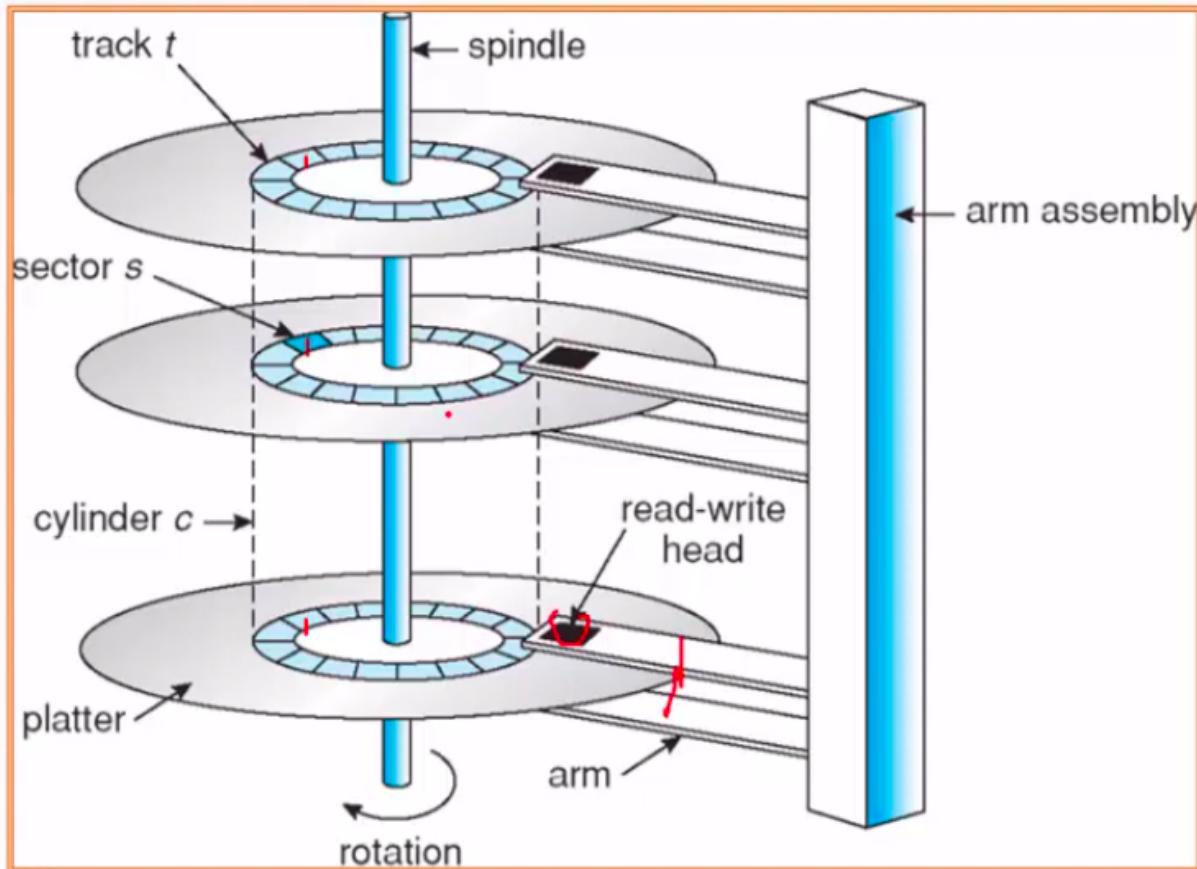


# Disk Structure



Silberschatz, A., Galvin, P. B., & Gagne, G. Operating system principles (2008). John Wiley & Sons. 8th Edition



# Disk Scheduling

- *Seek time* is the time for the disk arm to move the heads to the cylinder containing the desired sector.
- Minimize seek time
- Scheduling
  - FCFS (First Come First Serve)
  - SSTF (Shortest Seek Time First)
  - SCAN
  - LOOK



# FCFS

- In FCFS the head is moved to the first request in the request queue.
- E.g.
- On a disk with 200 cylinders (0-199), find the number of cylinders the disk arm must move considering a disk queue with requests for I/O to blocks on cylinders

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

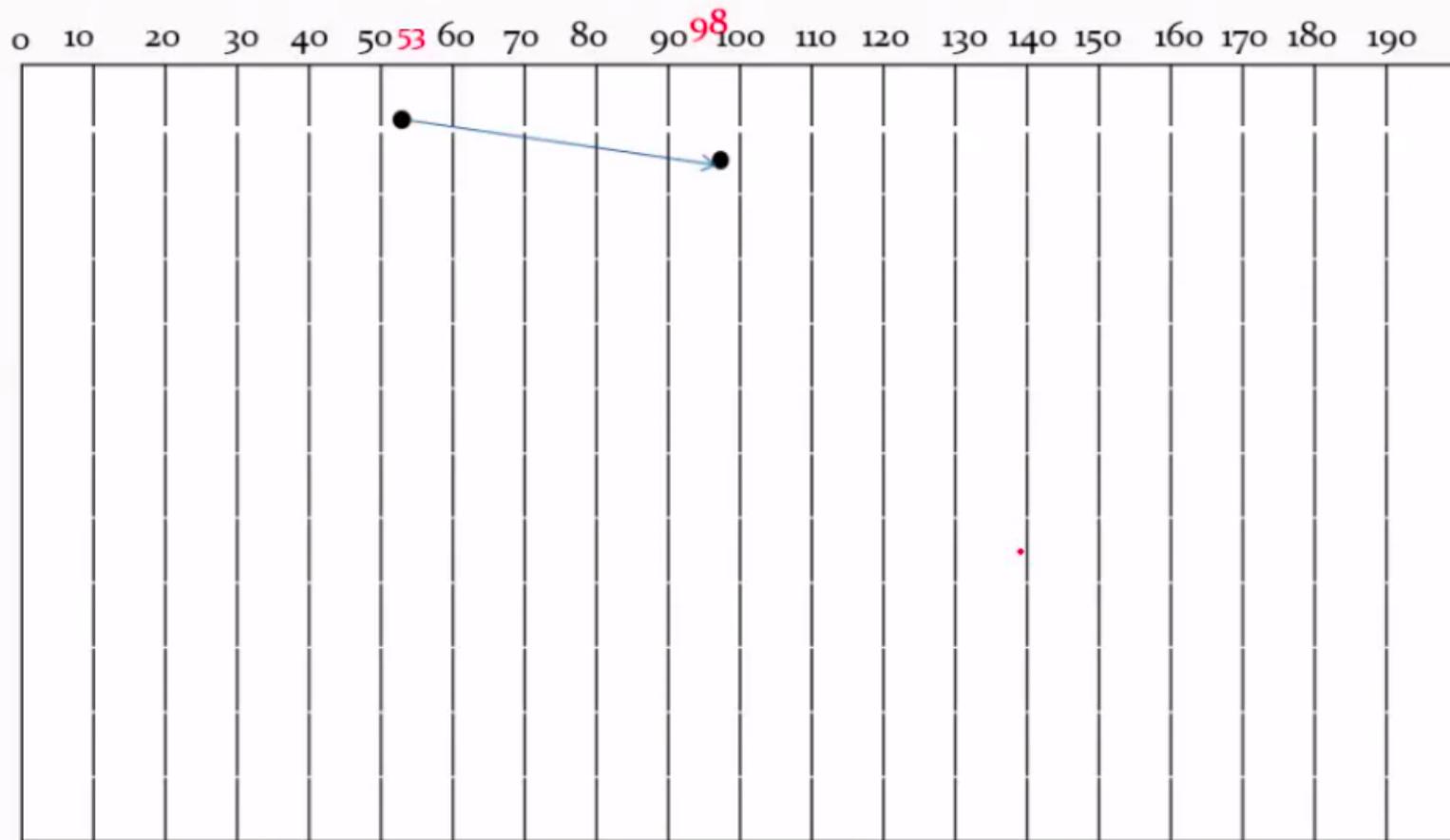
Assume the current Head pointer (position) is 53 rd cylinder



Request queue (0-199).

