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Exercise 10.11 (from Silberschatz)

**10.11)**Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving a request at cylinder 2,150, and the previous request was at cylinder 1,805. The queue of pending requests, in FIFO order, is:

2, 069,

1,212,

2,296,

2,800,

544,

1,618,

356,

1,523,

4,965,

3681

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

**First Come, First Serve** :

Start: 2150--81 --2069 ––857 –––1212––1084–– 2296––504–– 2800––2256–– 544––1074––1618 – 1262--356––1167–– 1523––3442–– 4965––1284–– 3681

cylinders: 13011

**Shortest Seeking Time First:**

Start: 2150--81--2, 069--227--2,296--504--2,800--881—3681--1284—4965--3347—1618—95—1523—311—1212 -- 668—544 – 188-- 356

Cylinders: 7586

**SCAN: What direction?**

Start: 2150--81--2069-- 451--1618—95—1523-- 311—1212 -- 668—544 --188—356--356—0—2296 -- 2,296--504--2800 --881—3681--1284—4965

Cylinders 7115

**LOOK:**

Start: 2150--81--2069-- 451--1618—95—1523-- 311—1212 -- 668—544 --188—356-- 1940-- 2,296--504--2800 --881—3681--1284—4965

Cylinder 6403

**C-SCAN:**

Start: 2150– 146 --2,296--504--2800 --881—3681--1284—4965— 34--4999-- 4999–0 --356 --356--188—544 -- 668 -- 1212 -- 311 – 1523 – 95 – 1618 — 451 – 2069

Cylinder 9917

**C-LOOK**

Start: 2150– 146 --2,296--504--2800 --881—3681--1284—4965--4609 --356--188—544 -- 668 -- 1212 -- 311 – 1523 – 95 – 1618 — 451 – 2069

Cylinders: 9137

**Exercise 10.19 (from Silberschatz)**

Compare the performance of write operations achieved by a RAID level 5 organization with that achieved by a RAID level 1 organization.

Write operations in a RAID level 5 system have a lot more overhead because it spreads the data and parity it stored across multiple blocks so it must read old blocks before it can update the content of its target block. The RAID level 1 systems on the the other hand, can simply perform the writes on mirrored data at the same time, with none of the overhead of a RAID level 5 system.

**Exercise 10.20 (from Silberschatz)**

Assume that you have a mixed configuration comprising disks organized as RAID level 1 and RAID level 5 disks. Assume that the system has flexibility in deciding which disk organization to use for storing a particular file. Which files should be stored in the RAID level 1 disks and which in the RAID level 5 disks in order to optimize performance?

Data that is frequently updated should be stored in a RAID Level disk system as it can be written to and update a lot faster, while data that is mostly read should be stored in a RAID level 5 disk as reading stored data does not carry the same overhead that writing does.

**Exercise 12.11 (from Silberschatz)**

What are the advantages of the variant of linked allocation that uses a FAT to chain together the blocks of a file?

The advantage is that pointers stored in the FAT can be used to access specific and individual block of the file rather than having to access the entire disk and having to read through the all the file blocks in a sequential order to find the block one is looking for.

**Exercise 12.12 (from Silberschatz)**

12.12  Consider a system where free space is kept in a free-space list.

1. Suppose that the pointer to the free-space list is lost. Can the system reconstruct the free-space list? Explain your answer.

The system can reconstruct the free-space list but it is necessary to use a garbage collection scheme to determine when the last reference has been deleted and then disk space can be reallocated. Then, a second pass collects everything that is not marked onto a list of free space.

1. Consider a file system similar to the one used by UNIX with indexed allocation. How many disk I/O operations might be required to read the contents of a small local file at /a/b/c? Assume that none of the disk blocks is currently being cached.
2. disk operations are needed:

1. root directory

2.read the disk block containing directory “a”

3.read disk block containing directory b

4.Read the actual file

Suggest a scheme to ensure that the pointer is never lost as a result of memory failure.

Store the pointer on the disk, perhaps in several places.