

Operating System: Disk Scheduling

By: Vishvadeep Gothi



VISHVADEEP GOTHI SIR

**AIR- 19, 119, 440, 682
in GATE**



**ME from IISc Bangalore
Mtech BITS Pilani in Data
Science**



**14+ Years of Teaching Experience,
10+ Years in GATE/IES**



Subjects Taken:
Computer Organization & Architecture,
data structure, operating system,
C-Programming, Data science,
Machine Learning, Python,
coding interview problems,





Vishvadeep Gothi

#1 Educator in CS & IT · GATE & ESE

- GATE AIR-19, 119, 440, 682 - ME from IISc, - MTech BITS Pilani (Data Science) - 14 years experience

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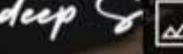
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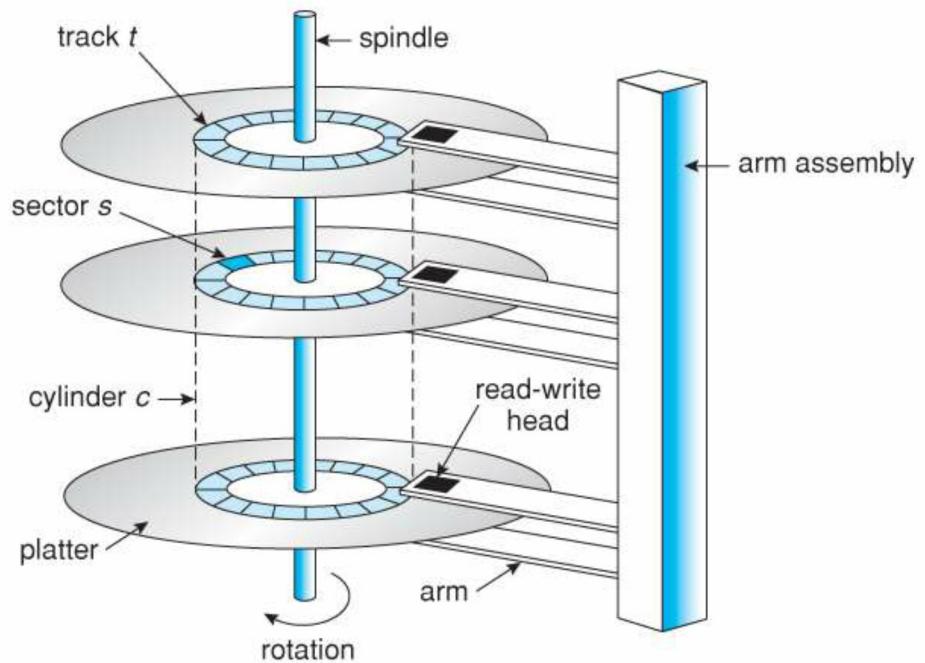


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Disk



Cylinder

- ◎ Collection of tracks of same radius from all surfaces

content in disk stored cylinder wise.

so that seek time can be saved.



Disk Scheduling

- ◎ Done by operating systems to schedule I/O requests arriving for the disk

→ using this we will try to save seek time

Disk Scheduling Algorithms

1. FCFS (First Come First Serve)
2. SSTF (Shortest Seek Time First)
3. Scan
4. C-Scan (Circular-Scan)
5. Look
6. C-Look (Circular-Look)

