CSC 120 Lab 03

* (+15) **Install VirtualBox on your system.**

In this exerise you will be installing Virtual Box on your system. (Windows or Mac). After installing VirtualBox you will be using it for installing a linux operating system by creating a Virtual Machine in Virtual Box. (Read online about what a virtual machine is).

**VirtualBox Download link** <https://www.virtualbox.org/wiki/Downloads>

* (+15) **Explain what is a Virtual Machine**.

Why and how is are virtual machines used today?

VM's are used today to test applications in a sandbox environment before deploying them to a "live" application.

How does VirtualBox help you create Virtual Machine?

VirtualBox helps create VM's by run multiple OS's on one machine. This allows the user to not need all types of different hardware to test applications.

What is the Host Operating System. How is it different from a Guest Operating System?

A Host OS is software on the computer that works with the machine's current hardware. It differs from Guest OS because guest Guest OS allow software running on the VM. Which in turn, allows for testing applications as well as running multiple applications that require different hardware.

(**You can refer online** but **do not copy paste text** from blogs. It is very easy to detect and will undo the whole purpose of this assignment. I am not looking for a super technical answer but a general understanding of VM's. Write your own explanation here)

* (+20) **Install Ubuntu 20.04 as a virtual machine using VirtualBox.**

**Step 0:** Open VirtualBox on your machine.

**Step 1:** Download the ISO for Ubuntu 20.04 to install it using Virtual Box.**Ubuntu 20.04 ISO Download Link** [**https://ubuntu.com/download/desktop**](https://ubuntu.com/download/desktop)

**Step 2:** Read more about what an ISO is below. **Note:** You just need to download an ISO for this exercise and not burn or mount one,The links provided give a lot more details about ISO which may not be relevant for this assignment,*]*

**Reading :** [**https://www.lifewire.com/iso-file-2625923**](https://www.lifewire.com/iso-file-2625923)

**Step 3:** Follow the steps provided in the tutorial below to install Ubuntu 20.04 using VirtuallBox.

**Ubuntu installation Video link:** [**https://youtu.be/3qcK\_Bwa0sU**](https://youtu.be/3qcK_Bwa0sU)

**Ubuntu Installation Screenshotslink:** [**https://itsfoss.com/install-linux-in-virtualbox/**](https://itsfoss.com/install-linux-in-virtualbox/)

**Note:** Although the above tutorial is for installating Ubuntu 17.04, the steps are still the same.

* (+10) **Open the terminal and type whoami. Paste the screenshot of the command and the output below.**
* **Conceptual Question**
* (+5) Explain the concept of a process. What is the difference between a process that is ready vs waiting?

A process is when a text file is written and then executed into a program. A process that is ready can continue with the instructions given and process that is waiting has to wait for some events to occur before continuing.

* (+5) What is the distinction between application software and system software. Give an example of each.

System Software is used to manage system resources whereas applicaton software is used for performing a specific set of functions.

System Software : Windows, mac, iOS.

Application Software : Internet browsers, Microsoft Word, Spotify

* (+5) What is the difference between main memory and virtual memory?

Main memory (RAM) is much faster than virtual memory. MM is the physical memory in the computer. Virtual memory is used as hard drive space and temporary storage for computer processes.

* (+5) What are pages in virtual memory? Explain the concept of page size.

Pages are also the smallest unit of data for memory management. Page size affects the amount of memory needed and being used when running programs.

* (+5) Summarize the booting process.

PC is turned on BIOS initializes hardware in the computer > The OS is located and loaded allowing it to boot into the computer's main storage. > bootloader loads system softwares from a hard drive , CD, or USB.

* What is the difference between an IO-bound process vs a compute-bound process?

IO Bound process is limited by the speed of the IO subsystem whereas a compute-bound process is limited by the speed of the CPU.

CPU BOUND : a task performing calculations on a small group of numbers.

IO BOUND : a task that processes data ie: counting number of lines in a file.

* (+5) If both IO bound and compute bound process are waiting for a time slice which (+5) process should be given priority? Why?

IO Bound process is given priority because the computer is able to do its own tasks in between input commands from the user.

* (+5) What problem arises when the lengths of time slices in a multiprogramming system are made smaller and smaller? What hapens when they are made longer and longer?

If the lengths are made smaller and smaller the system would try to complete the next tasks before completely finishing the current task. If they are made longer and longer the computer would be left idle amd take much longer to run than needed.

* (+5) Explain the relationship between **semaphore**, **critical region** and **mutual exclusion.**

Semaphores are used to block access to a resource that can only be used by one process at a time ( Mutual exclusion ) in the critical region.

**Instructions: Upload the file with the screenshot on Blackboard with youyr firstname\_lastname.docx**