CS & IT ENGINEERING

Operating System

File System & Device Management

DPP 02 (Discussion Notes)

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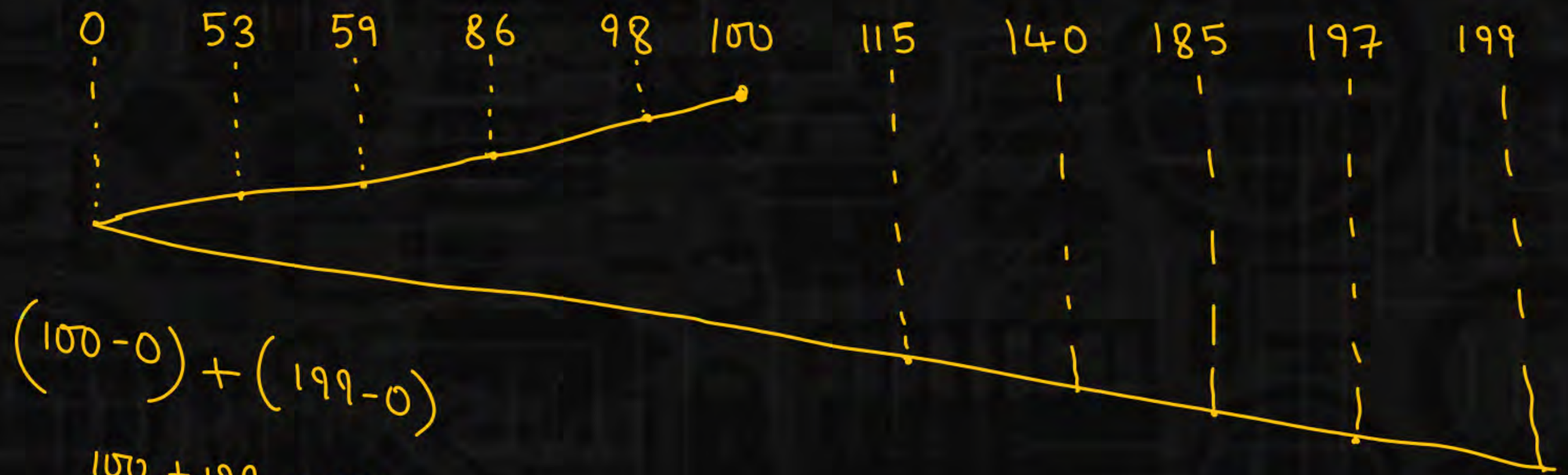
01 Question

02 Discussion

Q.1

Consider a disk queue with request for I/O to block on cylinders 53, 98, 140, 59, 115, 185, 197, 86. The SCAN algorithm is used. The head is initially at 100 moving towards left. The cylinders are numbered from 0 to 199. The total head movement incurred while servicing these request is_____. **[NAT]**



$(100-0)+(199-0)$

$100+199=299$

Q.2

Consider the following statements:

S_1: Loop instructions cannot be interrupted till they complete. False

S_2: Nearest cylinder next disk scheduling strategy gives the best through put in comparison to first come first serve scheduling strategy. True.

S_3: Using large file block size in a fixed block size file system leads poor disk through put. False.

Which of the above statements are incorrect?

[MCQ]