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

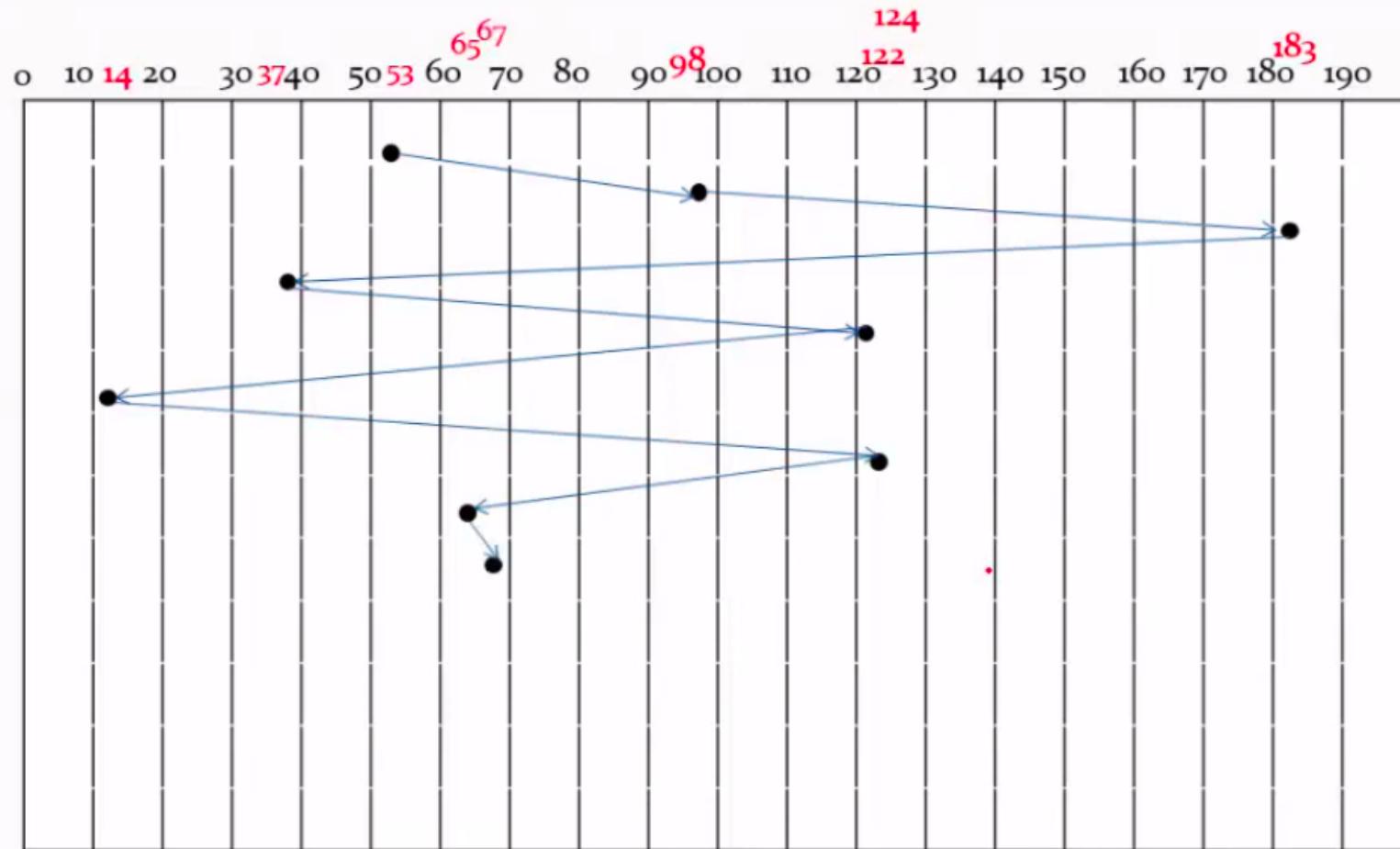
Head pointer 53



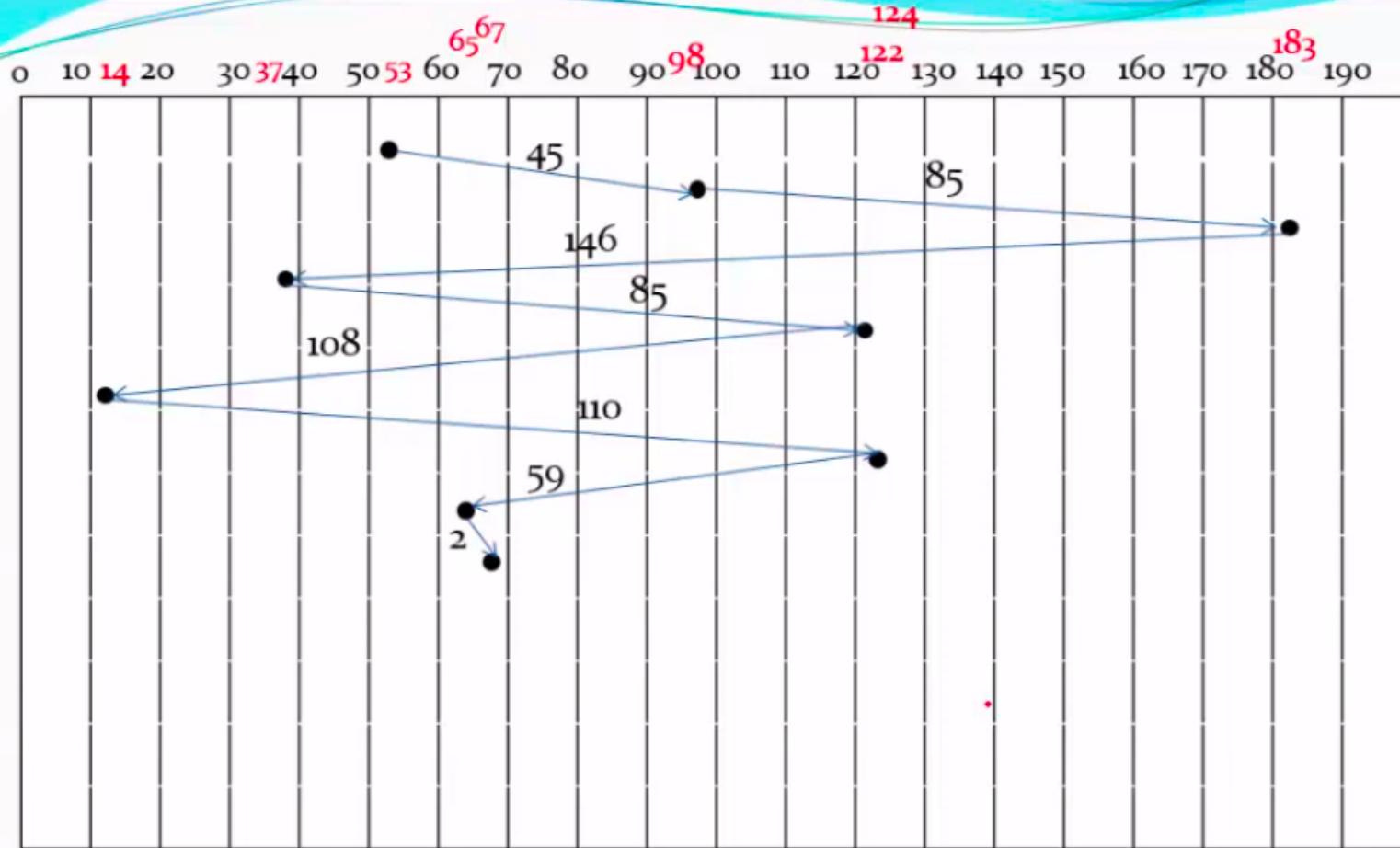
Request queue (0-199).

