Homework 4: Multitasking

Due date: noon of Thursday Mar 10, 2022

**[Question 1]** What is the difference between concurrent and parallel processing?

Concurrent processing means the program is making progress on one or more task seemingly at the same time but in reality, it is context switching between the different processes and working on them piece by piece separately. Parallel processing is when a computer has more than one CPU or CPU core, and makes progress on more than one task simultaneously. Threads executed on the same CPU are executed concurrently, whereas threads executed on

different CPUs are executed in parallel.

**[Question 2]** What is the difference between multiprocessing and multithreading?

To start multithreading uses light weight threads that share the same memory while multiprocessing uses independent processes that do not share the same memory space and in general is much “heavier” in weight than setting up threads for multithreading. In python multiprocessing is good for parallelism where the tasks are CPU bound (very CPU intensive) and multithreading is good for concurrency especially when tasks are I/O bound (waiting for user input.)

**[Question 3]** What is the difference between Multiprocessing Pipes and Queues in Python?

Queues are synchronized (run one after the other making sure one process finishes before the next runs) while Pipes are not synchronized, therefore they are faster, yet more prone to error. Also at most one process can access the pipe at a time. Though only one process can access a pipe at a time so that means pipes can only have 2 processes while a queue can have many processes.

**[Submission]**

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