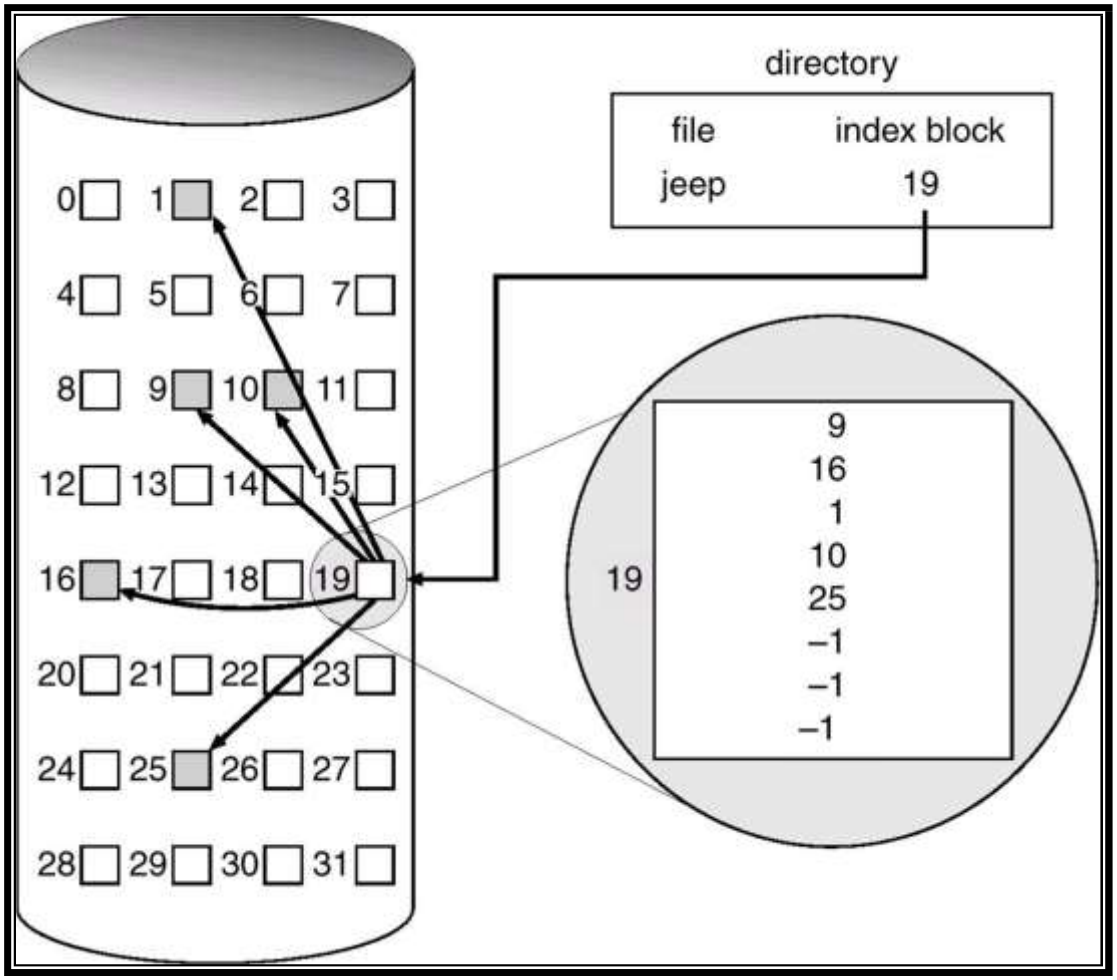
Indexed Allocation

- Brings all pointers together into the *index block.*
- Logical view.



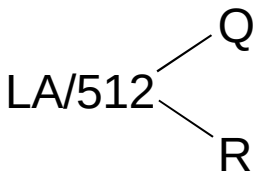
index table

Example of Indexed Allocation



Indexed Allocation (Cont.)

- Need index table
- Random access
- Dynamic access without external fragmentation, but have overhead of index block.
- Mapping from logical to physical in a file of maximum size of 256K words and block size of 512 words. We need only 1 block for index table.

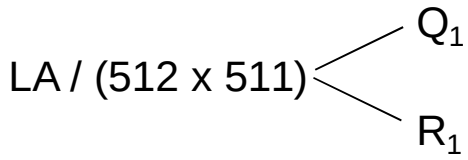


Q = displacement into index table

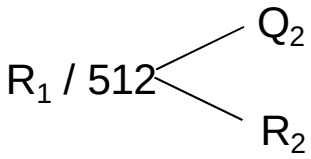
R = displacement into block

Indexed Allocation – Mapping (Cont.)

- Mapping from logical to physical in a file of unbounded length (block size of 512 words).
- Linked scheme – Link blocks of index table (no limit on size).



Q_1 = block of index table
R_1 is used as follows:



Q_2 = displacement into block of index table
R_2 displacement into block of file:

Summarization