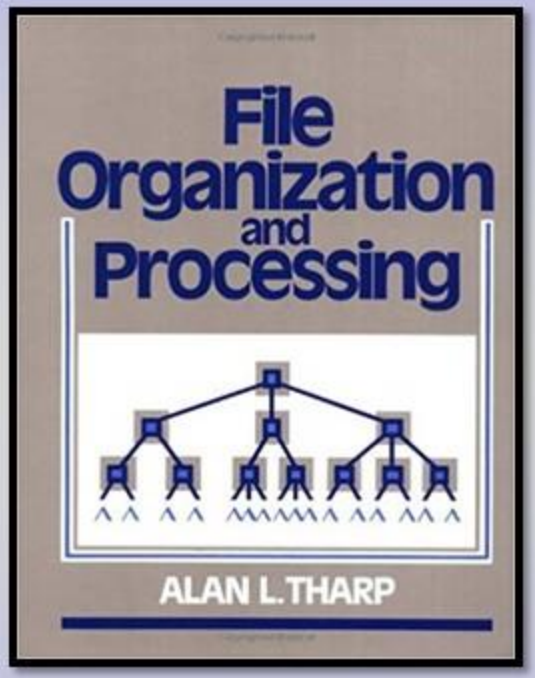
File Organization & Processing

CS2202

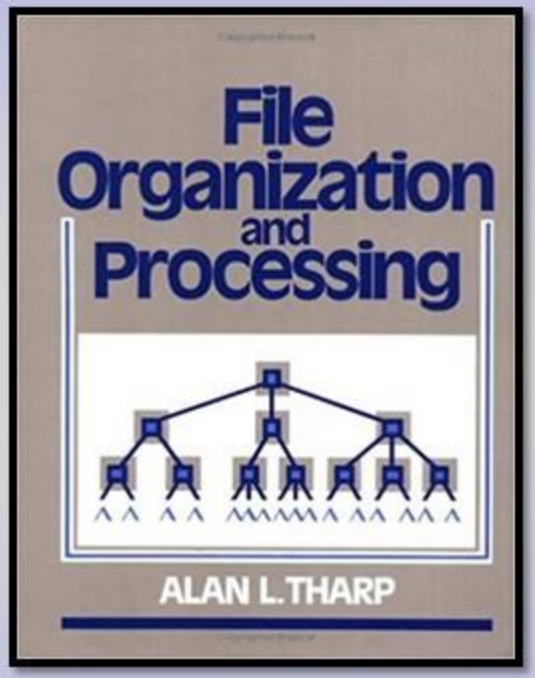


Instructor:

Dr. Mohamed Hassan

Chapter 4:

- Disk Scheduling Algorithms



Disk Scheduling Algorithms

- First Come-First Serve (FCFS)
- Shortest Seek Time First (SSTF)
- Elevator (SCAN)
- Circular SCAN (C-SCAN)
- C-LOOK

Disk Scheduling - FCFS

First Come First Serve

- Process request sequentially
- Fair to all processes
- Approaches random scheduling in performance if there are many processes

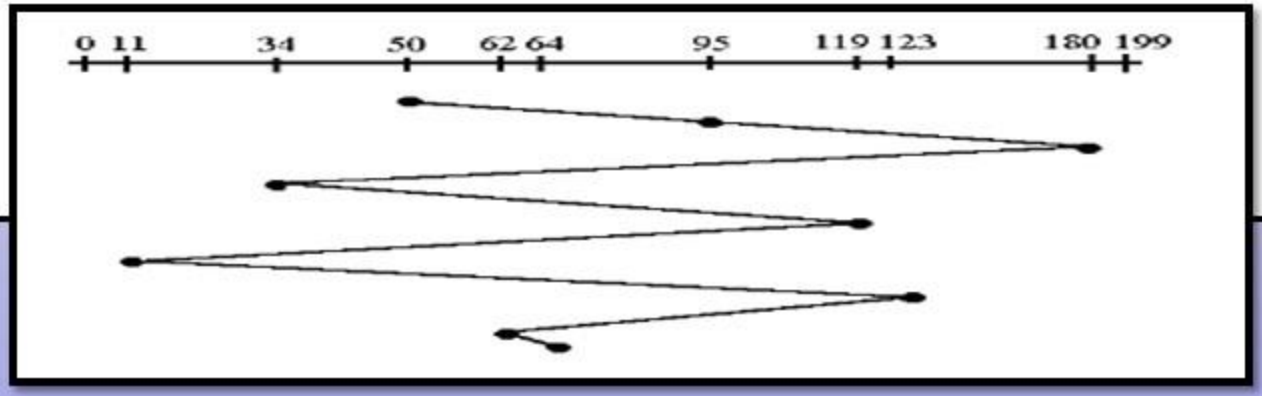
Disk Scheduling - FCFS

Given the following queue:

