Assignment 7:

Mass Storage

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COMP 3411 – Operating System

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Question 1

a. FCFS scheduling order
   116 – 22 – 3 – 11 – 75 -185 -100 – 87
   The total movement range is 393

b. SCAN scheduling order (arm is moving up from cylinder 88)
   100 – 116 – 185 - 87 – 75 – 22 – 11 – 3
   The total movement range is 279

c. C-SCAN scheduling order (arm is moving up from cylinder 88)
   100 – 116 – 185 – 3 – 11 – 22 – 75 – 87
   The total movement range is 351

d. Thus, the SCAN scheduling algorithm gave the best result with 279 movement range in this case

Question 2

a. FCFS scheduling order
   116 – 22 – 3 – 11 – 75 - 185 - 100 – 87
   The total movement range is 393

b. SCAN scheduling order (arm is moving down from cylinder 88)
   87 – 75 – 22 – 11 – 3 – 100 – 116 - 185
   The total movement range is 266

c. C-SCAN scheduling order (arm is moving down from cylinder 88)
   87 – 75 – 22 – 11 – 3 - 185 – 116 - 100
   The total movement range is 351

d. Thus, the SCAN scheduling algorithm gave the best result with 266 movement range, in this case

Question 3

a. Since each sector size is 512 bytes and there are 50 sectors in a track. A track size would be 512 * 50 = 25600 bytes
b. The total number of cylinders of the disk is equal to the number of tracks per surface, that is 2000
c. Any valid block size should be a multiple of the sector size and must not exceed the track size, that is 25600 bytes. Some examples of blocks sizes are 512, 1024, 1536, etc.
   Therefore, we can see that:
   - 256 is not a valid block size since it is less than the sector size
   - 2048 = 512 * 4, thus is a valid block size
   - 51200 while is also a multiple of 512, is not valid as it exceeds the track size of 25600

Question 4

Since each of the 4 different zone are all 120-cylinder. The total number of sectors would be

120 * (200 + 240 +280 +320) = 124800 sectors

Since each sector is 4096 bytes. The total disk capacity would be
124800 * 4096 = 511180800 bytes