CS & IT ENGINEERING

Operating System

File System

DPP_01 Discussion Notes

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[NAT]

#Q. A particular disk unit uses a bit string to record the occupancy or vacancy of its disk blocks with '0' denoting occupied block and '1' denoting vacant block. A 32-bit part of this string has Hexadecimal value of AC0121DE. The percentage of occupied blocks on the disk for this part is ___ % (rounded to 1 decimal place)?

A	C	0	1	2	1	D	E
1010	1100	0000	0001	0010	0001	1101	1110

$\frac{19}{32} * 100 \Rightarrow 0.59375 * 100 \Rightarrow 59.375\% \cong 59.4\%$

[NAT]

#Q. A system directory is kept in 2 disk blocks each of size 4Kbytes. It is a single level-directory and each directory entry is of size 64-bits. The maximum number of files possible in this system is __1__ k?

Total space that is available to store directory = 2 * 4KB

= 8KB

One directory entry size = 64bits ⇒ 8Bytes.

No. of files possible in this system ⇒ $\frac{8KB}{8B}$ = 1K.

[NAT]

#Q. The index node (inode) of a unix-like file system has 10 direct, one single-indirect, one double-indirect and one triple-indirect pointer. The disk block size is 2KB and disk block addresses 64-bits. The maximum possible file size (rounded off to nearest integer) is _____ GB?

One disk address size => 64bits => 8Bytes.

# of disk addresses can be stored / block = $\frac{2KB}{8B} = 256$ (2^8)

$$(2^8)^3 * 2KB = 2^{24} * 2KB$$

$$= 2^{35} B$$

$$\Rightarrow 2^5 * 2^{30} B$$

$$\Rightarrow 32 GB.$$

[MSQ]

#Q. Consider a file which is stored on disk with either contiguous file allocation method or linked file allocation method or indexed file allocation method. The file is stored on 100 blocks. Which of the following will take minimum number of disk block accesses of the file for insertion of a new block?

A. Insertion of a new block at starting if file is stored using contiguous file allocation method.

B. Insertion of a new block after 50th block of file if file is stored using linked file allocation method.

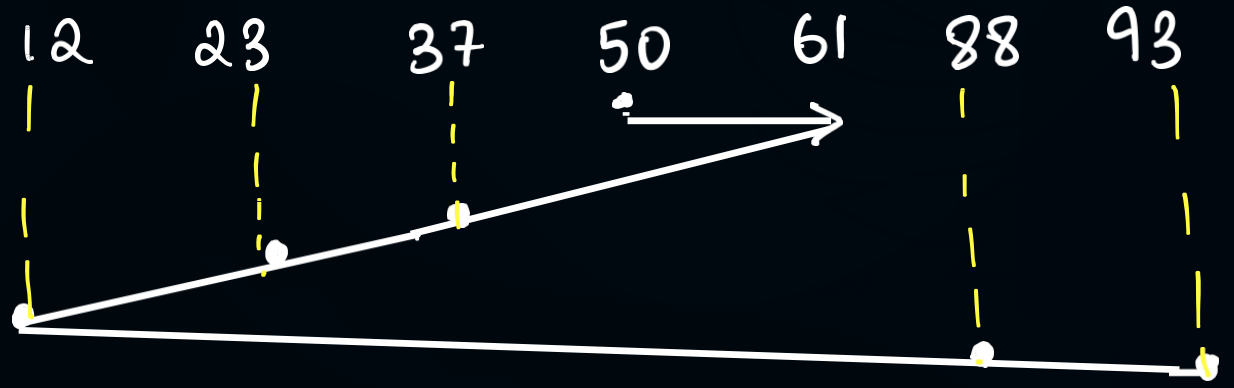
C. Insertion of a new block in the end if file is stored using indexed file allocation method.

D. Insertion of a new block in the end if file is stored using contiguous file allocation method.

C, D

[NAT]

#Q. Consider a disk with 6 platters each with 2 recording surfaces and 100 cylinders (numbered as 0, 1, 2 ...., 99). The following 6 disk requests (for cylinder number) are received by disk controller at the same time:
61, 88, 23, 37, 12, 93
Currently the head is positioned at cylinder number 50 and is moving towards higher cylinder numbers. The average seek time in moving head over 3 cylinder is 2 milliseconds and for reversing the direction of the head once is 5 millisecond. The total seek time to satisfy all the above requests using the Shortest seek time first disk scheduling algorithm is _____?



Total cylinder movement = (61-50)+(61-12)+(93-12)

$\Rightarrow 141 * \frac{2}{3} + 2 * 5 \Rightarrow 104$ ms.

[NAT]

#Q. Consider a disk with 60 cylinders (numbered 0, 1, 2 ....59). Disk requests are made for a disk drive for cylinders 5, 25, 18, 3, 39, 8 and 35 in that order. Assume that the arm is currently at cylinder 20 and moving towards higher cylinder numbers. The above all requests are serviced using scan algorithm. The number of head movements are 95 ? .

Total head movements $\Rightarrow$ 59-20+ 59-3

$\Rightarrow$ 39 + 56

$\Rightarrow$ 95. .

THANK - YOU