Xi XIA
2016213482
2016215117

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?

a. FCFS
b. SSTF
c. SCAN
d. LOOK
e. C-SCAN
f. C-LOOK

a. The FCFS schedule is 2150, 2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681. The total seek distance is 13,011.
b. The SSTF schedule is 2150, 2069, 2296, 2800, 3681, 4965, 1618, 1523, 1212, 544, 356. The total seek distance is 7586.
c. The SCAN schedule is 2150, 2296, 2800, 3681, 4965, 2069, 1618, 1523, 1212, 544, 356. The total seek distance is 7492.
d. The LOOK schedule is 2150, 2296, 2800, 3681, 4965, 2069, 1618, 1523, 1212, 544, 356. The total seek distance is 7424.
e. The C-SCAN schedule is 2150, 2296, 2800, 3681, 4965, 356, 544, 1212, 1523, 1618, 2069. The total seek distance is 9917.
f. The C-LOOK schedule is 2150, 2296, 2800, 3681, 4965, 356, 544, 1212, 1523, 1618, 2069. The total seek distance is 9137.

10.21 The reliability of a hard-disk drive is typically described in terms of a quantity called mean time between failures (MTBF). Although this quantity is called a “time,” the MTBF actually is measured in drive-hours per failure.

a. If a system contains 1,000 disk drives, each of which has a 750,000hour MTBF, which of the following best describes how often a drive failure will occur in that disk farm: once per thousand years, once per century, once per decade, once per year, once per month, once per week, once per day, once per hour, once per minute, or once per second?

a. 750,000 drive-hours per failure divided by 1000 drives gives 750 hours per failure—about 31 days or once per month.

b. Mortality statistics indicate that, on the average, a U.S. resident has about 1 chance in 1,000 of dying between the ages of 20 and 21. Deduce the MTBF hours for 20-year-olds. Convert this figure from hours to years. What does this MTBF tell you about the expected lifetime of a 20-year-old?

b. The human-hours per failure is 8760 (hours in a year) divided by 0.001 failure, giving a value of 8,760,000 "hours" for the MTBF. 8760,000 hours equals 1000 years. This tells us nothing about the expected lifetime of a person of age 20.

Xi XIA
2016213482
2016215117

c. The manufacturer guarantees a 1-million-hour MTBF for a certain model of disk drive. What can you conclude about the number of years for which one of these drives is under warranty?

c. The MTBF tells nothing about the expected lifetime. Hard disk drives are generally designed to have a lifetime of 5 years. If such a drive truly has a million-hour MTBF, it is very unlikely that the drive will fail during its expected lifetime.