磁盘作业

共五道大题

1. 一个磁盘的平均寻道时间是 4ms，旋转速度是 7200 RPM (即每分钟 7200 转)，它的每条磁道有 500 个扇区，每个扇区 512 字节。
   1) 请问它的最大数据传输速率是多少字节/秒？
   2) 读一个扇区的平均时间是多少毫秒（ms）？
   3) 如果它的密度增加一倍，即每条磁道有 1000 个扇区，每个扇区仍然是 512 字节，请问它的最大数据传输速率是多少字节/秒？读一个扇区的平均时间是多少毫秒（ms）？

2. Consider a magnetic disk consisting of 16 heads and 400 cylinders. This disk has four 100-cylinder zones with the cylinders in different zones containing 160, 200, 240. and 280 sectors, respectively. Assume that each sector contains 512 bytes, average seek time between adjacent cylinders is 1 msec, and the disk rotates at 7200 RPM. Calculate the (a) disk capacity, (b) optimal track skew, and (c) maximum data transfer rate.

3. Disk requests come in to the disk driver for cylinders 10, 22, 20, 2, 40, 6, and 38, in that order. A seek takes 6 msec per cylinder. How much seek time is needed for

   (a) First-come, first served.
   (b) Closest cylinder next.
   (c) Elevator algorithm (initially moving upward).

   In all cases, the arm is initially at cylinder 20.

4. A personal computer salesman visiting a university in South-West Amsterdam remarked during his sales pitch that his company had devoted substantial effort to making their version of UNIX very fast. As an example, he noted that their disk driver used the elevator algorithm and also queued multiple requests within a cylinder in sector order. A student, Harry Hacker, was impressed and bought one. He took it home and wrote a program to randomly read 10,000 blocks spread across the disk. To his amazement, the performance that he measured was identical to what would be expected from first-come, first-served. Was the salesman lying?

5. 假设磁盘的平均寻道时间是 6ms，旋转速率是 15,000 RPM （即每分钟 15,000 转），每条磁道 1MB。请计算大小分别为 512B、1KB 和 4KB 的数据块的传输带宽。