95, 180, 34, 119, 11, 123, 62, 64

with the Read-write head initially at the track 50 and the tail track being at 199

- |50-95|+|95-180|+|180-34|+|34-119|+|119-11|+|11-123|+|123-62|+|62-64|
- **Total:** 45+85+146+85+108+112+61+2 = 640

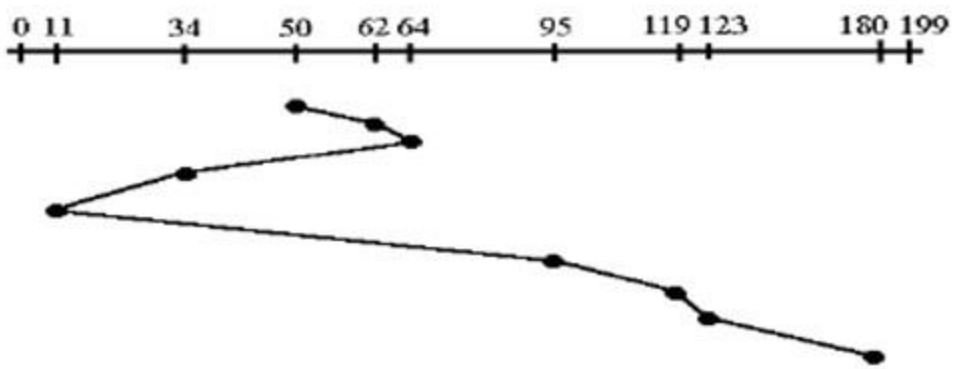


Disk Scheduling - (SSTF)

- **Shortest Seek Time First (SSTF)**
- •Select the disk I/O request that requires the least movement of the disk arm from its current position
- •Always choose the minimum seek time
- •Requests for tracks far away from the current position may never be served, if requests for closer tracks are issued continuously

Disk Scheduling - (SSTF)

- **Shortest Seek Time First (SSTF)**
- In this case request is serviced according to next shortest distance.
- Starting at 50, the next shortest distance would be 62 instead of 34 since it is only 12 tracks away from 62 and 16 tracks away from 34.
- The process would continue until all the process are taken care of.
- •**Total:** 236

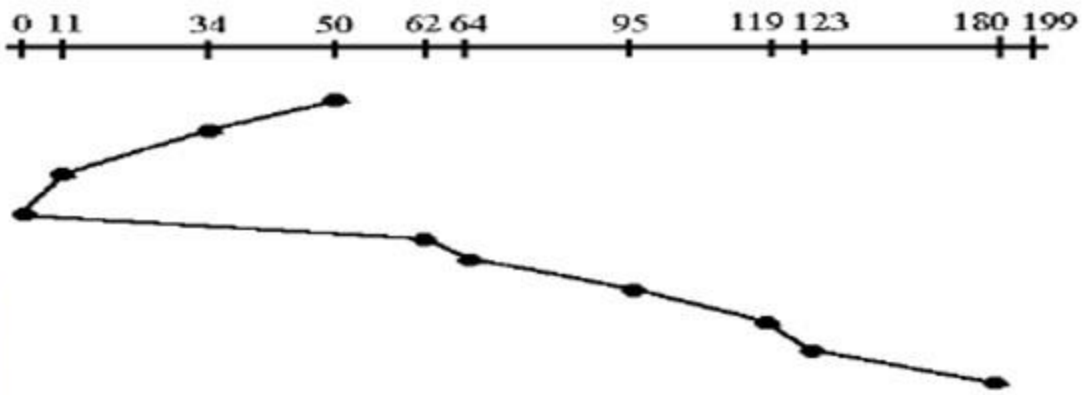


Disk Scheduling - (SCAN)

- **SCAN (aka Elevator Algorithm)**
- •Arm moves in one direction only, satisfying all outstanding requests until it reaches the last track in that direction
- •Direction is reversed

Disk Scheduling - (SCAN)

- This approach works like an elevator does.
- •It scans down towards the nearest end and then when it hits the bottom it scans up servicing the requests that it didn't get going down.
- •If a request comes in after it has been scanned it will not be serviced until the process comes back down or moves back up.
- •**Total:** 230