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

Head pointer 53



## Total Head Movement



$$\text{Total head movement} = 45 + 85 + 146 + 85 + 108 + 110 + 59 + 2 = 640$$

# SSTF(Shortest Seek Time First)

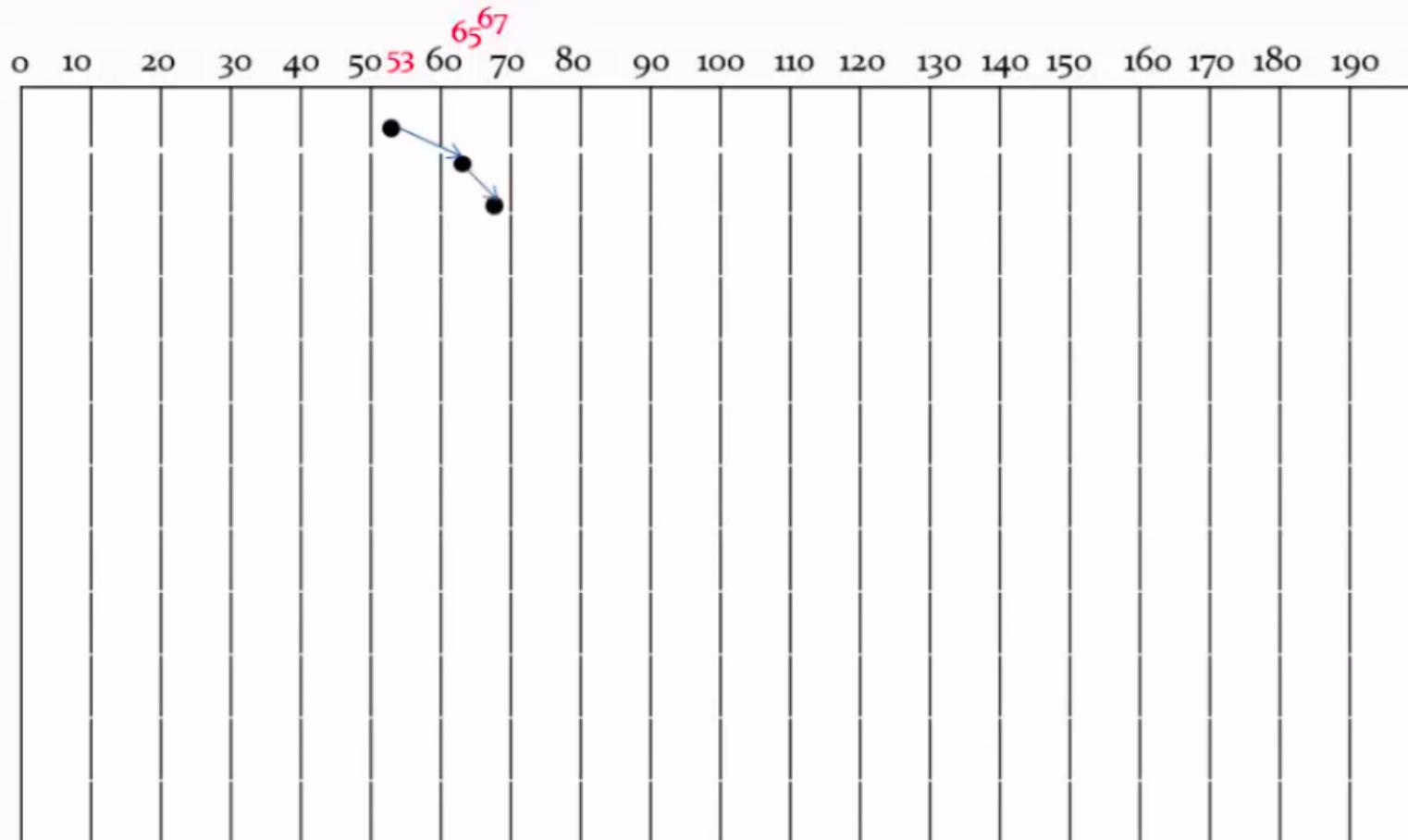
- SSTF selects the request with the least seek time from the current head position.
- SSTF chooses the pending request closest to the current head position
- E.g.
- **Request queue (0-199).**  
**98, 183, 37, 122, 14, 124, 65, 67**  
**Head pointer 53**



Request queue (0-199).

