Indexing and Disk Scheduling

Q.1 A file of size 18,300 bytes is stored using an indexed allocation scheme. If each disk block is 1 KB and the index block itself consumes 1 block, find the total number of blocks allocated on disk (data + index).

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Q.2 **An inode contains 12 direct pointers, 1 single indirect pointer, and 1 double indirect pointer. Block size = 1 KB, and block addresses = 4 bytes each.**

Find the maximum file size supported.

Indexing and Disk Scheduling

Suppose the order of request is : 72, 160, 33, 130, 14, 6, 180.

Disk has 200 cylinders ranges from (0….199). The read/write arm is at 50. Find Number of head movements if

A)   FCFS is used.
B)   Shortest Seek Time First is used.
C)   SCAN is used
D)   Circular-SCAN is used
E)   LOOK is used
F)   C-LOOK is used assuming "arm is moving towards larger value"

Indexing and Disk Scheduling

Consider the following five disk access requests of the form (request id, cylinder number) that are present in the disk scheduler queue at a given time:

(P, 155), (Q, 85), (R, 110), (S, 30), (T, 115)

Assume the disk head is currently positioned at cylinder 100.
 The scheduler uses **Shortest Seek Time First (SSTF)** to service the requests.

Which one of the following statements is FALSE?

A. T is serviced before P.
 B. Q is serviced after S, but before T.
 C. The head reverses its direction of movement between servicing of Q and P.
 D. R is serviced before P.

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Disk requests come to a disk driver for cylinders in the order
10, 22, 20, 2, 40, 6, 38 at a time when the disk drive is reading from cylinder **20**.
The seek time is **6 ms per cylinder**.

The total seek time, if the disk arm scheduling algorithm is **First-Come-First-Served (FCFS)**, is

Indexing and Disk Scheduling

Consider a disk system with 100 cylinders. The requests to access cylinders occur in the following sequence:

4, 37, 10, 7, 19, 73, 2, 15, 6, 20

Assuming the head is currently at cylinder **50**, what is the time taken to satisfy all requests if it takes **1 ms** to move from one cylinder to the adjacent one and the **Shortest Seek Time First (SSTF)** algorithm is used?

A. 95 ms
 B. 119 ms
 C. 233 ms
 D. 276 ms

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Consider a storage disk with 4 platters (numbered as 0, 1, 2 and 3), 200 cylinders (numbered as 0, 1, ... , 199), and 256 sectors per track (numbered as 0, 1, ... , 255). The following 6 disk requests of the form [sector number, cylinder number, platter number] are received by the disk controller at the same time:

[120, 72, 2] , [180, 134, 1] , [60, 20, 0] , [212, 86, 3] , [56, 116, 2] , [118, 16, 1]

Currently the head is positioned at sector number 100 of cylinder 80, and is moving towards higher cylinder numbers. The average power dissipation in moving the head over 100 cylinders is 20 milliwatts and for reversing the direction of the head movement once is 15 milliwatts. Power dissipation associated with rotational latency and switching of head between different platters is negligible.

The total power consumption in milliwatts to satisfy all of the above disk requests using the Shortest Seek Time First disk scheduling algorithm is _____.