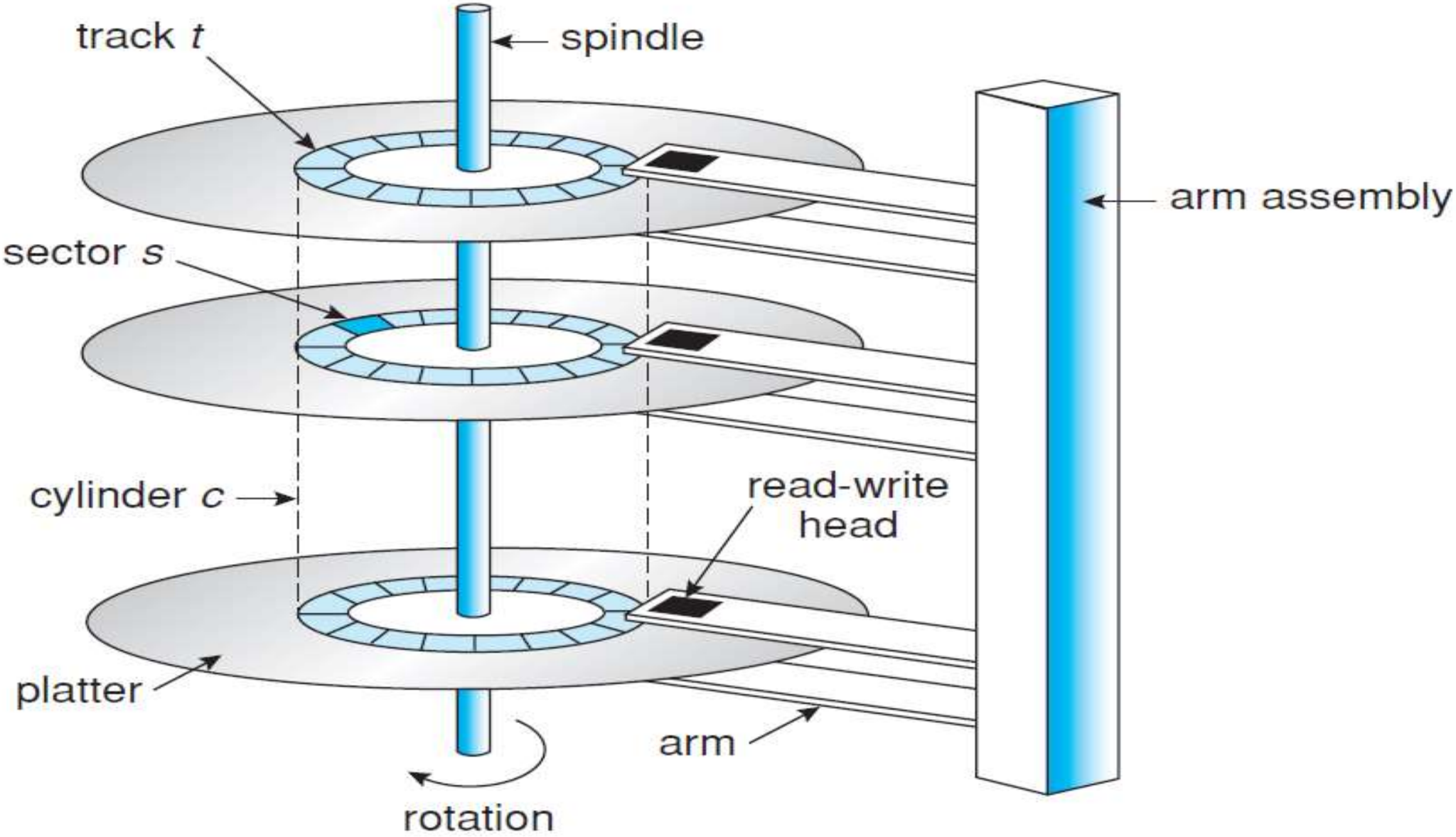
