

## 4.2 DISK SCHEDULING

One of the responsibilities of the operating system is to use the hardware efficiently.

For the disk drives it means,

1. A fast access time and
2. High disk bandwidth.

The **access time** has two major components;

- The **seek time** is the time for the disk arm to move the heads to the cylinder containing the desired sector.
- The **rotational latency** is the additional time waiting for the disk to rotate the desired sector to the disk head.
- The disk **band width** is the total number of bytes transferred, divided by the total time between the first request for service and the completion of the last transfer.
- Several algorithms exist to schedule the servicing of disk I/O requests.
- We illustrate them with a request queue (0-199).

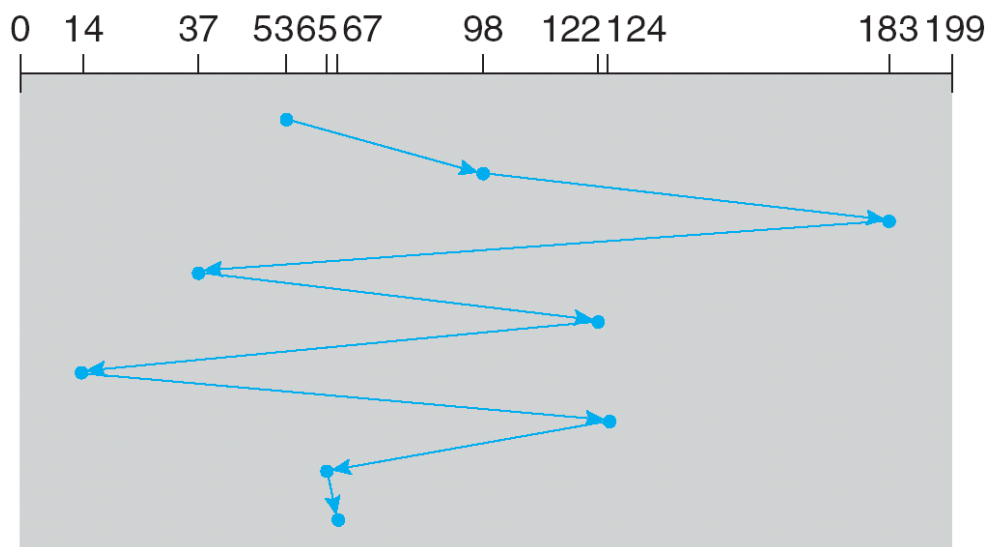
98, 183, 37, 122, 14, 124, 65, 67

Head pointer 53

### 1. FCFS Scheduling:

The simplest & fastest form of disk scheduling. I/O requests are serviced based on their arrival.

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



Total head movement = 640 cylinders

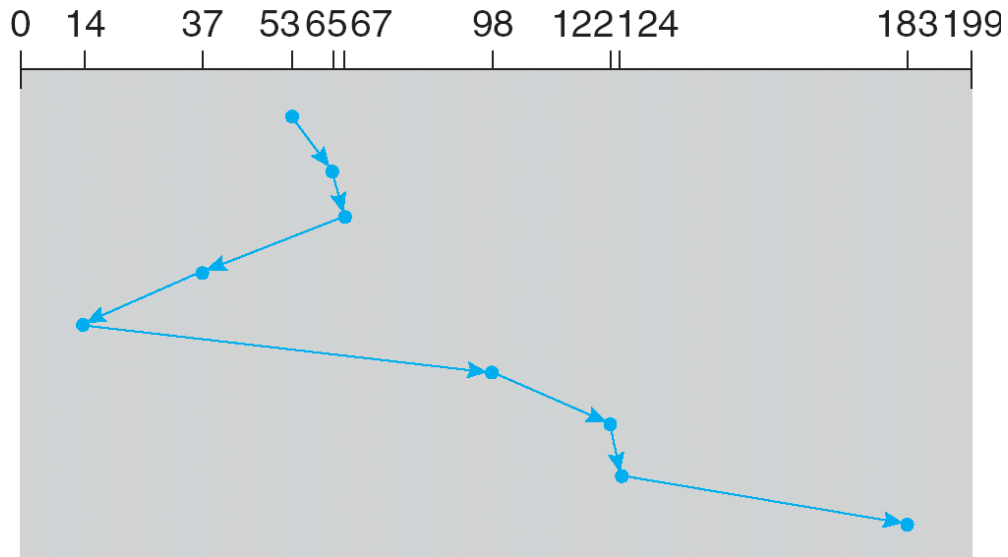
## 2. SSTF (shortest-seek-time-first) Scheduling

Selects the request with the minimum seek time from the current head position.