A. Only S_1

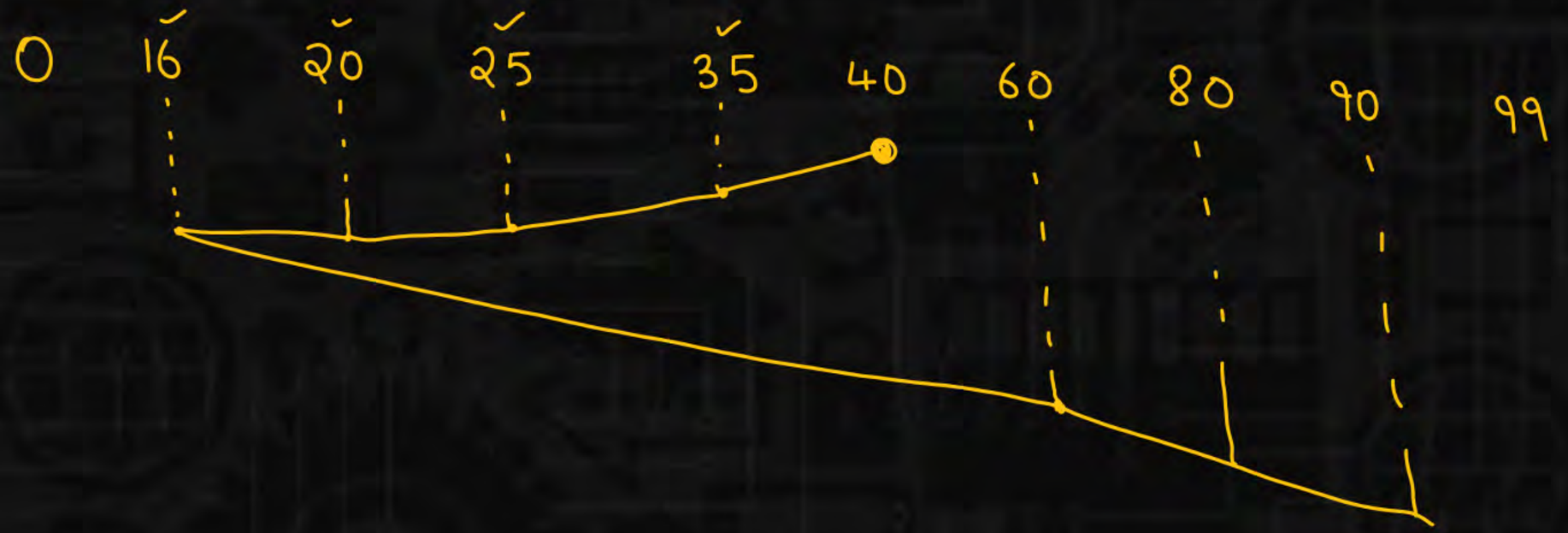
B. S_1, S_2 and S_3

C. Only S_1 and S_3

D. Only S_2.

Q.3

Consider a disk has 100 numbered from 0 to 99. At some time the disk arm is at cylinder 40 and there is a queue of disk access request for cylinder 16, 35, 25, 60, 80, 90 and 20. If Shortest seeks time first (SSTT) is being used for scheduling disk access, the request for cylinder 60 is serviced after servicing the number of request ____4____. **[NAT]**



Q.4

An unix style I-node has 10 direct pointers and two single 5 double and 2 triple Indirect pointers. Disk block size is of 8 KB, disk block address is 32 bits. The maximum possible file size is TB. **[NAT]**