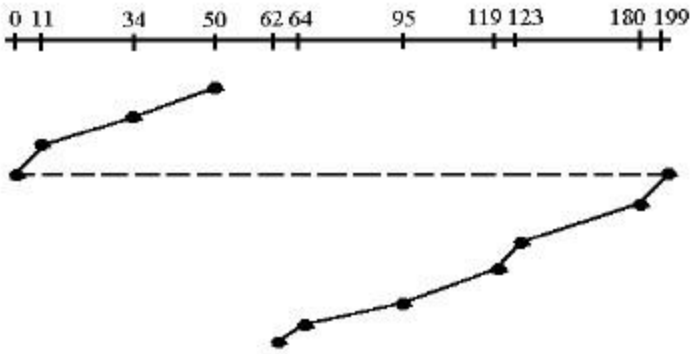


Disk Scheduling - (C-SCAN)

- **C-SCAN**
- •Restricts scanning to one direction only
- •When the last track has been visited in one direction, the arm is returned to the opposite end of the disk and the scan begins again
- •In case of repetitive requests to one track, we will see "arm stickiness" in SSTF, SCAN, C-SCAN

Disk Scheduling - (C-SCAN)

- Circular scanning works just like the elevator to some extent. It begins its scan toward the nearest end and works it way all the way to the end of the system.
- •Once it hits the bottom or top it jumps to the other end and moves in the same direction.
- •Keep in mind that the huge jump doesn't count as a head movement.
- •The total head movement for this algorithm is only 187 track;
- •But it is still not the best …



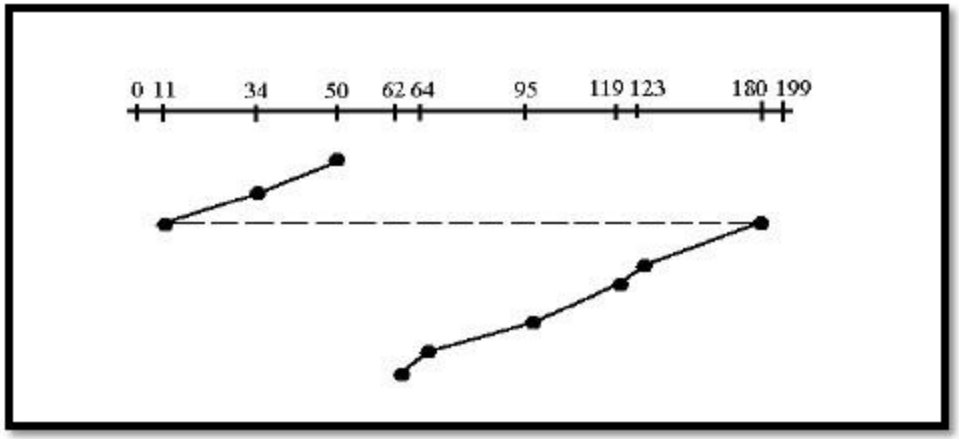
Disk Scheduling - (C-LOOK)

C-LOOK

- This is just an enhanced version of C-SCAN.
- In this the scanning doesn't go past the last request in the direction that it is moving.
- It too jumps to the other end but not all the way to the end. Just to the furthest request.

Disk Scheduling - (C-LOOK)

- C-SCAN had a total movement of 187, but this scan (C-LOOK) reduced it down to 157 tracks.



Disk Scheduling - (C-LOOK)

- Example: 55, 58, 39, 18, 90, 160, 150, 38, 184

(a) FIFO (starting at track 100)		(b) SSTF (starting at track 100)		(c) SCAN (starting at track 100, in the direction of increasing track number)		(d) C-SCAN (starting at track 100, in the direction of increasing track number)	
Next track accessed	**Number of tracks traversed**	**Next track accessed**	**Number of tracks traversed**	**Next track accessed**	**Number of tracks traversed**	**Next track accessed**	**Number of tracks traversed**
55	45	90	10	150	50	150	50
58	3	58	32	160	10	160	10
39	19	55	3	184	24	184	24
18	21	39	16	90	94	18	166
90	72	38	1	58	32	38	20
160	70	18	20	55	3	39	1
150	10	150	132	39	16	55	16
38	112	160	10	38	1	58	3
184	146	184	24	18	20	90	32
Average seek length	55.3	**Average seek length**	27.5	**Average seek length**	27.8	**Average seek length**	35.8