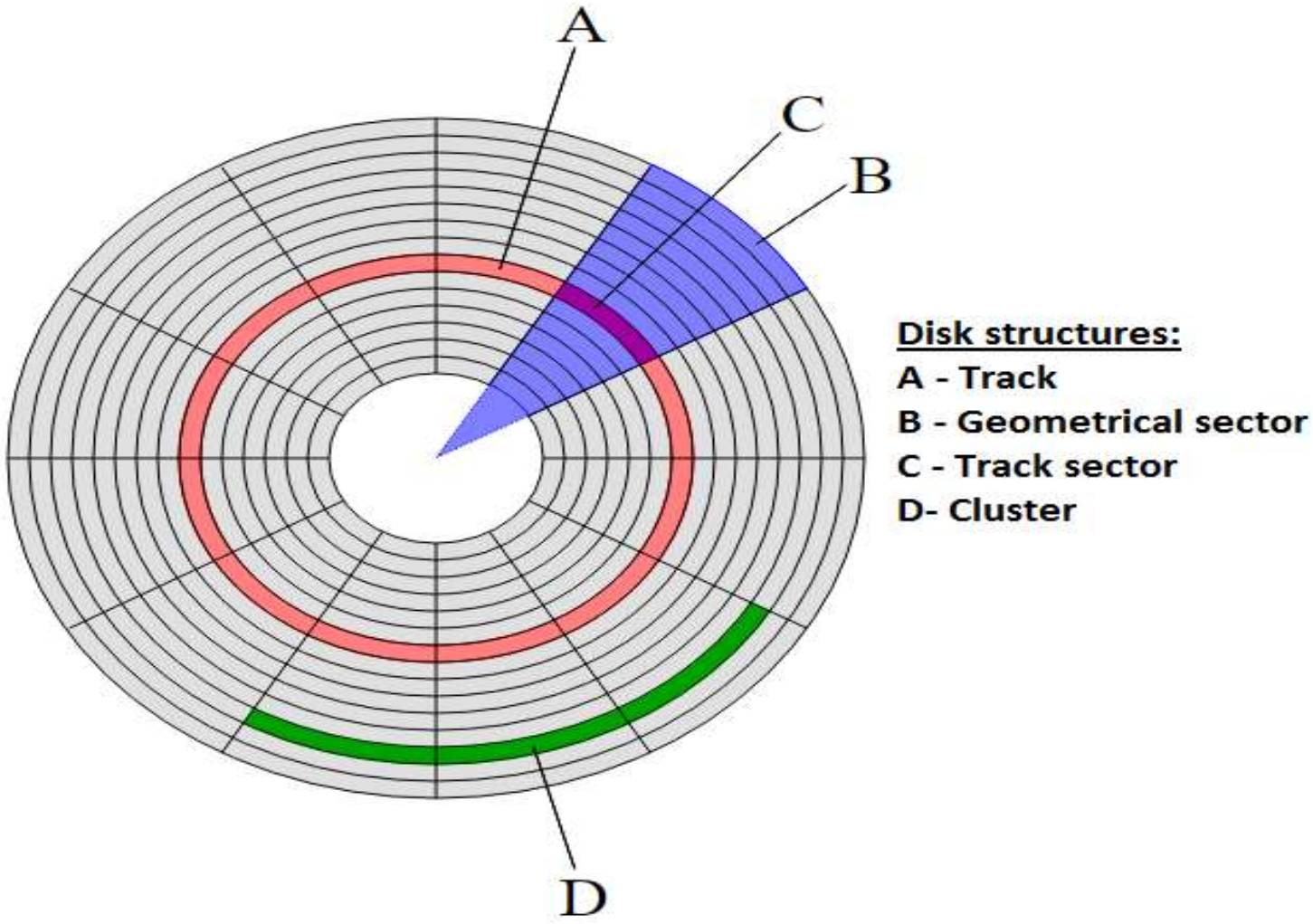
Disk scheduling algorithms

