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CS 423
MP3 Analysis
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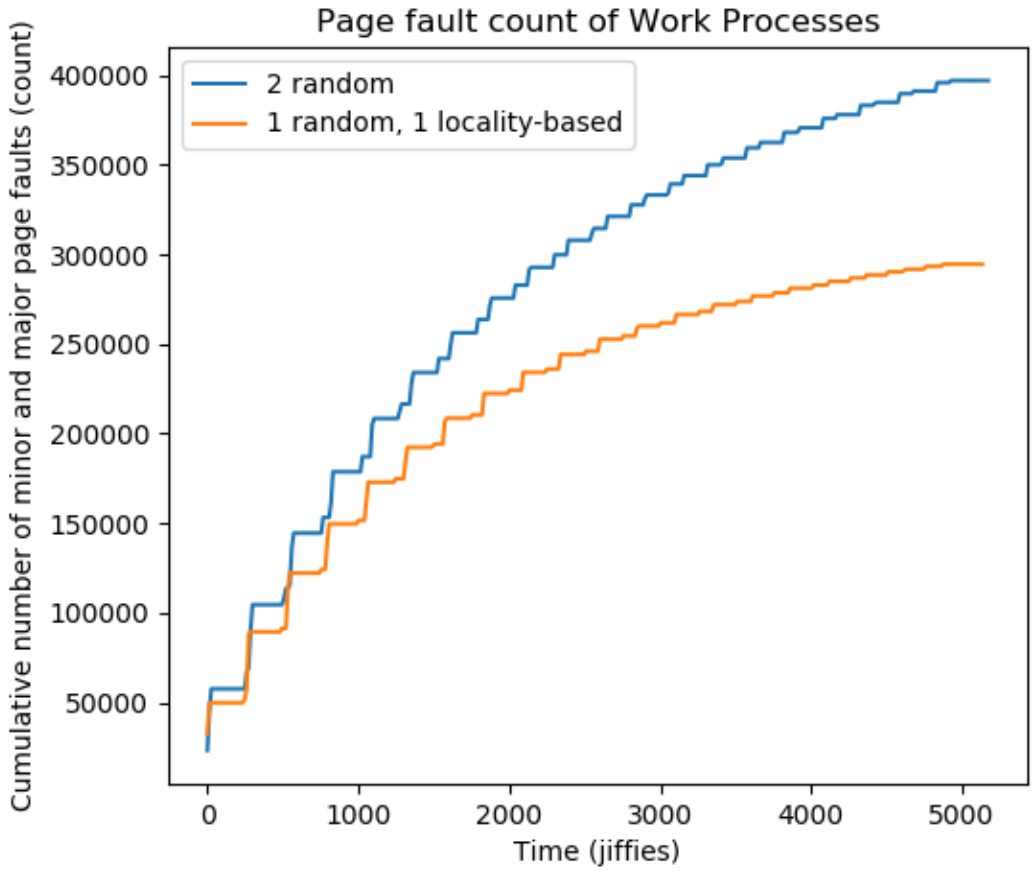
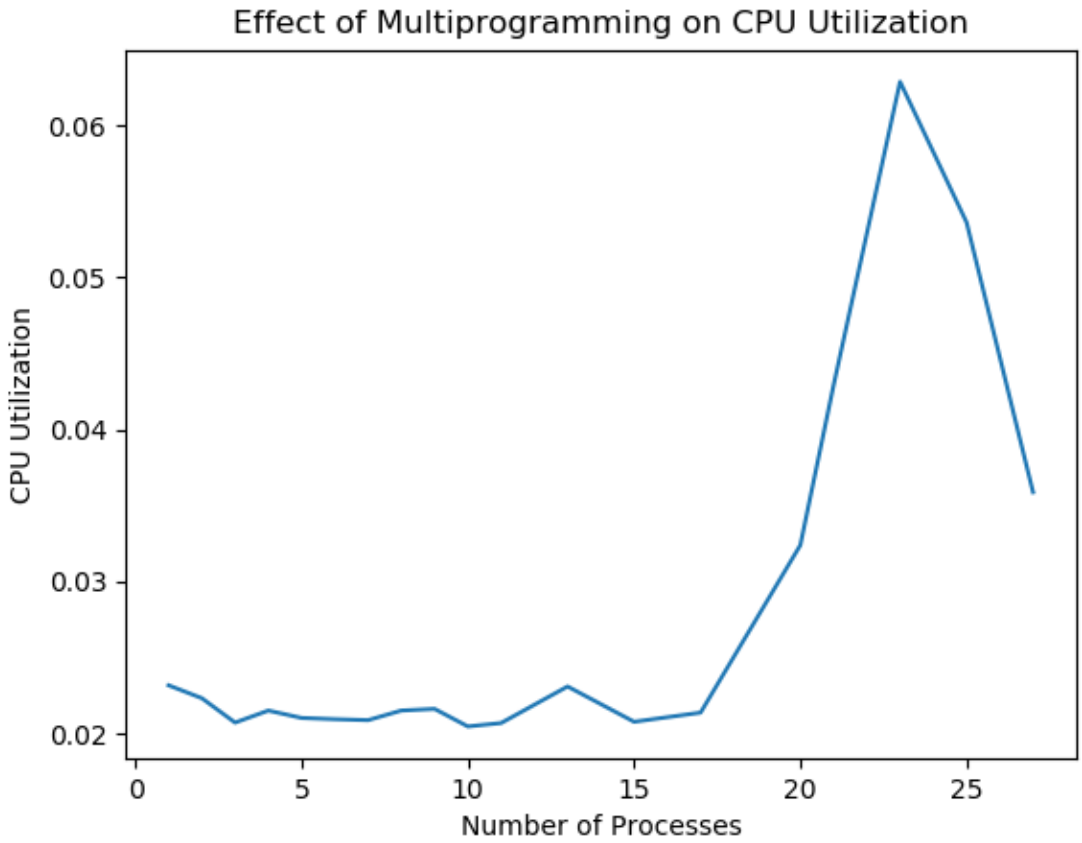
Thrashing and Locality



Depicted here is the cumulative number of (major and minor) page faults over the first 5000 jiffies of two workloads. The blue line corresponds to the workload where two tasks are utilizes memory in random access. The orange line corresponds to the workload where one task is assigned memory in random access and the other uses memory to keep frequently used sections available. This consideration for locality dramatically reduces the number of page faults during the execution of the process. Additionally, the latter had a shorter run time by about 100 milliseconds.

Degree of Multiprogramming and CPU Utilization



Here, the effect of additional tasks on CPU utilization is visualized. The CPU utilization is calculated as the accumulated CPU time (recorded using the module I implemented) divided by the total number of jiffies summed over all N tasks. As you can see, the CPU utilization grows until it hits a threshold memory use, at which point, the system begins to thrash and CPU utilization is hindered. Until about N=21 tasks, the workload took about 20 seconds. At N=27, the workload took 1 minute and 25 seconds. This slowdown cannot be attributed to additional tasks and thus indicates the thrashing behavior.