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Department of Computer Science
CS 471 - Operating Systems
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Assignment on Performance Evaluation of Multiprogrammed OSs

Consider that a multiprogrammed operating is used to support a database server. The system has one CPU and two disks. Each database transaction uses 110 msec of CPU time, accesses disk 1 ten times on average and disk 2 eight times on average. Both disks are identical. Their physical characteristics are: 8 msec of average seek time, 7,200 RPM, and 100 MBytes/sec transfer rate. The service time S for a disk can be computed as

S = avg. seek + latency (i.e., ½ revolution) + (record_size / transfer_rate)

The record size is equal to 4Kbytes on access to disk 1 and 8KBytes on accesses to disk 2. Plot graphs of the average response time and the average throughput as a function of the degree of multiprogramming. Show the throughput and response times in a table. What is the bottleneck? How would these graphs change if you changed the system configuration so that the bottleneck device is replaced by one twice as fast?