Calculate the number of page faults as per FCFS, OPR, LRU, Enhanced LRU, Second Chance, MFU,

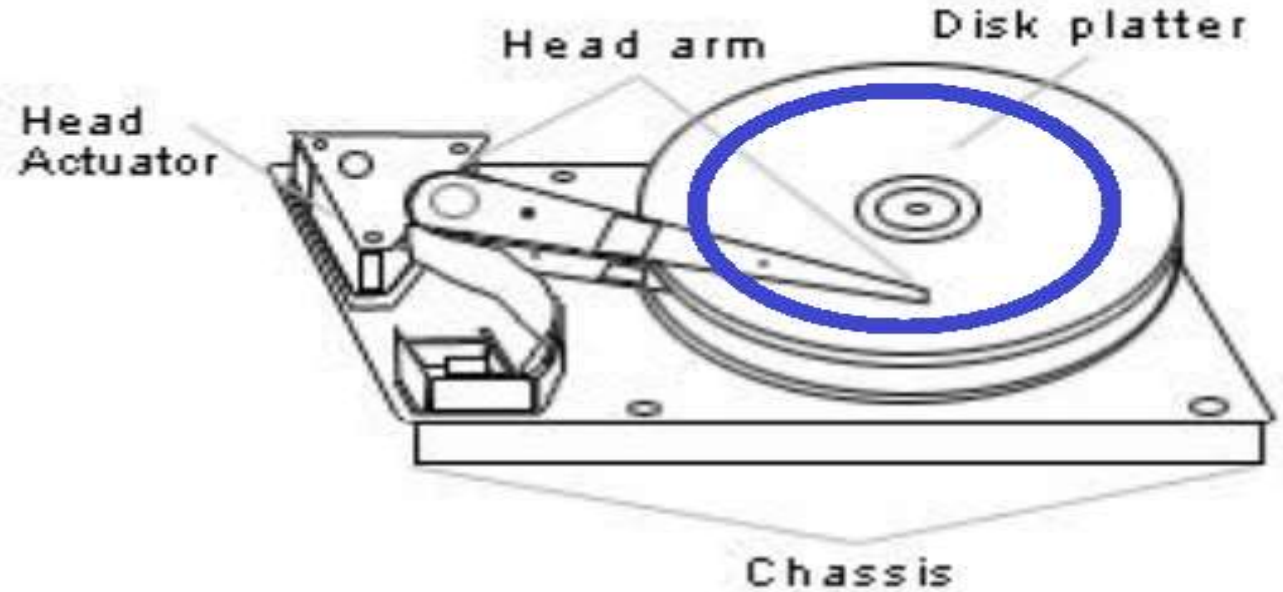

track t
spindle
arm assembly
sector s
cylinder c
read-write
head
platter
arm
rotation



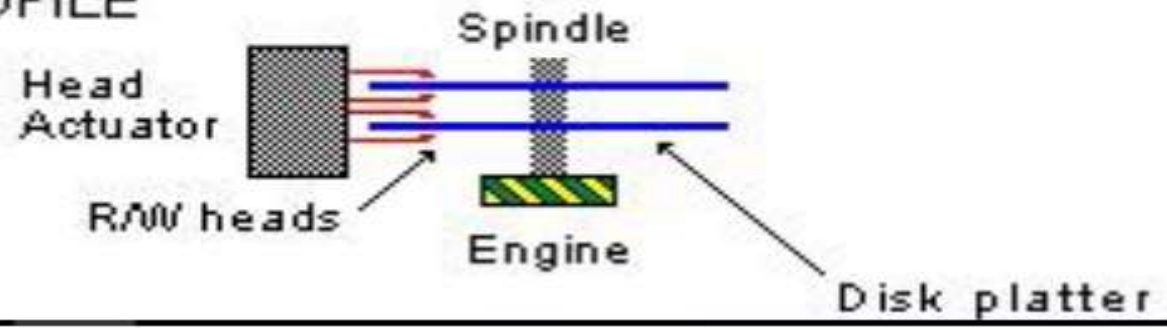
- **Track:** one ring
- **Sector:** one pie-shaped piece.
- **Block:** intersection of a track and a sector.

- When the disk is in use, a drive motor spins it at high speed.
- Most drives rotate 60 to 250 times per second, specified in terms of rotations per minute **(RPM).**
- Common drives spin at 5,400, 7,200, 10,000, and 15,000 RPM. Disk speed has two parts.
- The **transfer rate is the rate at which data flow between the drive** and the computer.
- The **positioning time, or random-access time, consists of** two parts:
  - the time necessary to move the disk arm to the desired track, called the **seek time,**
  - and the time necessary for **the desired sector to rotate to** the disk head, called the **rotational latency**

INSIDE DISK



PROFILE



- Consider, for example, a disk queue with requests for I/O blocks (tracks) on cylinders. **Initial head position is 53**. Calculate the **average seek time** as per **FCFS, SSTF, SCAN, C-SCAN, Look and C-Look**
- 98, 183, 37, 122, 14, 124, 65, 67