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

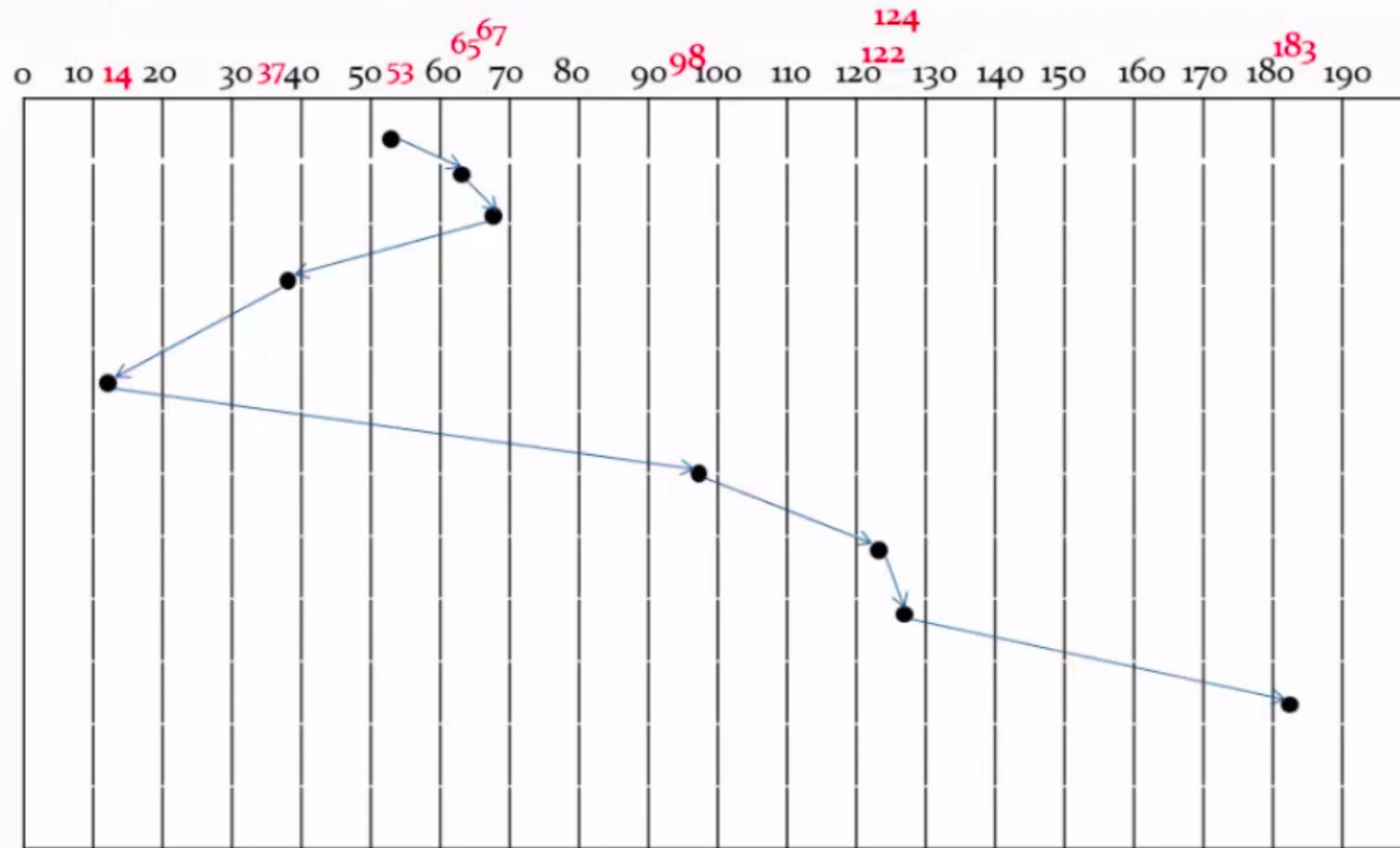
Head pointer 53 .