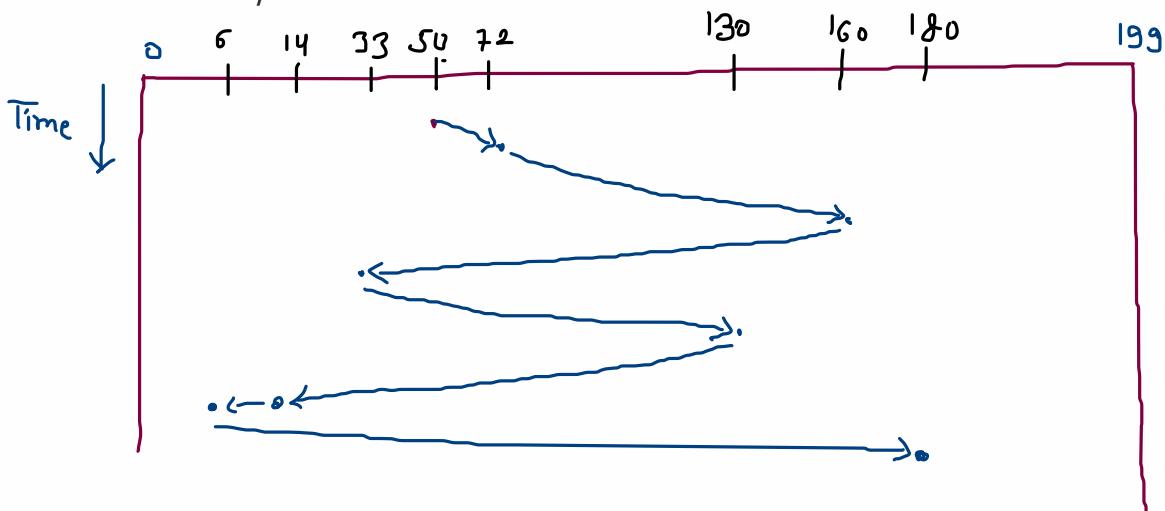
FCFS (First Come First Serve)

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50

$$\text{no. of cylinders} = 200 \\ (0-199)$$



$$\begin{aligned} \text{no. of head movements} &= (72-50) + (160-72) + \\ &(160-33) + (130-33) + (130-14) + \\ &(14-6) + (180-6) \end{aligned}$$

FCFS (First Come First Serve)

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

Number of head movements = ~~642~~

$$\text{Seek time} = \left(\text{no. of head movements} * \frac{1}{\text{head movement time}} \right) + \text{extra delay}$$

FCFS (First Come First Serve)

Advantages:

- ◎ Every request gets a fair chance
- ◎ No indefinite postponement

Disadvantages:

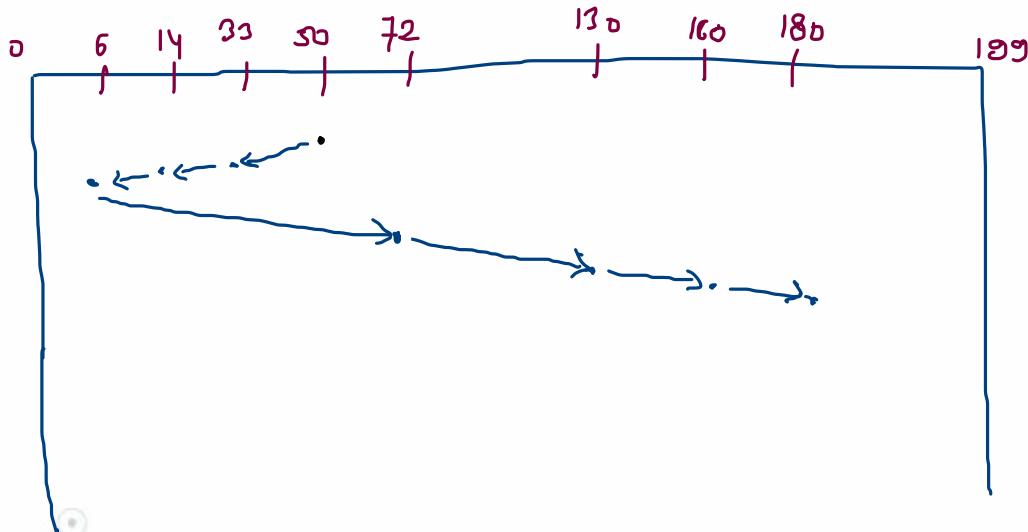
- ◎ Does not try to optimize seek time
- ◎ May not provide the best possible service

SSTF (Shortest Seek Time First)

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50



$$\begin{aligned} \text{no. of head movements} &= (50-6) + (180-6) \\ &= 44 + 174 \end{aligned}$$

SSTF (Shortest Seek Time First)

Suppose the order of request is: 72, 160, 33, 130, 14, 6, 180

Number of head movements = ~~208~~

218

SSTF (Shortest Seek Time First)

Advantages:

- ◎ Average Response Time decreases
- ◎ Throughput increases

Disadvantages:

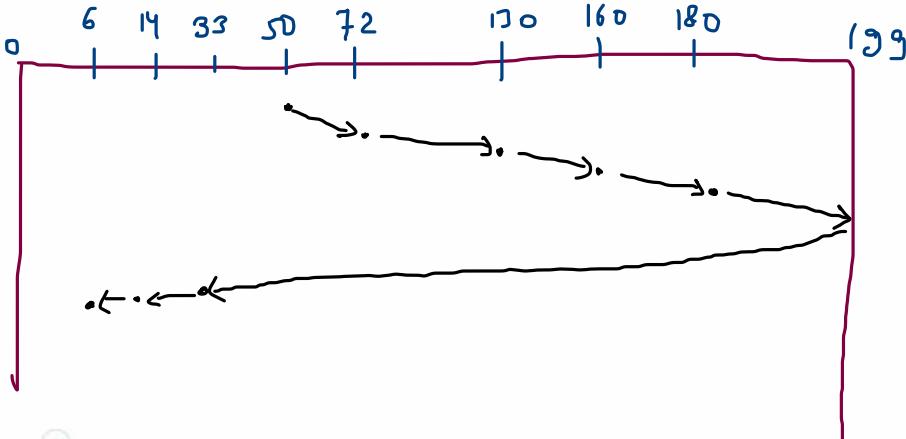
- ◎ Overhead to calculate seek time in advance
- ◎ Can cause Starvation for a request if it has higher seek time as compared to incoming requests
- ◎ High variance of response time as SSTF favors only some requests

Scan (Elevator)

Suppose the order of request is: 72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”



$$\text{head movements} = (109 - 50) + (199 - 6)$$

$$= 149 + 193 = 42$$

Scan

Advantages:

- ◎ ✓ High throughput
- ◎ ✓ Low variance of response time
- ◎ ✓ Average response time

Disadvantages:

- ◎ ✓ Long waiting time for requests for locations just visited by disk arm

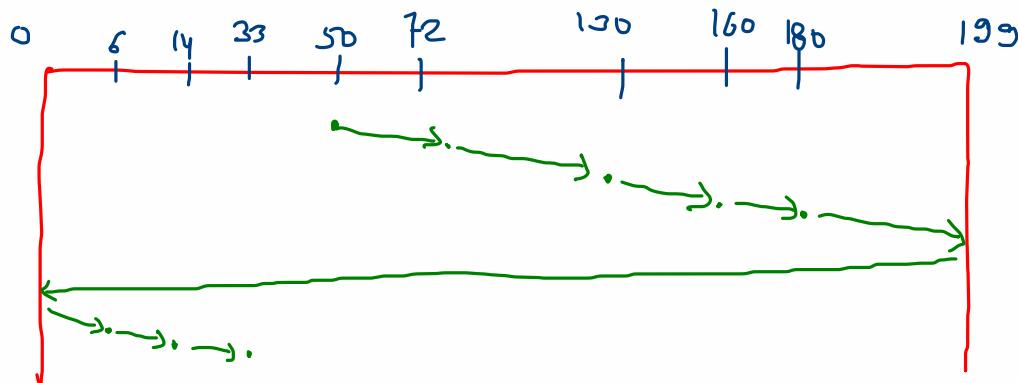
C-Scan

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”



$$\text{head movements} = (199 - 50)$$

$$+ (199 - 0) + (33 - 0)$$

$$= 149 + 199 + 33$$

$$= 381$$

C-Scan

Advantages:

- Provides more uniform wait time compared to SCAN

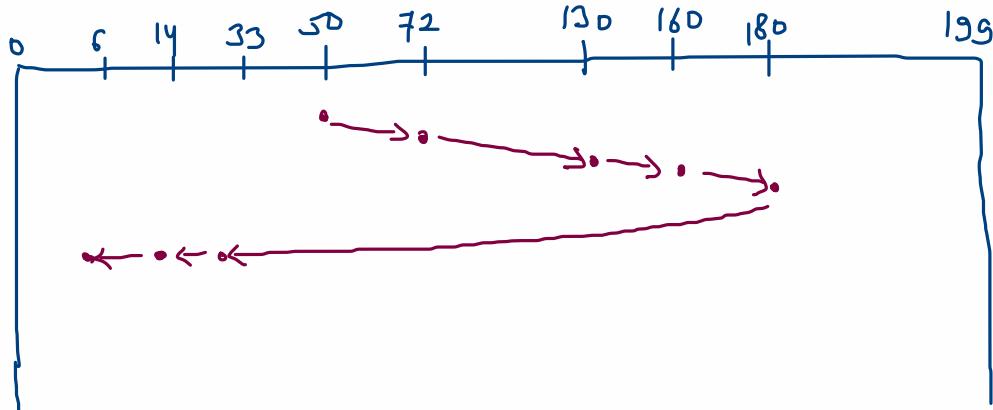
Look

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”