FCFS

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

53 to 98 = 45

98 to 183 = 85

183 to 37 = 146

37 to 122 = 85

122 to 14 = 108

14 to 124 = 110

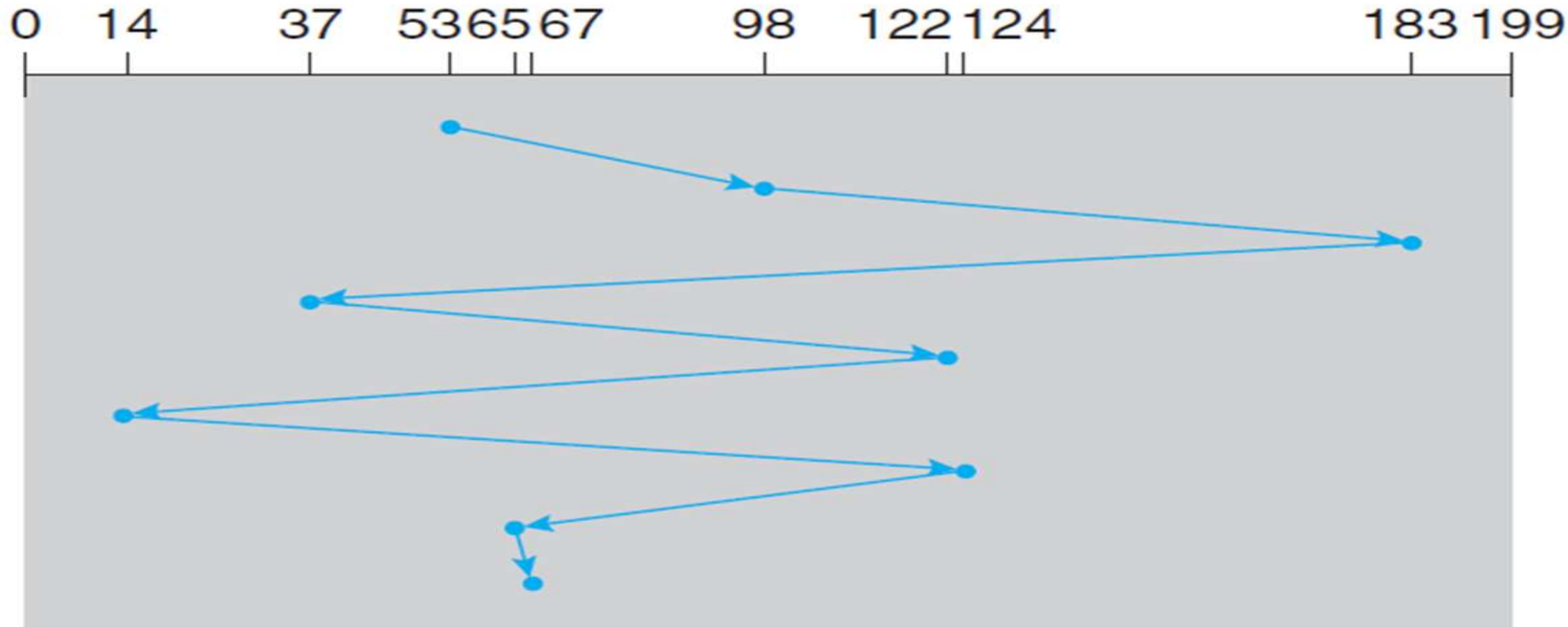
124 to 65 = 59

65 to 67 = 2

640

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

head starts at 53



Shortest Seek Time First(SSTF)

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

53 to 65 = 12

65 to 67 = 2

67 to 37 = 30

37 to 14 = 23

14 to 98 = 84

98 to 122 = 24

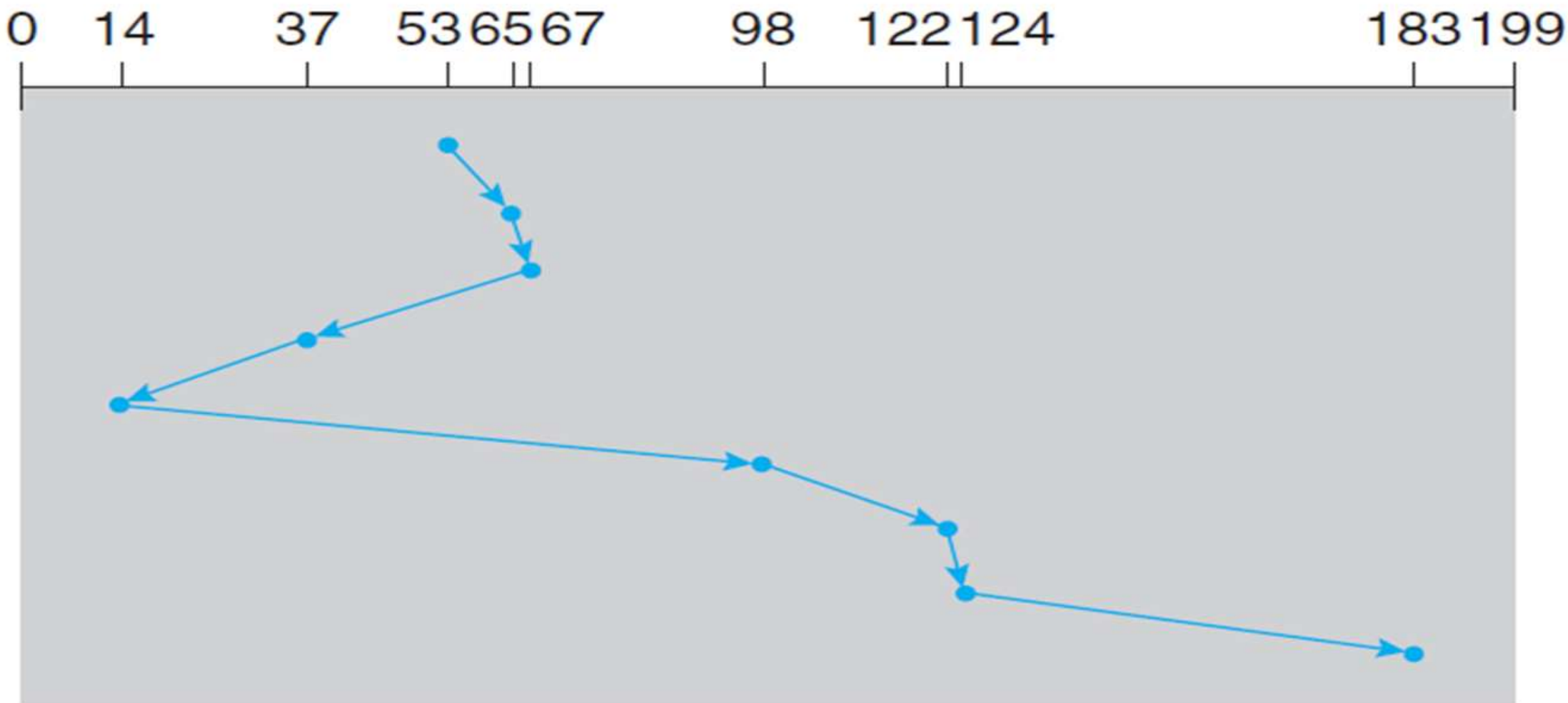
122 to 124 = 2

124 to 183 = 54

231

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

head starts at 53



SCAN

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

53 to 37 = 16

37 to 14 = 23

14 to 0 = 14

0 to 65 = 65

