SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF COMPUTER SCEINCE AND ENGINEERING

Course Code & Name	: 23CST206-OPERATING SYSTEMS AND VIRTUALIZATION
Class	: II CSE
Course Faculty	: Ms.R.SWATHIRAMYA

Question Bank

UNIT-III

Puzzle 1: The Missing Pages

A process needs **10 pages**, but only **4 frames** are available. The page reference string is:

1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5

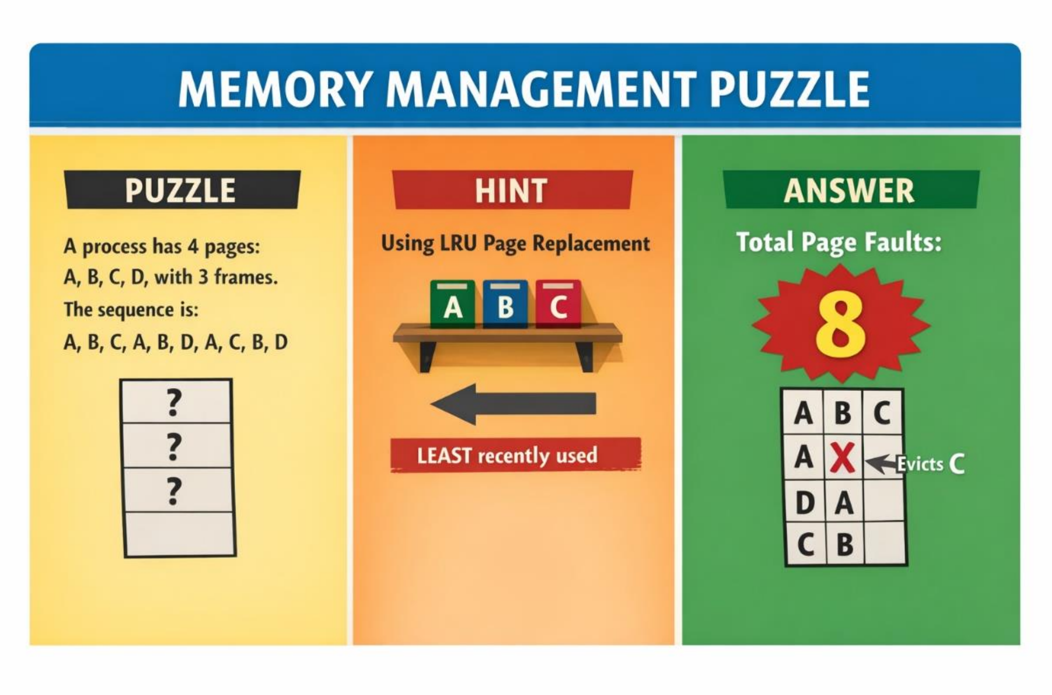
Using **FIFO page replacement**, how many page faults occur?

Hint:
FIFO removes the oldest page first. Track frame changes step-by-step.

Answer:

10 Page Faults

Puzzle 2: Fit Me If You Can



MEMORY MANAGEMENT PUZZLE

PUZZLE

A process has 4 pages: A, B, C, D, with 3 frames. The sequence is: A, B, C, A, B, D, A, C, B, D

HINT

Using LRU Page Replacement

LEAST recently used

ANSWER

Total Page Faults: 8

🧩 Puzzle 3: Fit Me If You Can

You have memory blocks of sizes:
100KB, 500KB, 200KB, 300KB, 600KB

Processes arrive with sizes:
212KB, 417KB, 112KB, 426KB

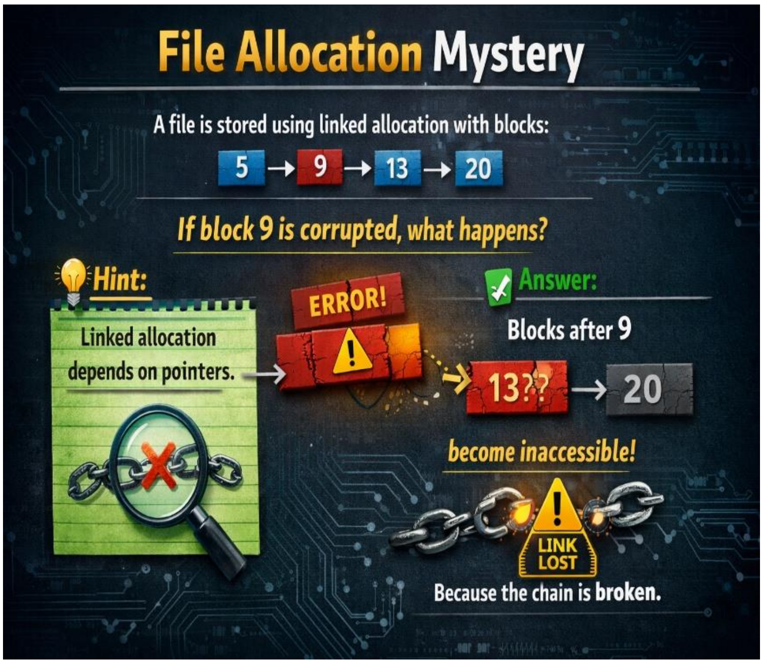
Using **First Fit**, where will each process be allocated?