## Request queue (0-199).

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

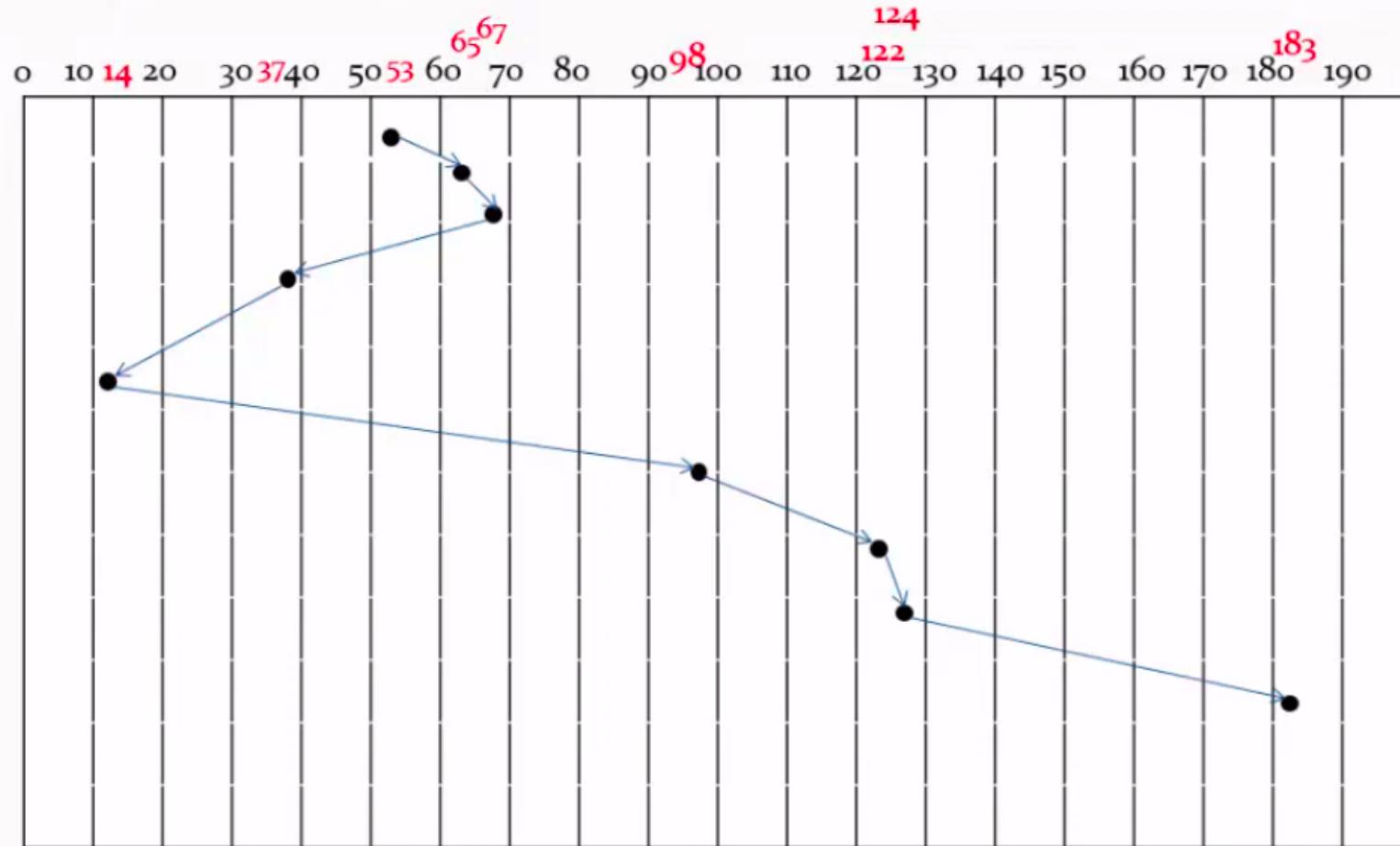
Head pointer 53



### Request queue (0-199).

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

Head pointer 53



$$\text{Total head movement} = 12 + 2 + 30 + 23 + 84 + 24 + 2 + 59 = 236$$

Baljit Singh Saini



# SCAN

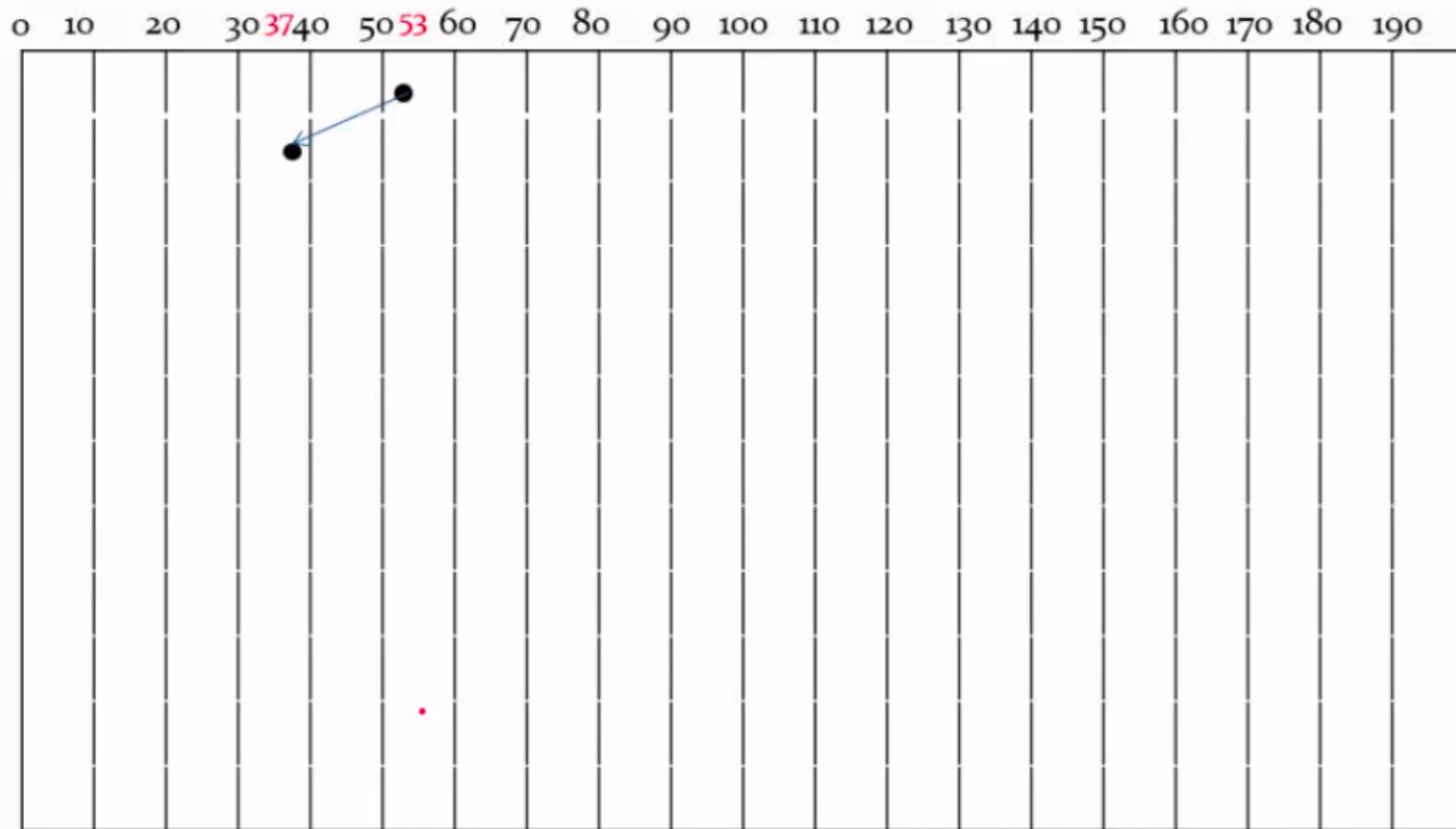
- The disk arm starts at one end of the disk and moves towards other end, servicing requests as it reaches each cylinder.
- At the other end, the direction of head movement is reversed, and servicing continues
- E.g.
- Request queue (0-199).  
98, 183, 37, 122, 14, 124, 65, 67  
Head pointer 53
- The disk arm is moving towards 0
- Current head position is 53



Request queue (0-199).

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

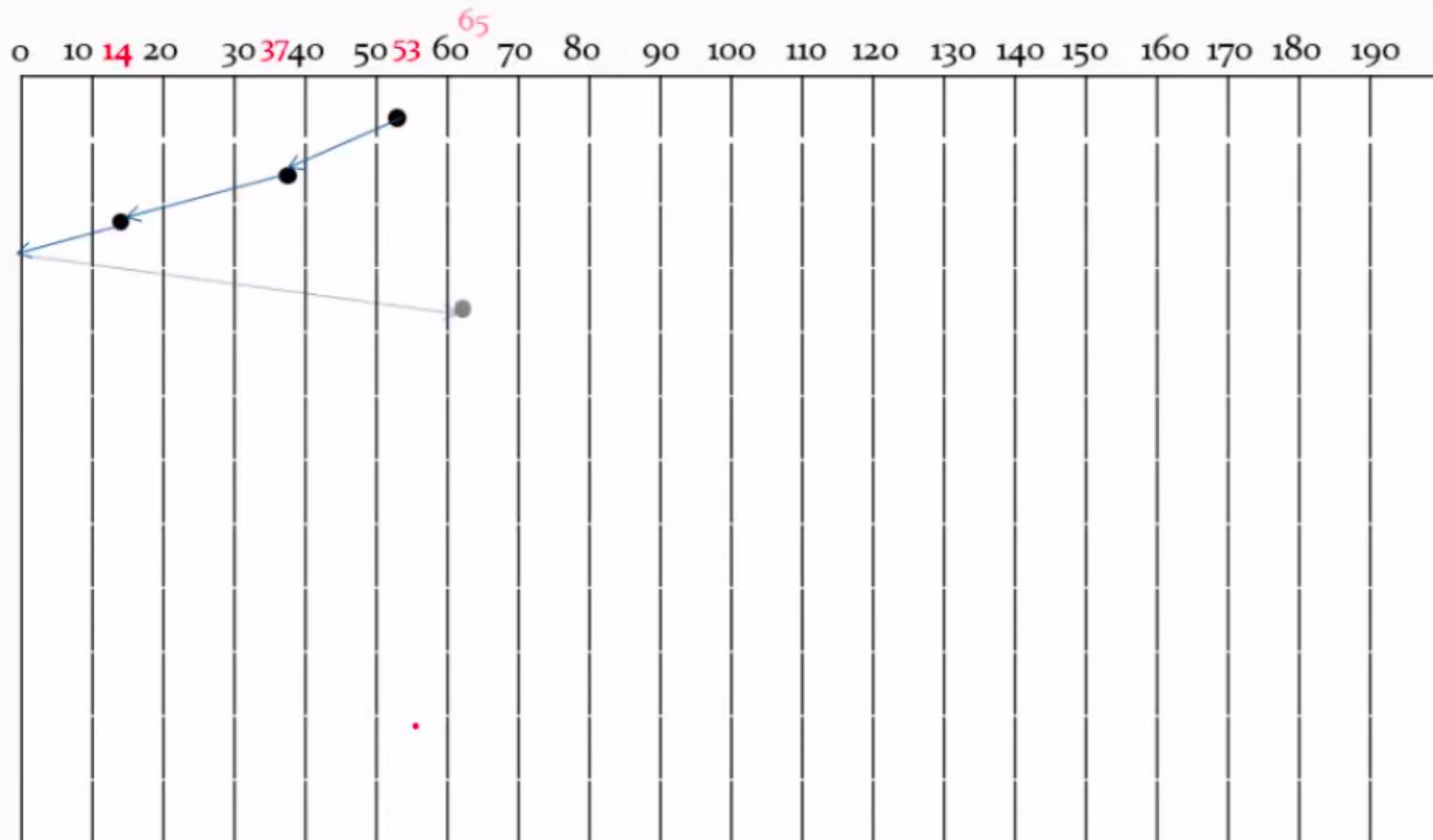
Head pointer 53



Request queue (0-199).