65 to 67 = 2

67 to 98 = 31

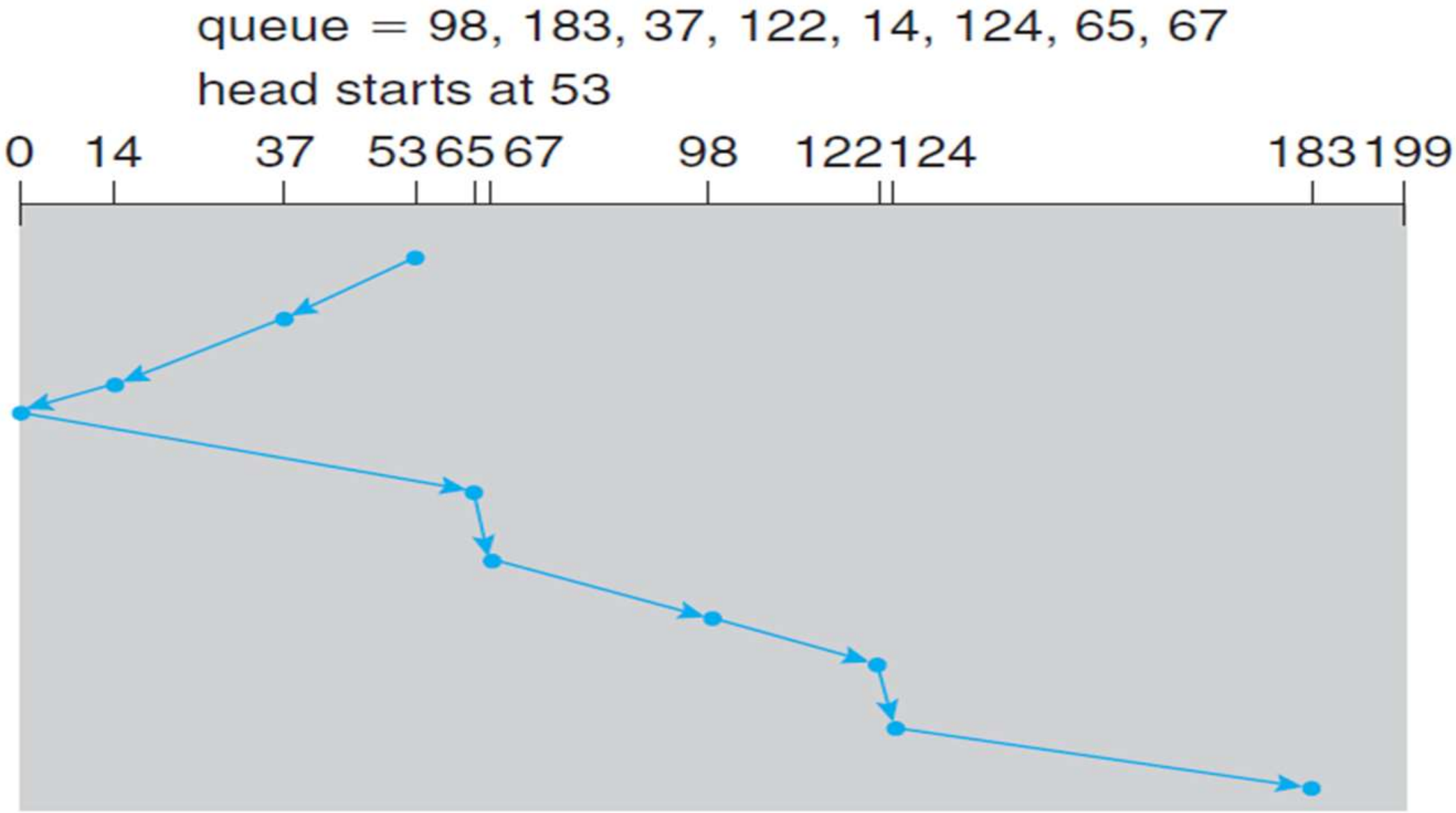
98 to 122 = 24

122 to 124 = 2

124 to 183 = 59

236

SCAN Scheduling



C-SCAN

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

53 to 65 = 12

65 to 67 = 2

67 to 98 = 31

98 to 122 = 22

122 to 124 = 2

124 to 183 = 59

183 to 199 = 16

199 to 0 = 199

0 to 14 = 14

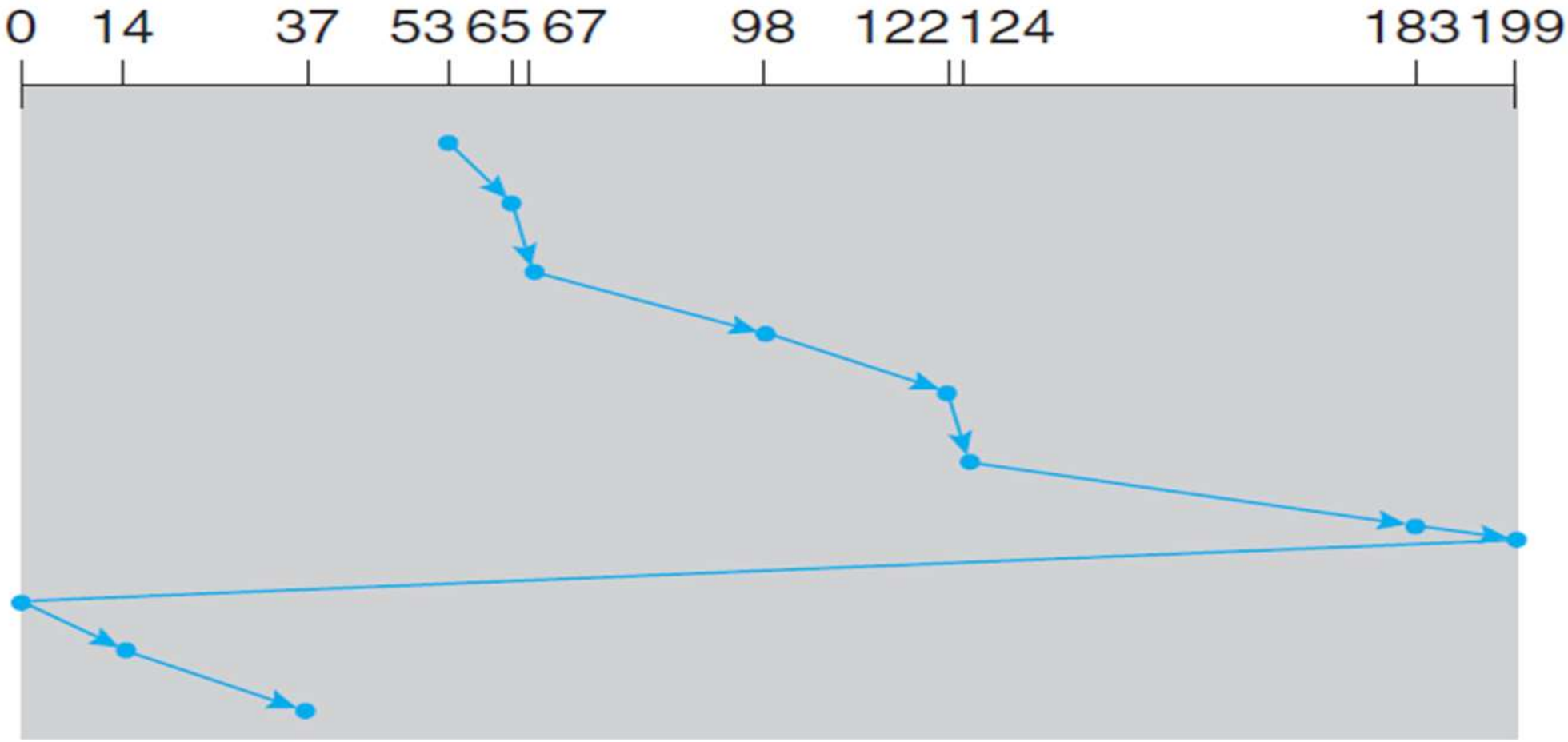
14 to 37 = 23

380

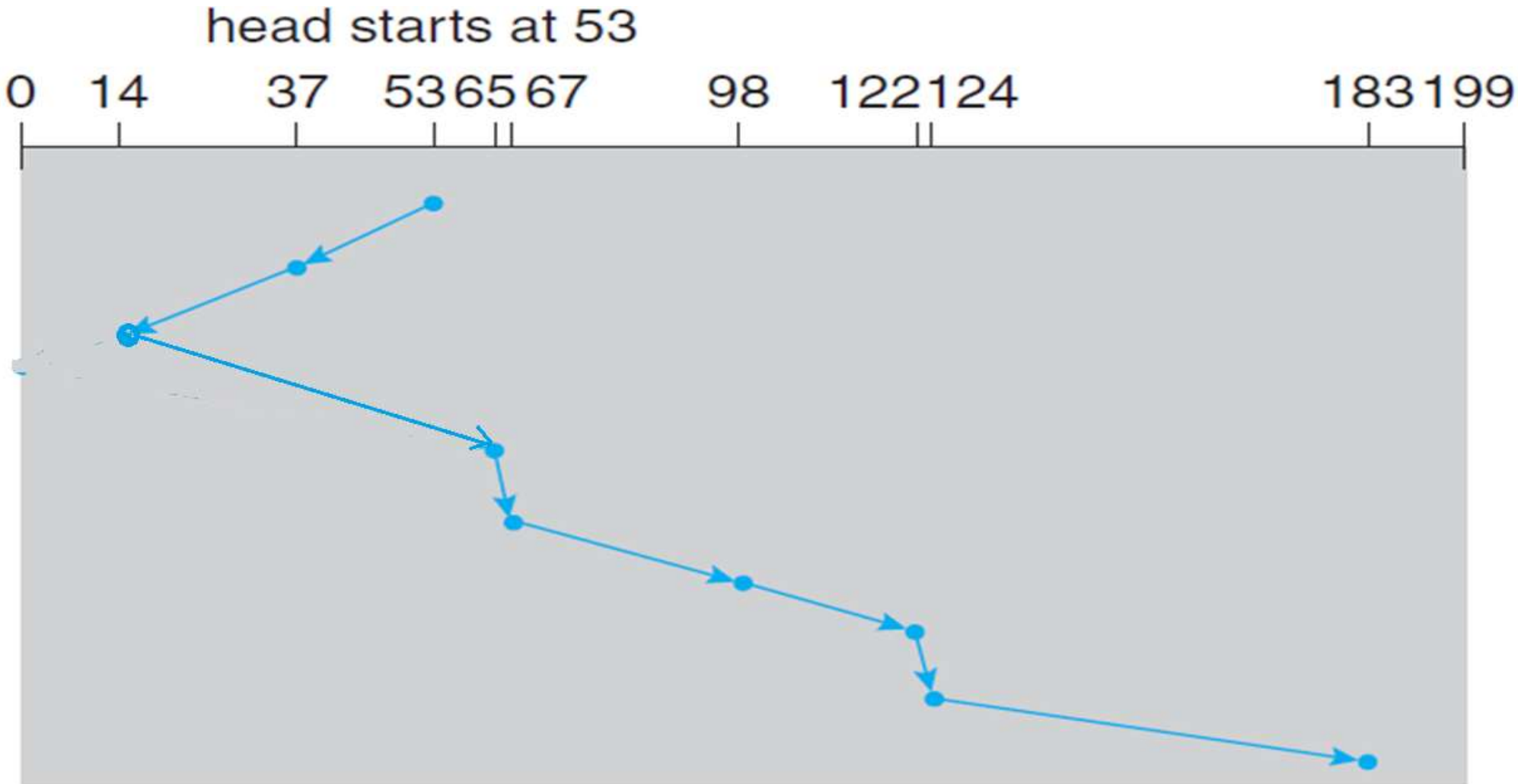
