Department of Computer Science and Engineering

FACULTY OF ENGINEERING AND TECHNOLOGY
UNIVERSITY OF LUCKNOW
LUCKNOW

CS-501

Dr. Zeeshan Ali Siddiqui
Assistant Professor
Deptt. of C.S.E.

DISK SCHEDULING

Disk Scheduling 1/2

- The *operating system* is responsible for using hardware efficiently — for the disk drives, this means having a *fast access time* and *disk bandwidth*.

- **Access time** has two major components
  - Seek time
  - Rotational latency

- Minimize seek time
- Seek time ~ seek distance

Disk Scheduling 2/2

- **Disk bandwidth** 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.

- Idle disk can immediately work on I/O request, busy disk means work must *queue*.

- *Optimization algorithms* only make sense when a queue exists.

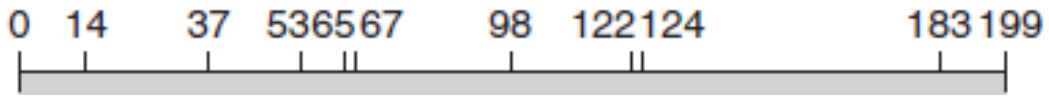
- Several *algorithms* exist to schedule the servicing of disk I/O requests.

FCFS DISK SCHEDULING

FCFS Disk Scheduling

- This algorithm is intrinsically *fair*, but it generally does not provide the fastest service.
- Consider, for **example**, a disk queue with requests for I/O to blocks on cylinders. **previous request was at cylinder 50.**

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



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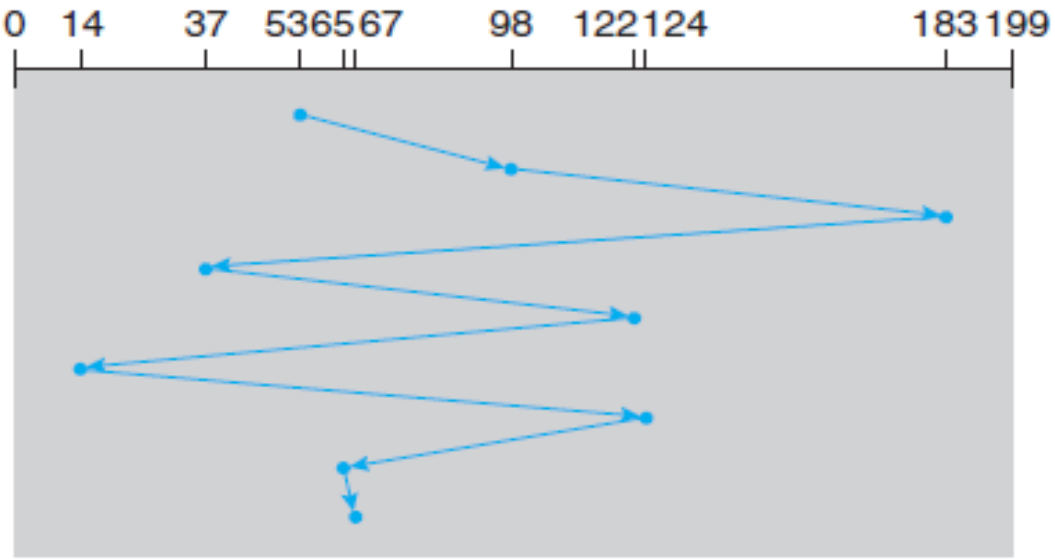

- **Total head movement** = 640 cylinders.

SHORTEST-SEEK-TIME-FIRST (SSTF) DISK SCHEDULING

Shortest-seek-time-first (SSTF) Disk Scheduling

- The SSTF algorithm selects the request with the *least seek time from the current head position*. In other words, SSTF chooses the pending request closest to the current head position.

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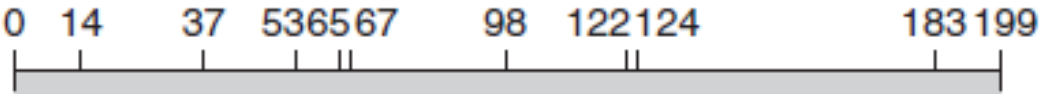

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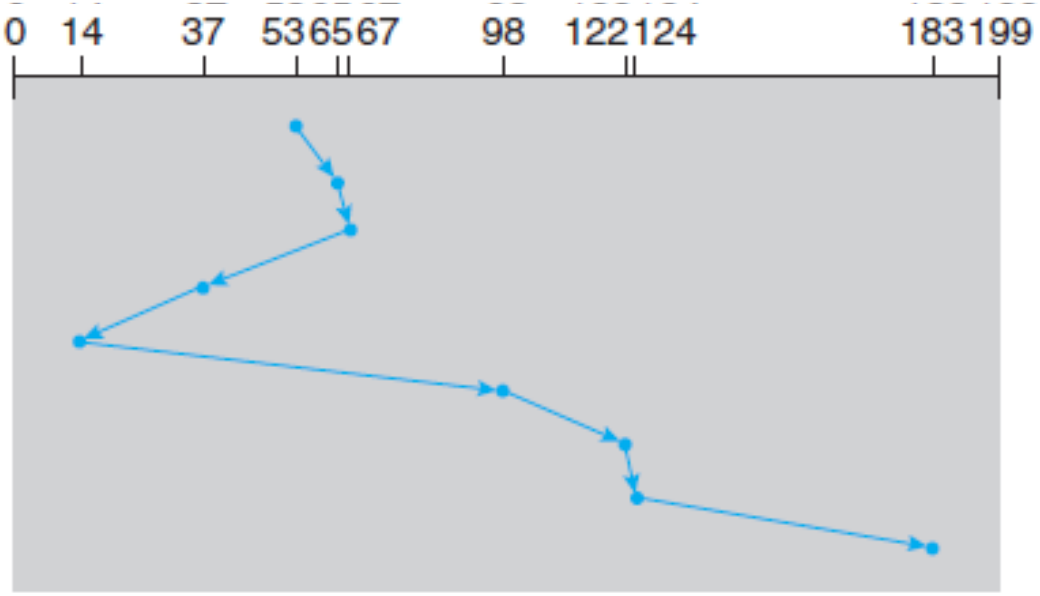

- **Total head movement** = 236 cylinders.

Shortest-seek-time-first (SSTF) Disk Scheduling

- SSTF scheduling is essentially a form of *shortest-job-first (SJF) scheduling*; and like SJF scheduling, it may cause *starvation* of some requests.

- Note: Although the SSTF algorithm is a substantial improvement over the FCFS algorithm, it is *not optimal*.

References

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley.

2. William Stallings, “Operating Systems: Internals and Design Principles”, 6th Edition, Pearson Education.

3. D M Dhamdhere, “Operating Systems: A Concept based Approach”, 2nd Edition, TMH.

Thank You.