💡 Hint:
First Fit → Allocate the first block that is large enough.

☑ Answer:

- 212KB → 500KB
- 417KB → 600KB
- 112KB → Remaining 288KB (from 500KB block)
- 426KB → Not allocated ✗

🧩 Puzzle 4: Paging Puzzle



File Allocation Mystery

A file is stored using linked allocation with blocks:

5 → 9 → 13 → 20

If block 9 is corrupted, what happens?

Hint:

Linked allocation depends on pointers.

Answer:

Blocks after 9

13?? → 20

become inaccessible!

Because the chain is broken.

🧩 Puzzle 5: Paging Puzzle

A system has:

- Logical address space = **16 pages**
- Page size = **1 KB**

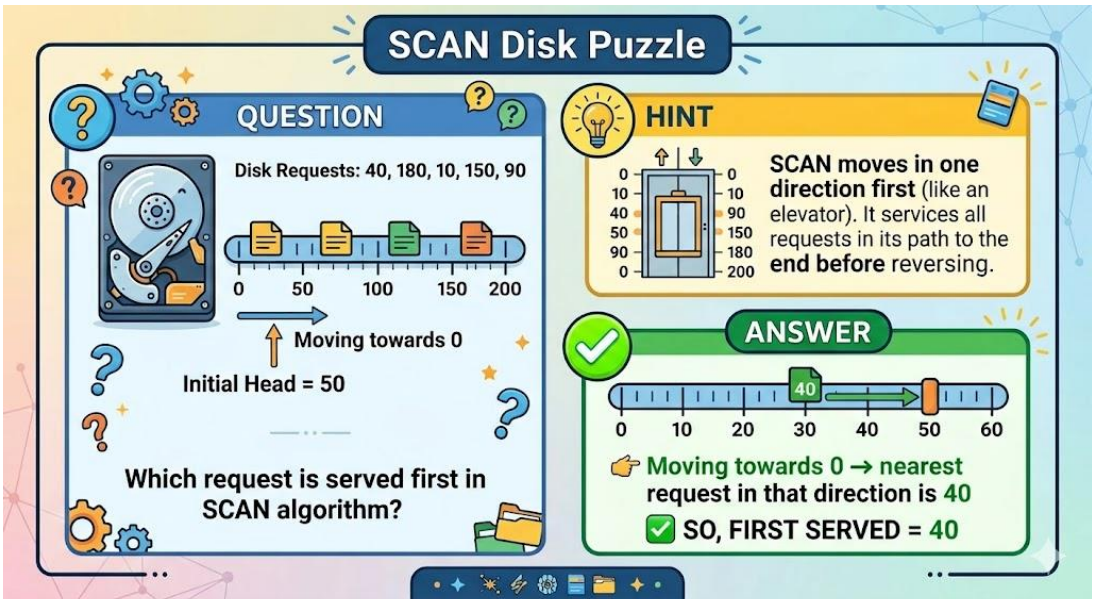
What is the size of the logical address (in bits)?

💡 Hint:
Logical address = Page number bits + Offset bits
Offset = $\log_2$(page size)

☑ Answer:

- Page size = 1KB = 1024 bytes → **10 bits offset**
- Pages = 16 → **4 bits page number**
  ☞ Total = **14 bits**

Puzzle 6



SCAN Disk Puzzle

QUESTION

Disk Requests: 40, 180, 10, 150, 90

Moving towards 0

Initial Head = 50

Which request is served first in SCAN algorithm?

HINT

SCAN moves in one direction first (like an elevator). It services all requests in its path to the **end before** reversing.

