

In-Class Problems: Disk I/O

Suppose that a server has a single disk drive and one single-core processor. A total of k processes are running in the system. Each process, if it were running alone in the system, would issue a request to retrieve a 4KB (2^{12} bytes) block of data from the disk after every 5 milliseconds of run time on the CPU.

The disk drive has 1024 (2^{10}) tracks and a total capacity of 128 MB (2^{27} bytes). According to the manufacturer, the drive's average seek time is 5 milliseconds, and the disk spins at 100 rotations per second.

Q1: Suppose that $k = 1$. Estimate the CPU utilization, i.e. the fraction of the time that the CPU is not idle.

Q2: Repeat Q1, assuming that $k = 2$.