Simulation of Mixed Workload Scheduler

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In this project, we have to investigate the performance of mixed workload scheduling algorithms we have discussed in class.

Consider a system with four disks. Let say there is only one video file and data blocks are stored in a round-robin manner across all four disks. Beside one video file, there are also many database files in the system. For simplicity, assume the data access to the database files are uniformly distributed (e.g., each disk has equal probability of being accessed).

First, use the disk parameters and the value of T given in the lecture. Then simulate the real-time workload and the non-real-time workload. For the real-time workload, you need to generate a random cylinder number, random rotational latency (using uniform distribution) and exponential data transfer latency. For the non-real-time request, you also need to generate a random cylinder number, random rotational latency and exponential data transfer latency. Note that the current disk head position and the target cylinder number will determine the seek distance, which you can use to compute the seek time.

Perform simulation study for the following cases:

- Performance of the three mixed workload algorithms under different non-real-time request arrival rates under 1 mini-cycle.
- Performance of the three mixed workload algorithms under different non-real-time request arrival rates all possible mini-cycles.
- Propose your own mixed-workload scheduling algorithm. Clearly specify your algorithm and compare the performance with the other three algorithms.