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**CST232 – Operating Systems**

**TUTORIAL 1**

Answer all four (4) questions.

**Chapter 1**

1. Can a computer run on more than one operating system (OS) at same time? Explain your answer.

Yes, it is possible to run two operating systems on a computer at the same time. There are two methods to operate. Virtual machines. There are softwares or programs that allows running one operating system on parent device, while others running within virtual machines. For example, Parallels or VirtualBox. Each operating system operates in its own isolated virtual environment and it is easy to switch to another OS without restarting the device. Dual booting where installation of multiple OS takes place on different partitions on hard disk or on different hard disk.

1. Show how each of the following operating system can be used, using common or real life examples.
   1. Batch OS – Processes a collection of jobs all at once without requiring user interaction.

Payroll Processing System collects employee’s data, such as hour worked, overtime or deduction and a batch OS processes it at once, at a scheduled time. It handles all the calculations of the payment needed and generates pay slips automatically at one go. (bulk payment processing)

Banking Transaction System often used by the banks use batch OS to handle end of day transactions such as updating account balances, processing deposits and generating reports. These tasks are processed in batch at off peak times.

* 1. Interactive OS – Allow user to interact with the system, with immediate responses. It allows multiple jobs and multi-tasking.

Windows OS, MacOS, Linus, Android, IOS, PlayStation and Xbox are the examples of interactive OS. They allow users to interact with the system via a graphical user interface, such as the start menu, task bar, app icons and navigation gestures. They also allow tasks like file management, software or apps installation and internet browsing.

* 1. Real time OS – Process data and give outputs within a strict time constraint.

Air traffic control system process large volumes of data from aircraft and ground sensors in real time to manage flight paths, prevent collisions, determine weather conditions, communication between ground and aircraft as well as to ensure safe travels.

Automotive Control System in modern vehicles such as the anti-lock braking system (ABS) and air bag deployment is critical in real time, where rapid response time is required for safety.

1. Explain why multiprogramming was introduced in the 1960s and how it was implemented?

CPU was very fast in the 1960s, but the I/O devices were very slow in speed. Hence, this causes the CPU to become free or idle most of the time when the program carries out the services of the I/O devices. Therefore, multiprogramming was introduced where many programs can be loaded at the same time and enables the CPU to multitask.

Active multiprogramming, where each program is allowed to use only certain slice of CPU. When one program is actively using the CPU, the computer processes the tasks until it hits certain time. When the time expires, the job was interrupted and allows another job to process. The interrupted job has to wait till it is allowed to resume.

Passive multiprogramming uses of the concept of the interrupt, whereby the CPU was notified of

events needing operating system services. For example, when a program issued a print

command, it generated an interrupt requesting the services of the I/O processor and the CPU was released to begin execution of the next job. The OS did not control the interrupt but waited for each job to end an execution sequences.

1. Show the steps performed by the operating system managers as they execute a user instruction to copy a file from one folder to another.

User locate the file that needs to be copied. This can be done through file explorer or command line interface. Right-click the file and select “copy” from the context menu or press CTRL + C or Command C. The process manager allocates the necessary resources like memory and CPU time and handles the scheduling for this process. The file system manager checks the file permissions to ensure the user has read access to the source file and write access to the destination folder. The memory manager allocates memory buffers for reading and writing data. The file that needs to be copied is temporarily stored in these buffers before being written to new location. After reading the data, the I/O manager then transfers it from the buffers to the folder location. Once the copy is completed, the file system manager updates directory entries in the destination. The process manager terminates the copy process. Memory used for the buffers is deallocated, and any file handles or I/O resources are released.

* + - The End -----

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