

1. Suppose that a disk drive has 2000 cylinders, numbered 0 to 1999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position, for each of the disk-scheduling algorithms (FCFS, SSTF, SCAN and C-LOOK), what is the **total distance (in cylinders)** that the disk arm moves to satisfy all the pending requests?

FCFS ①

SSTF ②

SCAN ③

C-Look ④

填空题 (40 分) 30 分 (请按题目中的空缺顺序依次填写答案)

①

②

③

④

回答错误

正确答案:

- ① 7081
② 1745
③ 3769
④ 3363

答案解析:

FCFS: **total distance**= 7081 **sequence**: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

SSTF: **total distance**= 1745 **sequence**: 130, 86, 913, 948, 1022, 1470, 1509, 1750, 1774.

SCAN: **total distance**= 3769 **sequence**: 913, 948, 1022, 1470, 1509, 1750, 1774, 1999, 130, 86.

C-LOOK: **total distance**= 3363 **sequence**: 913, 948, 1022, 1470, 1509, 1750, 1774, 86, 130.

2. Consider that many RAID devices now ship with the following options: RAID 0 - data striped across all disks
RAID 1 - each disk mirrored
RAID 5 - striped parity
Assume a system with 8 disks For each level, how much usable storage does the system receive?(Notice that you should fill the blanks with **only numbers** like 10)

RAID 0 ①

RAID 1 ②

RAID 5 ③

Assume a workload consisting only of small writes, evenly distributed. Calculate the throughput (in request per second) assuming one disk does 100 writes/sec,

RAID 0 ④

RAID 1 ⑤

RAID 5 ⑥

填空题 (30 分) 20 分 (请按题目中的空缺顺序依次填写答案)

①



②

4

③

7

④

800

⑤

100

⑥

25

回答错误

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正确答案:

- ① 8
- ② 4
- ③ 7
- ④ 800
- ⑤ 400
- ⑥ 100

3. In a dynamic memory allocation system, we have a list of available blocks:

Free block No. Block size (KB) Block base address

1 80 60

2 75 150

3 55 250

4 90 350

At one moment, a process requires 50KB memory, and the system start from No.1 block and finally allocated No.4 block to that process. We can learn that the system use _____ allocation algorithm.

单选题 (10 分) 10分

- A. first fit
- B. best fit
- C. worst fit
- D. none of the above

正确答案: C

4. Suppose that we have a disk with the following parameters:

- 1TB in size
- 7200 RPM, Data transfer rate of 40 Mbytes/s (40×10^6 bytes/sec)
- Average seek time of 6ms
- ATA Controller with 2ms controller initiation time
- A block size of 4Kbytes (4096 bytes)

What is the average expected rotation time to read a random block from the disk?

单选题 (10 分) 10分

- A. 8ms
- B. 4ms
- C. 6ms
- D. 2ms

正确答案: B



5. Given the same setting as Question 4, what is the average time to read a random block from the disk?

单选题 (10 分) 10分

A. 10ms

B. 12ms

C. 6ms

D. 8ms

正确答案: B