ANSWER

☞ Moving towards 0 → nearest request in that direction is 40

✅ SO, FIRST SERVED = 40

Puzzle 7: Thrashing Trouble

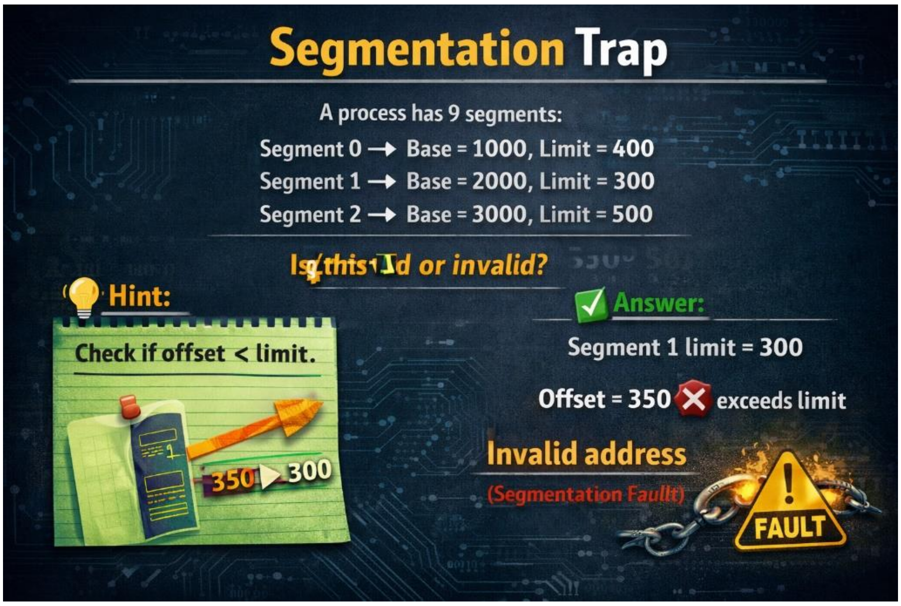
A system is experiencing heavy **thrashing**. CPU utilization is very low, and page faults are very high.

What is the **main reason**?

Hint:
Think about memory allocation vs process demand.

☑ **Answer:**
☞ **Insufficient frames allocated to processes**, causing frequent page faults and excessive swapping.

Puzzle 8:



Segmentation Trap

A process has 9 segments:

Segment 0 → Base = 1000, Limit = 400
Segment 1 → Base = 2000, Limit = 300
Segment 2 → Base = 3000, Limit = 500

Is this [illegible]d or invalid?

Hint:

Check if offset < limit.

✅ Answer:

Segment 1 limit = 300

Offset = 350 ❌ exceeds limit

Invalid address

(Segmentation Fault)

Puzzle 9: Disk Scheduling Mystery

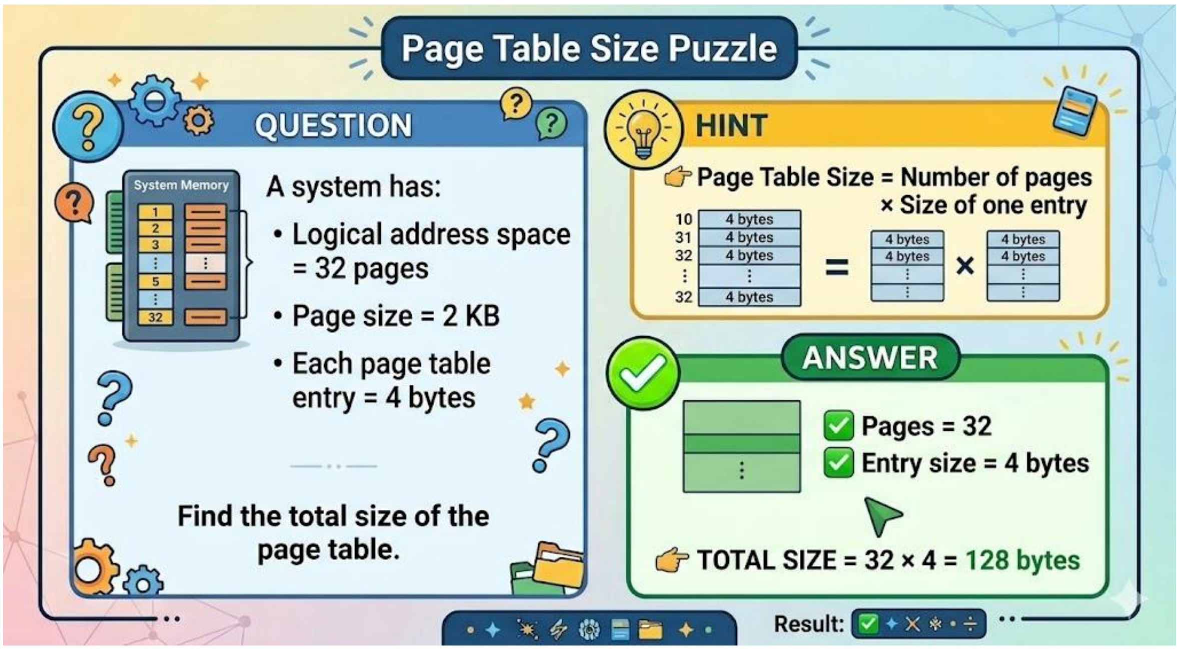
Disk queue requests:
98, 183, 37, 122, 14, 124, 65, 67
Initial head position = **53**

Using **SSTF (Shortest Seek Time First)**, what is the **first request served**?

Hint:
Pick the closest track to current head position.

Answer:
Closest to 53 is **65**
So, **first request served = 65**

PUZZLE 10:



Page Table Size Puzzle

QUESTION

A system has:

- Logical address space = 32 pages
- Page size = 2 KB
- Each page table entry = 4 bytes

Find the total size of the page table.

HINT

Page Table Size = Number of pages × Size of one entry

ANSWER

✓ Pages = 32
✓ Entry size = 4 bytes

TOTAL SIZE = 32 × 4 = 128 bytes

Result: