Assignment 1

Deadline: Tuesday 01/10/2024 @ 23:59

**[Total Mark for this Assignment is 8]**

***Operating Systems***

***IT241***

**Instructions:**

* You must submit two separate copies **(one Word file and one PDF file)** using the Assignment Template on Blackboard via the allocated folder. These files **must not be in compressed format**.
* It is your responsibility to check and make sure that you have uploaded both the correct files.
* Zero mark will be given if you try to bypass the SafeAssign (e.g. misspell words, remove spaces between words, hide characters, use different character sets, convert text into image or languages other than English or any kind of manipulation).
* Email submission will not be accepted.
* You are advised to make your work clear and well-presented. This includes filling your information on the cover page.
* You must use this template, failing which will result in zero mark.
* You MUST show all your work, and text must not be converted into an image, unless specified otherwise by the question.
* Late submission will result in ZERO mark.
* The work should be your own, copying from students or other resources will result in ZERO mark.
* Use **Times New Roman** font for all your answers.

Student Details:

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| **Name:** ###  **CRN:** ### |  | **ID:** ### |
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# Question One

***1 Marks***

*Learning Outcome (1):*

Describe the OS mechanism for process management, threads, memory, storage management, I/O, file and concurrency management.

Provide two programming examples in which multithreading provides better performance than a single-threaded solution.

Provide two programming examples in which multithreading provides

4.1 Provide two programming examples in which multithreading provideProvide two programming examples in which multithreading providesbetter performance than a single-threaded solution.

# Question Two

***3 Marks***

*Learning Outcome (4):*

Predict the expected impact of the interaction between design decisions and operating system features on the performance and robustness of the programs.

|  |  |  |  |
| --- | --- | --- | --- |
| Process | burst Time | Priority | Arrival |
| P1 | 20 | 40 | 0 |
| P2 | 25 | 30 | 25 |
| P3 | 25 | 30 | 30 |
| P4 | 15 | 35 | 60 |
| P5 | 10 | 5 | 100 |
| P6 | 10 | 10 | 105 |

Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

In addition to the processes listed above, the system also can enter an idle state (which there is no consumption for CPU resources. This idle state identified as p\_idle). This state should be appearing in drawing Gantt Chart whenever the system has no other available processes to run.

Each process is assigned a numerical priority, with a **higher number indicating a higher relative priority.**

For *each* of the scheduling algorithms:

1. **FCFS**
2. **Preemptive, Round robin scheduling algorithm:** The length of a time quantum is 10 units. If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.
3. Draw a Gantt chart to show how these processes would be scheduled.
4. Give the turnaround time (total time from first arrival into ready state until cpu-burst is completed) of each process.
5. Give the waiting time (total time spent in the Ready state) of *each* process.
6. Give the average waiting time of all the processes.

# Question Three

***2 Marks***

*Learning Outcome(s):*

Describe the OS mechanism for process management, threads, memory, storage management, I/O, file and concurrency management.

Let’s consider that a system is in an unsafe state. Illustrate with the help of an example that the processes still can possibly complete their execution without entering a deadlocked state.

# Question Four

***2 Marks***

*Learning Outcome(s):*

Describe the OS mechanism for process management, threads, memory, storage management, I/O, file and concurrency management.

Each process is represented in the operating system by a process control block (PCB). What pieces of information does it contain? Why is it important?