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

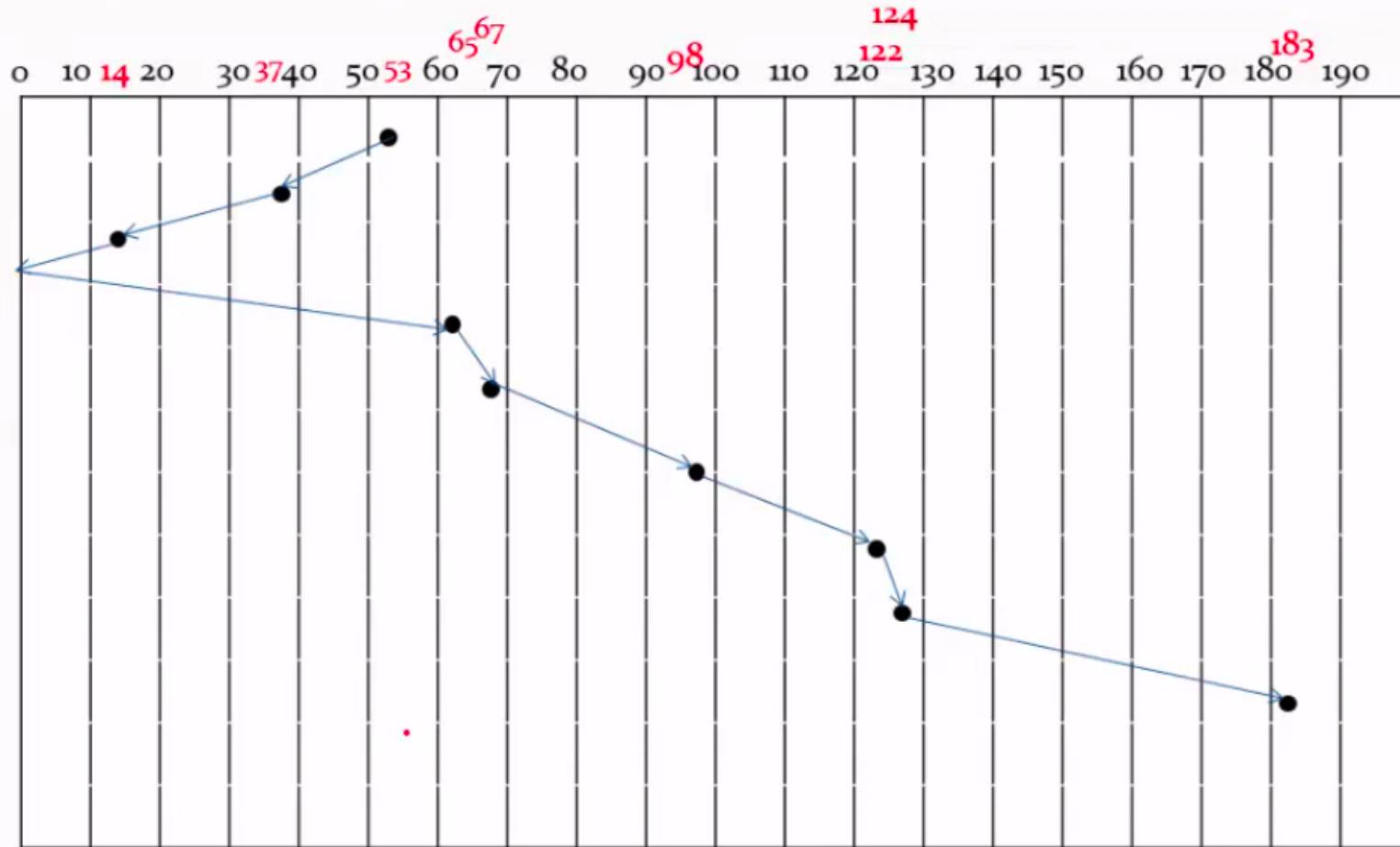
Head pointer 53



Request queue (0-199).

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

Head pointer 53



Total head movement =  $16+23+14+65+2+31+24+2+59=236$

Baljit Singh Saini



# LOOK

- Same as SCAN but with the difference that the arm goes only as far as the final request in each direction.
- Then, it reverses direction immediately without going all the way to the end of the disk



- Advantage:
  - If a request arrives in the queue just in front of the head, it will be services almost immediately.



