

## Disk Caching

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Currently accessed disk blocks are stored into a cache area in RAM to increase their access speed.

When a disk block is accessed, system looks for it first in cache. If missed, block is fetched from disk.

Overall access speed is improved if frequently accessed blocks are kept in memory.

Caching is an effective technique whenever locality of access is present.

## Disk Caching

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A similar technique is used whenever there is a fast, small capacity storage medium and a slow, large capacity medium.

### **Design Considerations:**

- Size of cache buffer.
- If cache is full, how to replace blocks?
- If a block is modified in cache, when to update it on disk?

## Disk Scheduling

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Several concurrent processes may access different files on the same disk. These files may be stored on distant cylinders.

Under heavy loads, handling access requests using a FCFS policy will result in very long access delays.

Thus, a better scheduling of the pending requests can improve performance.

Example: Consider the following queue of track requests:

98,183,37,122,14,124,65,67

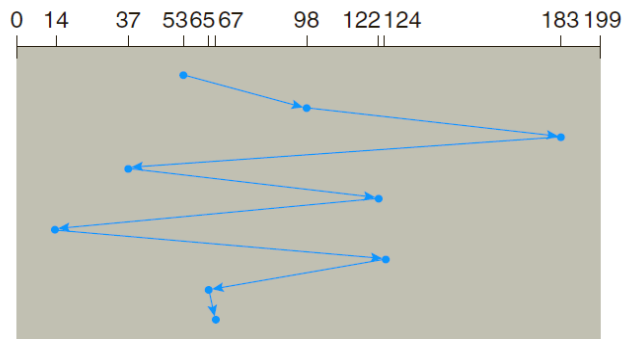
Currently head over track 53.

## Disk Scheduling

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### Using FCFS

queue = 98, 183, 37, 122, 14, 124, 65, 67  
head starts at 53



Source: [Silberschatz 14]

## Disk Scheduling

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### Seek Optimization Methods:

#### Shortest Seek Time First (SSTF):

start with the request to the nearest cylinder.

#### Scan (elevator) algorithm:

move head in one direction, as long as there are requests in that direction. Otherwise, reverse direction.

#### Circular Scan Scheduling:

similar but movement is in one direction only. Move to opposite end instead of reversing direction

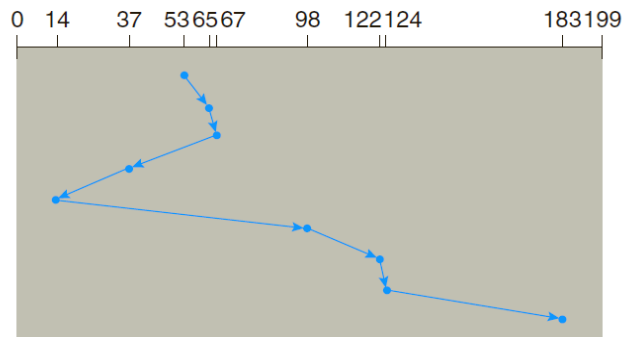
## Disk Scheduling

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### Using SSTF

queue = 98, 183, 37, 122, 14, 124, 65, 67

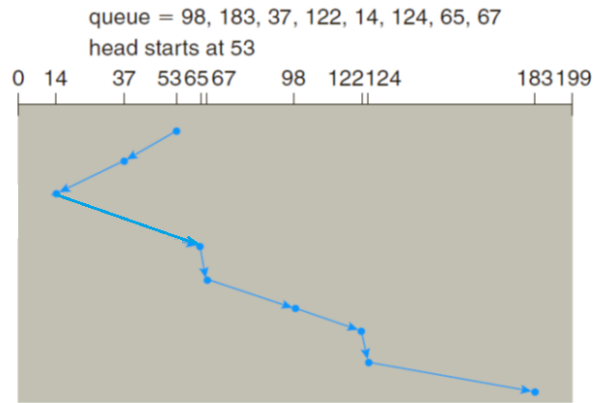
head starts at 53



Source: [Silberschatz 14]

## Disk Scheduling

### Using SCAN



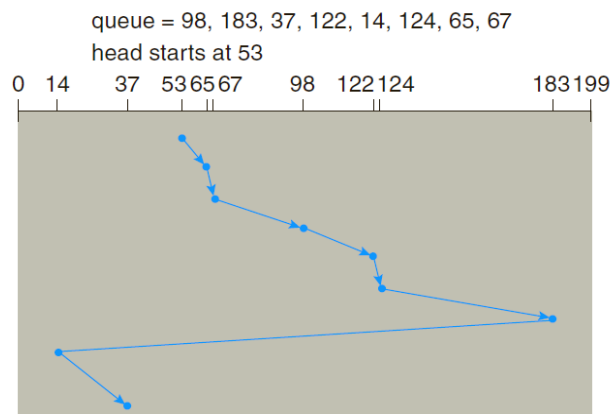
Source: [Silberschatz 14]

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## Disk Scheduling

### Using C-SCAN



Source: [Silberschatz 14]

Lecture 12

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