SSTF scheduling is a form of SJF scheduling; may cause starvation of some requests.

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

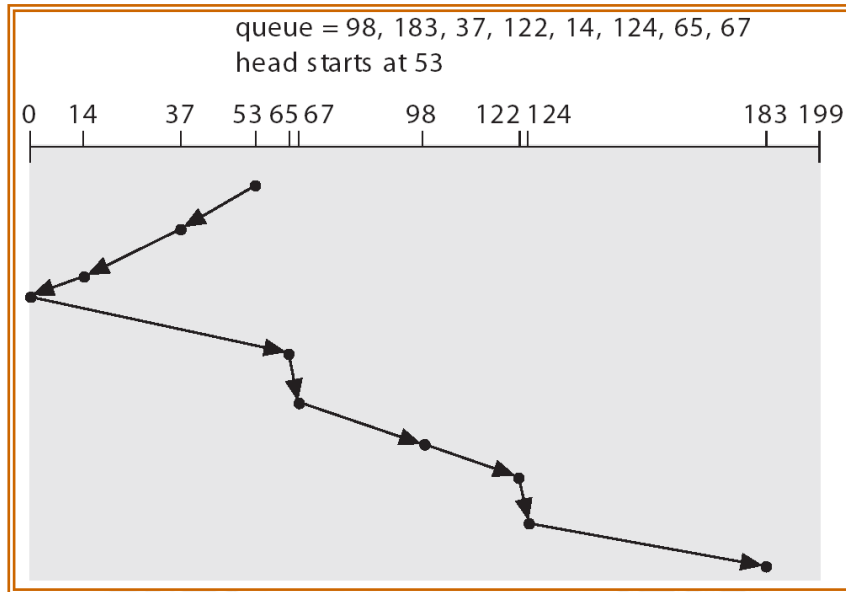
head starts at 53



Total head movement = 236 cylinders

## 3. SCAN Scheduling

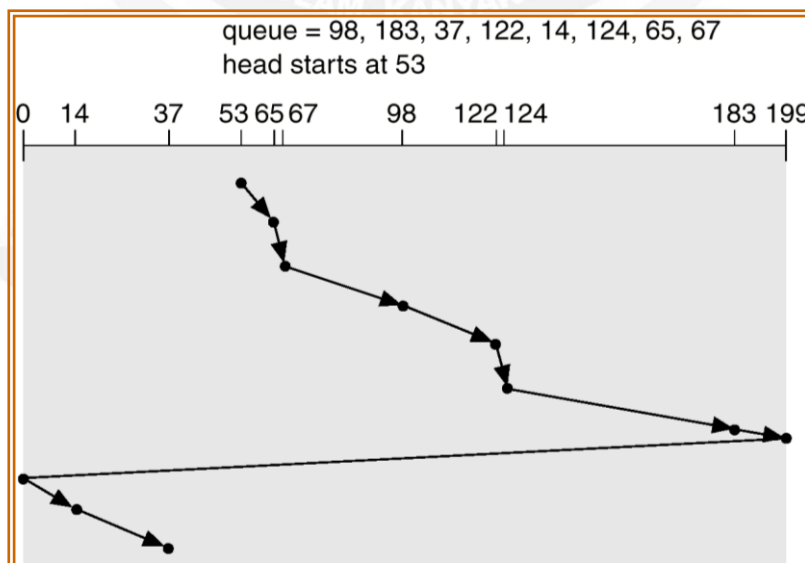
- The disk head starts at one end of the disk, and moves toward the other end, servicing requests, until it gets to the other end of the disk.
- At the other end, the direction of head movement is reversed, and servicing continues.
- The head continuously scans back and forth across the disk.
- **Elevator algorithm:** Sometimes the SCAN algorithm is called as the elevator algorithm, since the disk arm behaves just like an elevator in a building, first servicing all the requests going up, and then reversing to service requests the other way.



Total head movement of 208 cylinders

#### 4. C-SCAN

- Provides a more uniform wait time than SCAN.
- The head moves from one end of the disk to the other, servicing requests as it goes. When it reaches the other end, however, it immediately returns to the beginning of the disk, without servicing any requests on the return trip.
- Treats the cylinders as a circular list that wraps around from the last cylinder to the first one.



### 5. LOOK Scheduling

Both SCAN and C-SCAN move the disk arm across the full width of the disk. In this, the arm only moves up to the final request in each direction. Then, it reverses direction immediately, without reaching the end of the disk.

#### C-LOOK

- Version of C-SCAN
- Arm only goes as far as the last request in each direction, then reverses direction immediately, without first going all the way to the end of the disk.