128 TB

$D.B.S = 8KB\ (2^{13}B)$

$D.B.A = \frac{32 bits}{8} = 4 Bytes$

$D.B \Rightarrow \frac{2^{13}}{2^2} = 2^{11}$

$\left[2 * (2^{11})^3\right] * 2^{13}$ Bytes

$\left[2 * 2^{33}\right] * 2^{13}$ Bytes

$\Rightarrow 2^{34} * 2^{13}$ Bytes

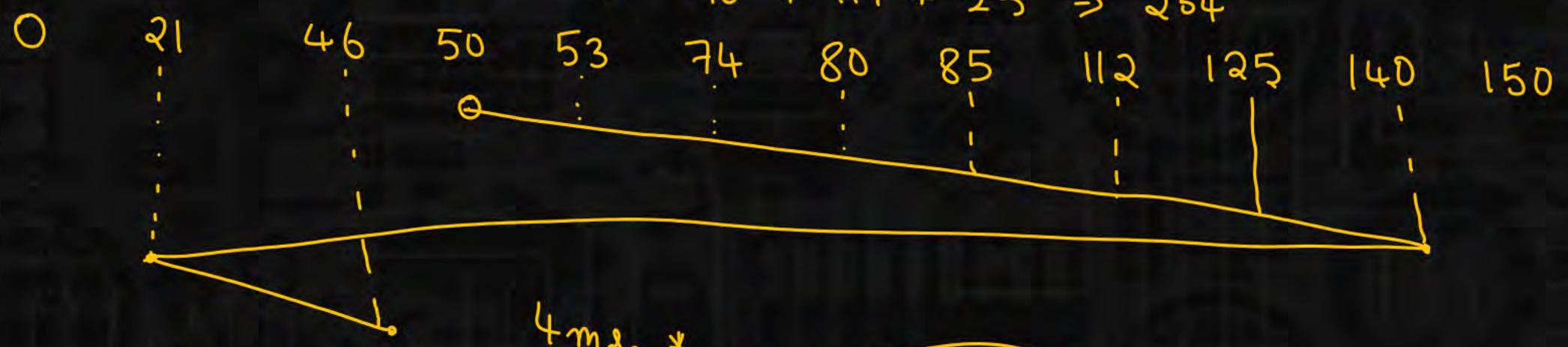
$\Rightarrow 2^{47}$ Bytes $\Rightarrow$ 128 TB

Q.5

Consider a disk queue with request sequence 125, 85, 46, 74, 80, 112, 21, 53, 140, the initial position of head is at 50 and it is moving towards right. The cylinder are number 0 to 150. Calculate the total time required to serve this request. When 4 ms time is needed to move head from one cylinder to another. The C-lock algorithm is used. **[NAT]**

$(140-50) + (140-21) + (46-21)$

$\Rightarrow 90 + 119 + 25 \Rightarrow 234$



$4\ msec * 234 \Rightarrow$ **936 msec**

Q.6

Choose the correct statement ~~form~~ from following : [MSQ]

A. A record is a collection of related fields that can be treated as a unit by some application program.

B. A file is a collection of similar records.

C. A database is a collection of non-related data.

D. A field is the basic element of data

A, B, D

Q.7

Each Inode in a file system has 6 direct pointers to disk blocks, 4 single-indirect pointers to disk blocks, 3 double-indirect pointers to disk blocks and nothing else. A disk block is 500 bytes, and a pointer to disk block is of 10 bytes. The entire disk consists 17,000,000 bytes at most. Calculate the maximum size [in byte] of a file in this file system. [MCQ]

A. 3850000 ✗

B. 3853400 ✗

C. 3853200 ✗

D. 3853000

D.B.S = 500 Bytes

D.B = 10 Bytes

$\frac{500}{10}$ = 50 pointers

$[6 + 4*(50)^1 + 3*(50)^2]$

6 + 200 + 7500

7706 * 500 ⇒ 3853000 Bytes

Q.8

In a UNIX OS, each data block is of 512 bits, each node has 5 direct data block addresses and three additional addresses. One for single indirect block, one is for double indirect block and one is for triple indirect block. Each block is addressed with 128-bit. Calculate the total size of a file possible in the file system (in k-bits). **[MCQ]**

A. 81.91 to 81.92

B. 82.91 to 82.92

C. 80.91 to 80.92

D. None of these

$$\left[5 + 1(\text{Single}) + (\text{Double}) + (\text{Triple})\right] * D.B.S$$

$$\frac{D.B.S}{D.B.A} \Rightarrow \frac{2^9}{2^7} \Rightarrow 2^2 = 4$$

$$\left[5 + (4)^1 + (4)^2 + (4)^3\right] * 512 \text{ bits}$$

$$\left[5 + 4 + 16 + 64\right] * 512 \text{ bits}$$

$$89 * 512 \text{ bits} \Rightarrow 45568 \text{ bits} \times \frac{10^3}{10^3}$$

$$45.568 \text{ K bits}$$


THANK YOU GW
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