

**ECU178 Computer Science:
207SE - Operating Systems, Security and Networks
Coursework**

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Week 12: Multitasking vs Multiprogramming

In this task I am going to be comparing two different types of process scheduling: Multitasking, and Multiprogramming. I will look into what they are, their differences and their similarities.

Multiprogramming

Definition: A way of scheduling processes to maximise CPU usage by switching processes that are 'waiting' for I/O, it ensures that the CPU is never idle.

Much older systems, unlike modern computers were very expensive and slow and often, when a process needed to use a peripheral device It often meant that the CPU was sitting idle for a long period of time. The solution to this is 'batch processing'.

Multiprogramming allows a computer to do several tasks at the same time. When a group of processes are marked 'Ready' for execution they are placed in a queue in main memory. The first process from this queue is then loaded into the CPU and is executed. There may come a time when this process is interrupted because It needs I/O to continue. At this point the process changed to a 'waiting' state. The process is then swapped out of the CPU into the I/O queue, and the next process in the 'Ready Queue' is swapped into the CPU. When the I/O request of the first process is completed, it is then placed back into the 'Ready queue'. This cycle continues until there are no jobs to be processed.

Multitasking

Definition: A logical extension of Multiprogramming, it involves rapidly switching between processes in the 'Ready state' to give the impression that they are all running simultaneously.

In Multiprogramming, processes are executing one at a time, in the order that they are placed into the ready queue. This means that only one process can be actively used at a time. Similarly in multitasking, processes are executed individually, but there is also a certain level of concurrency; Because once a process has used its allotted processing time, It is swapped back into main memory.

This is beneficial, because with multiprogramming, a process has complete control over the CPU until an interrupt is called. There may be a situation where a process does not call an interrupt and takes a long time to finish processing, which would be put off until