# LOOK

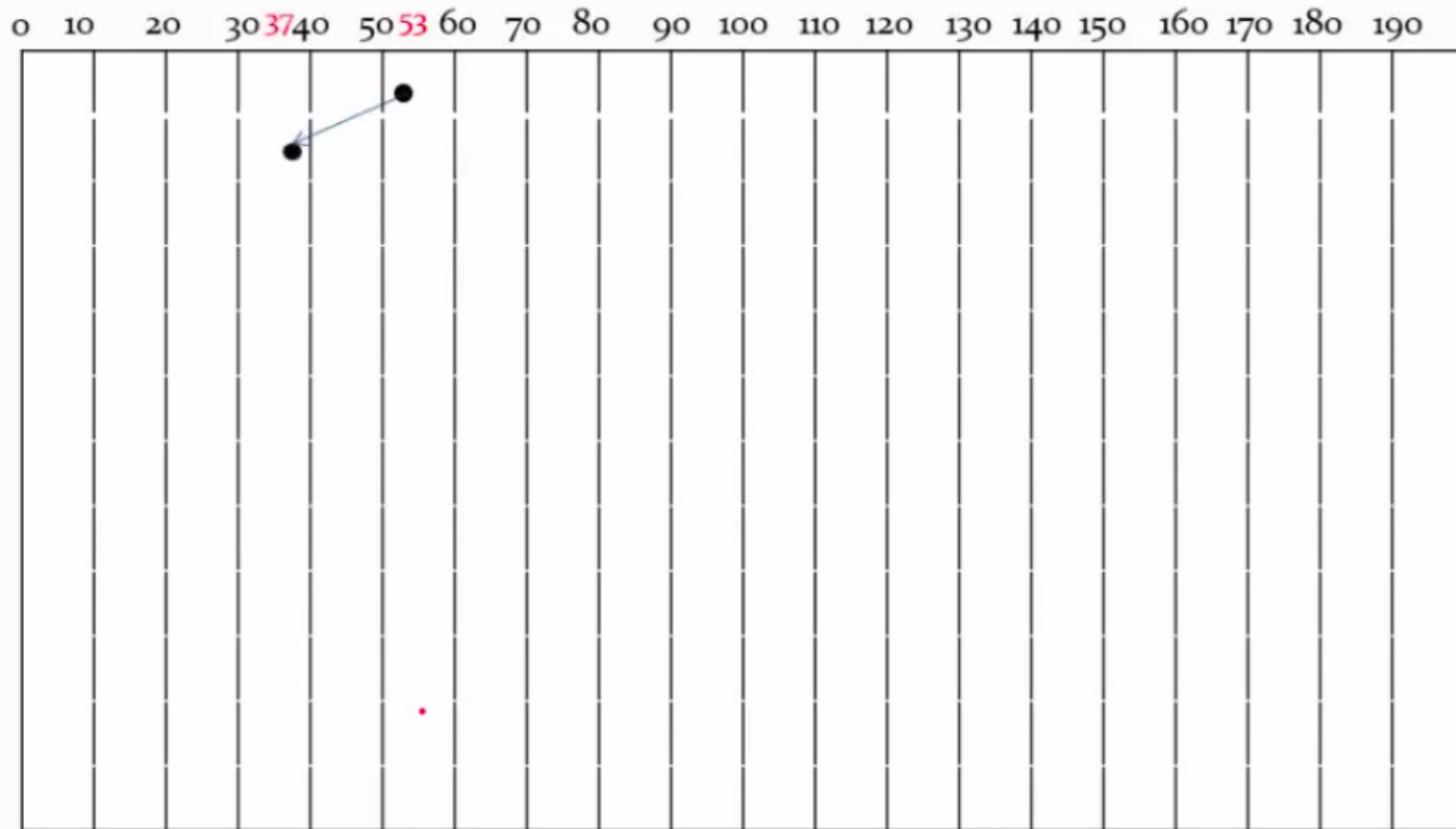
- Same as SCAN but with the difference that the arm goes only as far as the final request in each direction.
- Then, it reverses direction immediately without going all the way to the end of the disk



Request queue (0-199).

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

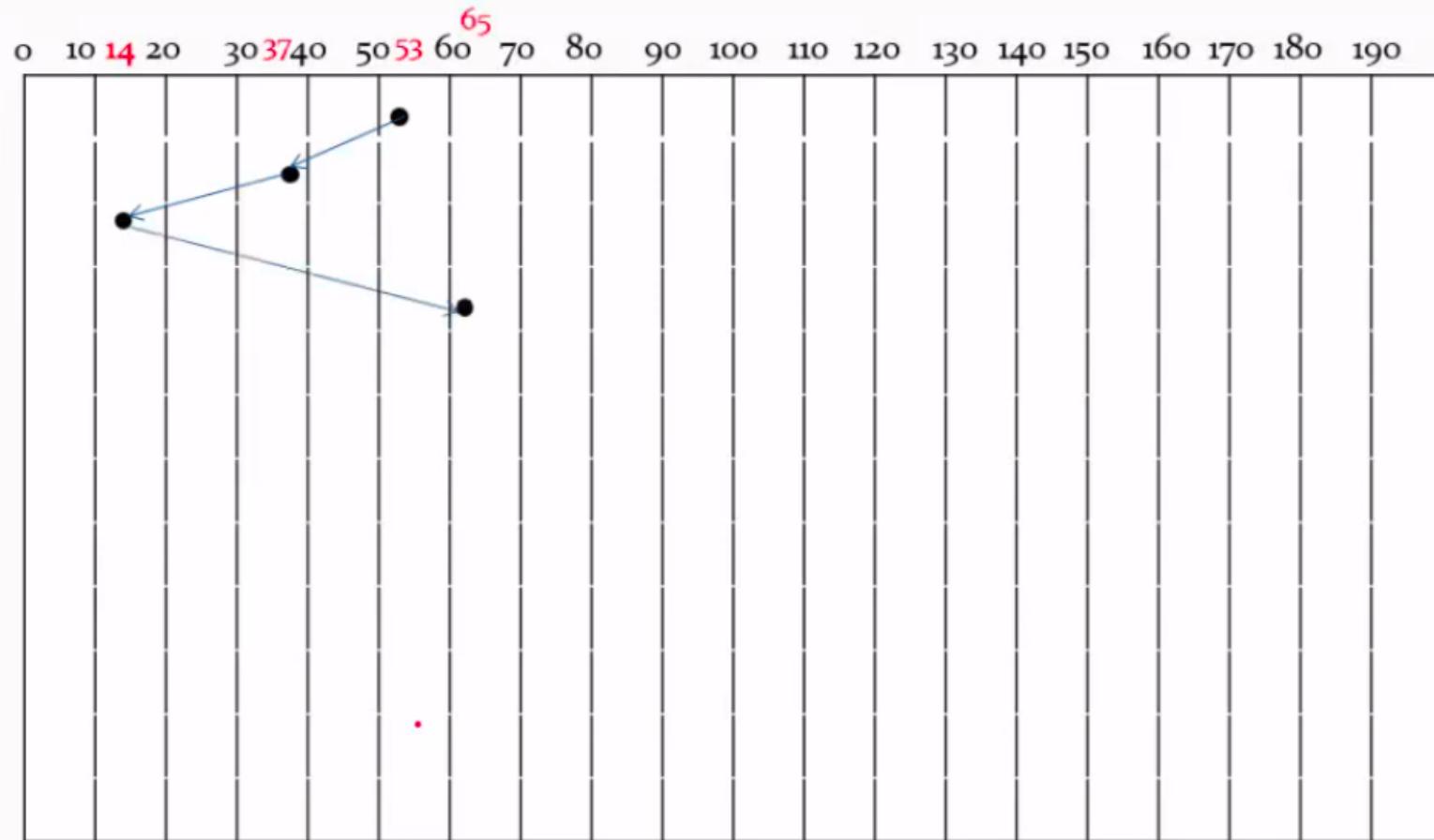
Head pointer 53



Request queue (0-199).

