Queen's School of Computing
CISC324 – Fall 2024
Instructor: Dr. Anwar Hossain
Lab 2 - Due Date: Oct. 12, 2024

Lab 2: Inter-process Communication (IPC) and Scheduling Algorithms

Part 1: Inter-process Communication (IPC)

Description:

We want you to demonstrate IPC through message queue. A boilerplate code messageQueue.py is given that demonstrates a simple communication between a parent and a child process. Your job is the following:

1. Do minor change as per the #NOTE in the given code, execute the code and copy program output to a file named lab2<last 4-digit student ID>.pdf.
2. Modify the given code to enable sending multiple messages by multiple child processes (number of child processes and messages per child) to communicate with the parent process using the same message queue. Save the changes in a new file named messageQueueV2.py. Execute this code and copy the output to the pdf file as above.

Part 2: Scheduling Algorithms

Description:

Here you will investigate Round Robin algorithm with varying time quantum. A sample implementation of RR scheduling algorithm RoundRobin.py is given, which assumes a fixed time quantum. Your job is the following:

1. Change the code to repeatedly execute the code with different time quantum value to be obtained from user input. To repeat execution, ask the user whether to continue or not ("Y" to repeat, exit otherwise). Changes required are marked by #NOTE within the code.
2. Change the code further to store the execution order of the processes in the order[ ] array. Print the execution order and number of context switch. Changes required are marked by #NOTE within the code. Save the code changes in a new file named RoundRobinV2.py. Execute this code and copy the output to the pdf file as above.

Prepare your environment!

The boilerplate code, provided to you, can work on any environment (Linux, Windows, MacOS, etc.) so please feel free to search for how to install Python on your machine.

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IDEs that you can use (feel free to use any other IDE)

1. Visual Studio Community Edition for Windows-based machines only (it's something different from VS Code).
2. Visual Studio Code (Can work on any operating system).
3. PyCharm (Can work on any operating system).

Install Python on Your Machine

There are too many methods to install Python (feel free to use any other method):

1. Download and install Anaconda (which works on any operating system).
2. Download and install Python from the official website (works on any operating system).

Download the Boilerplate Code

There are two methods to download the boilerplate code:

1. Download the whole repository of the course and open the folder named "**Lab2**".
2. If you are familiar with Git and Git commands, you can clone the repository or you can update your local repository if you already have it cloned previously.

What to submit?

1. Place all your updated source codes and the readme.txt file in a folder named in the following format:

   324-1234-Lab2, where 1234 stands for the last 4 digits of your student ID, e.g.: For student with ID 20196072, the folder should be named **324-6072-Lab2**.

2. Place a file **lab2<last 4-digit student id>.pdf** into the same folder above.

3. Compress the above folder using Zip (the extension must be .zip or .rar).

4. Log into OnQ, locate the lab's folder, and upload the compressed folder