C-SCAN Scheduling

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

head starts at 53



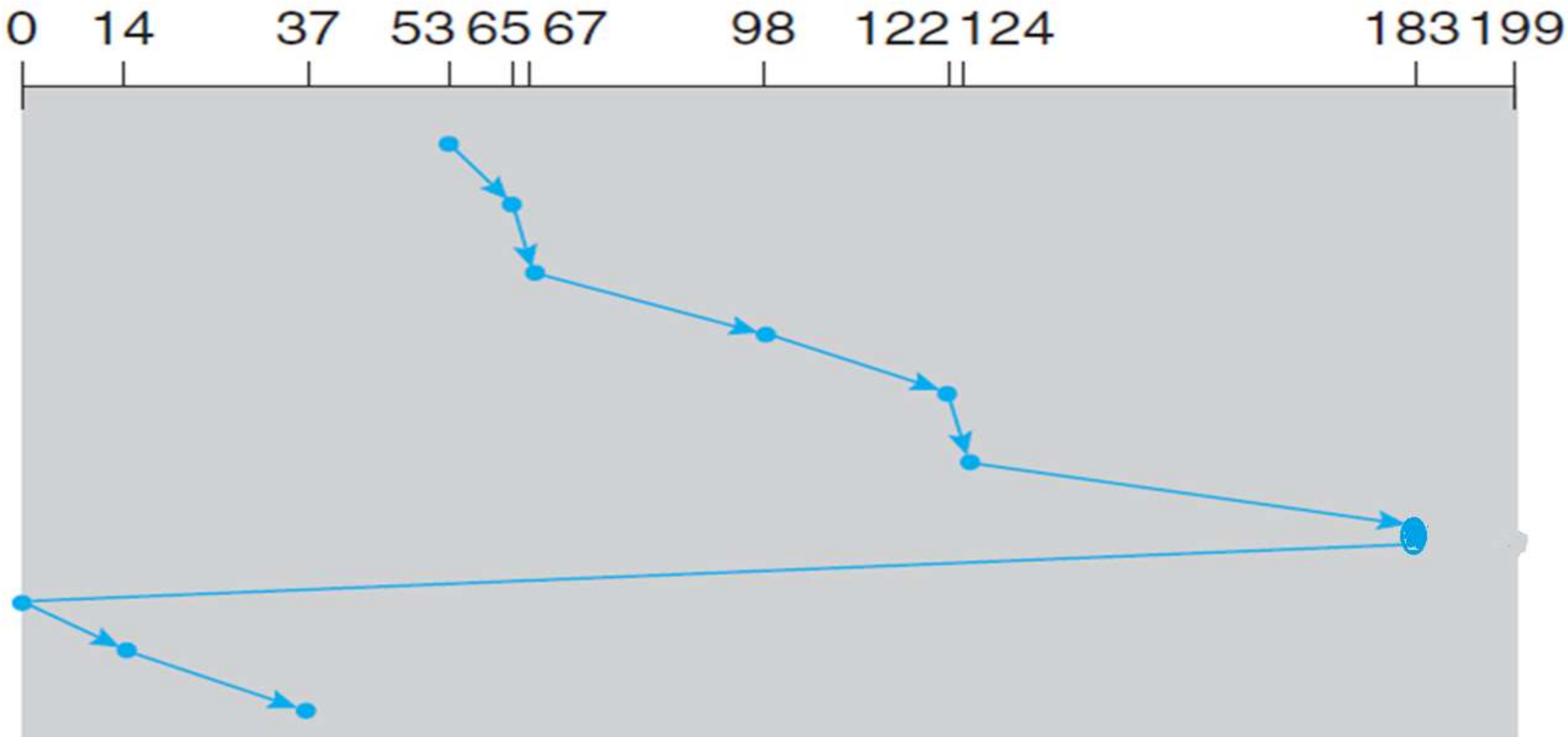
LOOK



C-LOOK

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

head starts at 53



2019 OS Question paper

(b) Assume a disk with 200 tracks and that the disk request queue has random requests in it. The requested tracks, in the order received by the disk scheduler, are 55, 58, 39, 18, 90, 160, 150, 38, and 184. The disk head is initially located at track 100. Starting from the current head position Appraise the average seek length required to satisfy all the pending requests for each of the following disk-scheduling algorithms?

i) FCFS (2.5)

ii) SSTF (2.5)

iii) SCAN (in the direction of increasing track number) (2.5)

iv) C-SCAN (in the direction of increasing track number) (2.5)