$$\text{Head movements} = (180 - 50) + (180 - 6)$$

$$= 130 + 174$$

$$= 304$$

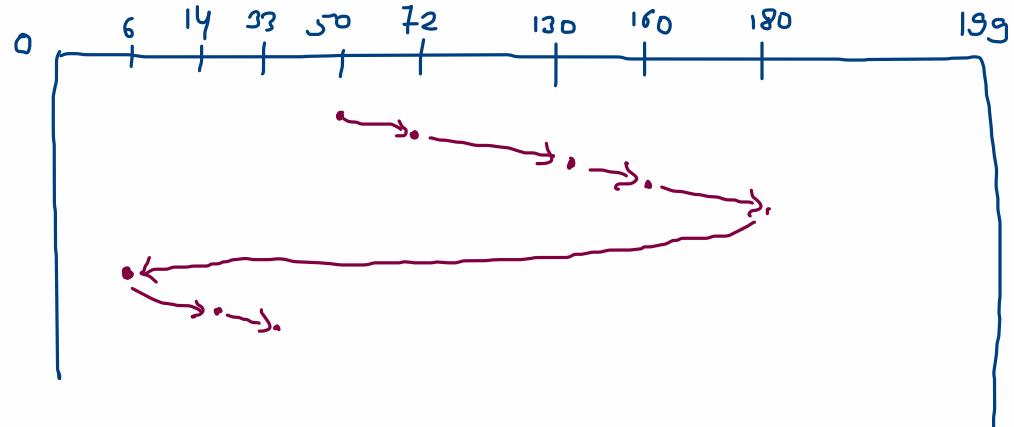
C-Look

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180 _____

The Read/Write arm is at 50,

The arm should move “towards the larger value”



Head movements

$$= (180 - 50) + (180 - 6) + (33 - 6)$$

$$= 130 + 174 + 27$$

$$= 331$$

Topics Covered

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Basics

Process Management

Process Synchronization

Deadlock

Memory Management

Paging

Segmentation

Virtual Memory

File System

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THE END

A large, stylized text "THE END" is centered on a dark purple rectangular background. The letters have a glowing, orange-yellow outline and a textured, metallic or stone-like interior. This central graphic is set against a dark, star-filled space background with wispy, orange-glowing nebulae and clouds.

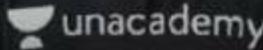
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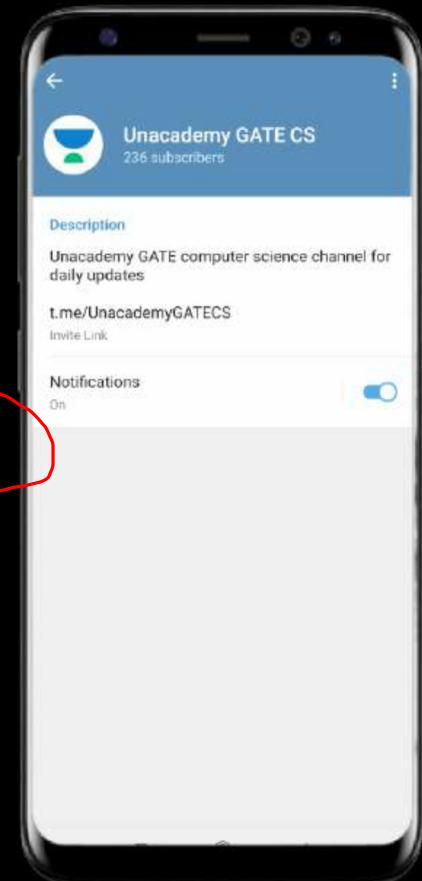


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