

Operating Systems Homework #4

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11.2 Contiguous:

- Sequential: Works very well as the file is stored contiguously. Sequential access will simply involve traversing the contiguous disk blocks.
- Random: Work very well as you can easily determine the adjacent disk block containing the position you wish to seek to.

Linked:

- Sequential: Satisfies as you are simply following the links from one block to the next.
- Random: It may require following the links to several disk blocks until you arrive at the intended seek point.

Indexed:

- Sequential: Works well as sequential access simply involves sequentially accessing each index.
- Random: Easy to determine the index associated with the disk block containing the position you are seeking.

$$11.8 \quad 12 \times 8 \text{ KB} + 2048 \times 8 \text{ KB} + 2048^2 \times 8 \text{ KB} + 2048^3 \times 8 \text{ KB} \\ = 64 \text{ TB}$$

$$12.3 \quad (a) \text{ FCFS} : 2150, 2069, 1212, 2296, 2800, 544, 1618, 356, \\ 1523, 4965, 3681 = 13011$$

$$(b) \text{ SSTF} : 2150, 2069, 2296, 2800, 3681, 4965, 1618, 1523, \\ 1212, 544, 356 = 7586$$

$$(c) \text{ SCAN} : 2150, 2296, 2800, 3681, 4965, 4999, 2069, 1618, \\ 1523, 1212, 544, 356 = 7492$$

$$(d) \text{ C-SCAN} : 2150, 2296, 2800, 3681, 4965, 4999, 0, 356, 544, \\ 1212, 1523, 1618, 2069 = 4919$$

12.10 (a) In RAID 1, a write of one block requires one write to the real disk, and one write to its mirror.

In RAID 5, a write of one block requires the system to read 4 data blocks, calculate the parity block, and then write the new data and parity blocks.

(b) In RAID 1, there is no speedup, since we are reading from a single disk. The mirror disk is treated as a backup disk, it is updated on every write, but only read if the first disk fails.

In RAID 5, any block read requires the system to read all 4 data blocks in the stripe, since the kernel always performs disk IO in logical block sizes.