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

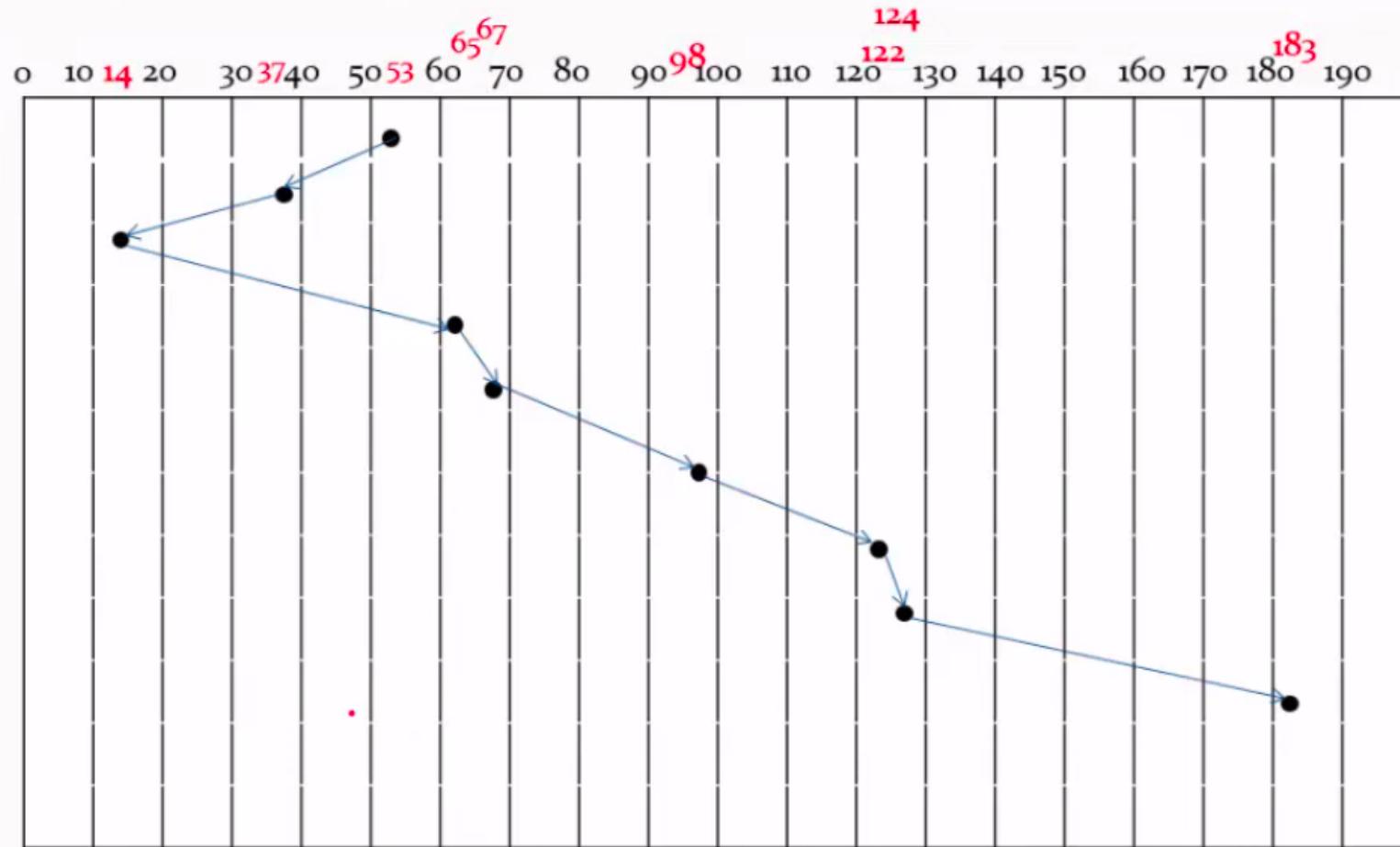
Head pointer 53



Request queue (0-199).

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

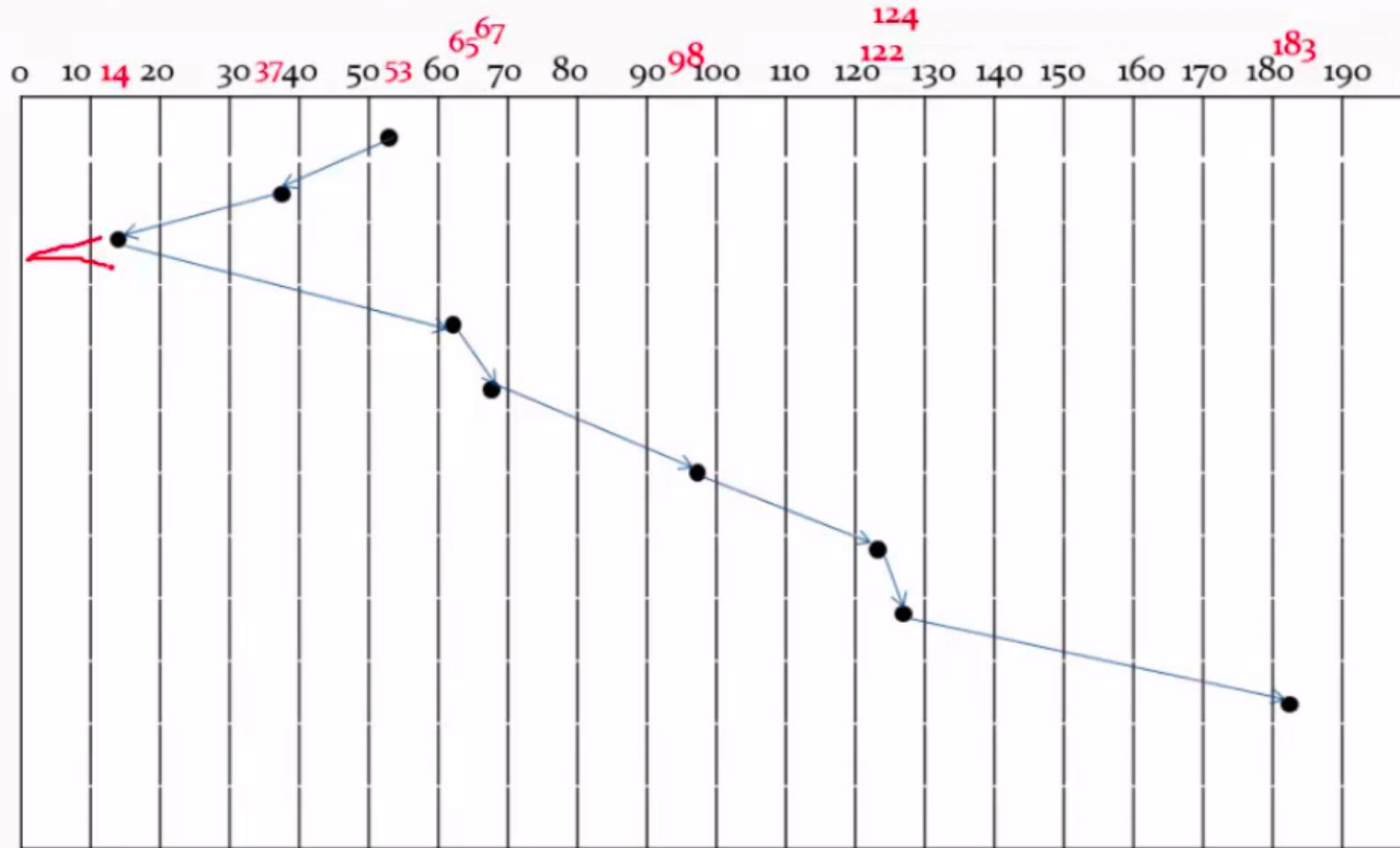
Head pointer 53



Request queue (0-199).

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

Head pointer 53



Total head movement =  $16+23+51+2+31+24+2+59=208$   
Baljeet Singh Saini

