Group Members

Member 1: Marqueses, Lorenz Bernard Section:

Member 2: Silva, Paulo Gabriel

Member 3:

3.0 Laboratory Activity 3 – OS Installation

Hello Class, during this Laboratory Activity, we would get to setup and install an operating system on our computers. After completing ***Laboratory Activity 2 – Assemble Your Own PC***, assume that we have built a working desktop computer, but without any additional configurations in the software. From here, we would get the opportunity to install an Operating System, both Linux and Windows, using their respective installers and installation process. However, instead of using our "working desktop computer" from Lab Activity 2, we would instead use a virtualization platform, such as that of CCS Cloud. CCS Cloud is a private cloud computing platform of the College of Computer Studies which is a cloud service that we could access through the Internet. Note that other virtualization platforms such as VMWare Workstation Player, Oracle Virtual Box, Parallels, and such would also work.

For this Laboratory Activity, we would start by getting to know what CCS Cloud is as well as how we can connect to the platform. Note that the Login Credentials are assigned to you and your group, which you would be using to gain authorization to use the platform. To access the cloud platform, here is the link below:

CCS Cloud – https://ccscloud.dlsu.edu.ph/

Upon accessing the CCS Cloud platform using your web browser, you should be presented with a Login screen. Write your assigned login credentials space provided below, then write the same information on the Login screen. Ensure that you are using the correct realm, **Proxmox VE authentication server**, and double check that you have entered the correct credentials before clicking the Login button. The login screen is as shown in the image below:

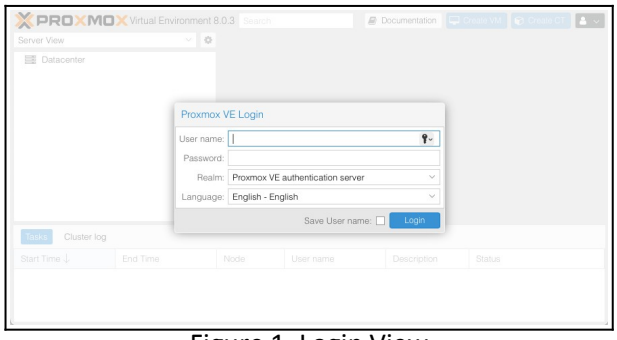

Figure 1. Login View

User name:

ccicomp-s13-03

Password:

hFUY2ZRQD7LPvgK5bny6mHEja3Az8MGw

Realm:

Proxmox VE authentication server

Note that failure to login multiple times would cause the system to implement an IP Ban, which would restrict you from accessing the system for the rest of the day

Because of the Internet-based nature of the CCS Cloud, you and your group members can all use the same credentials to access the cloud platform at the same time. This would allow everyone in the group to perform configurations as well as view the virtual machines simultaneously, thus enables better teamwork and collaboration. Once login is successful, you should be able to view the web dashboard, which allows you to see the different machines that you can use. For this laboratory activity, we would be focusing on just the most important features and steps that you would need to do in the platform, in order to be able to the activity.

After logging in, the web interface shows the Data Center View on your main dashboard. Figures are provided below showing the following information indicated by the same label in the figures:

1. **Server Machine or Host Machine** – ***hanan*** is the name of the server machine where your virtual machine is stored. The other machines below it are other servers that are being used by other students, researchers, and even faculty of the College. Trivia: the names of the servers actually come from traditional Philippine Dieties.
2. **Virtual Machines** – two (2) virtual machines have already been created for your account, they would typically have a virtual machine name or **VM Name** of something like **CCICOMP-SXX-##-Windows** and **CCICOMP-SXX-##-Ubuntu**. The XX corresponds to your section and the ## would be your group number, which is also used on your account. In addition, the 4-digit number that you can see before the **VM Name** is the unique virtual machine ID or **VM ID** that is associated with your machine (i.e. 1000 and 1010 on Figure 2).These machines are already preconfigured, but you can just think of them as the computers that we have physically assembled during the previous activity, allowing us to focus on the installation of the OS.
3. **Tasks/Cluster log Collapse Button** – Below the view, shows the activity that takes place in your machine. Don't mind the information for now, but simply **click the collapse button** in order to minimize that window. This would enable you to have a much larger view when using the cloud platform.

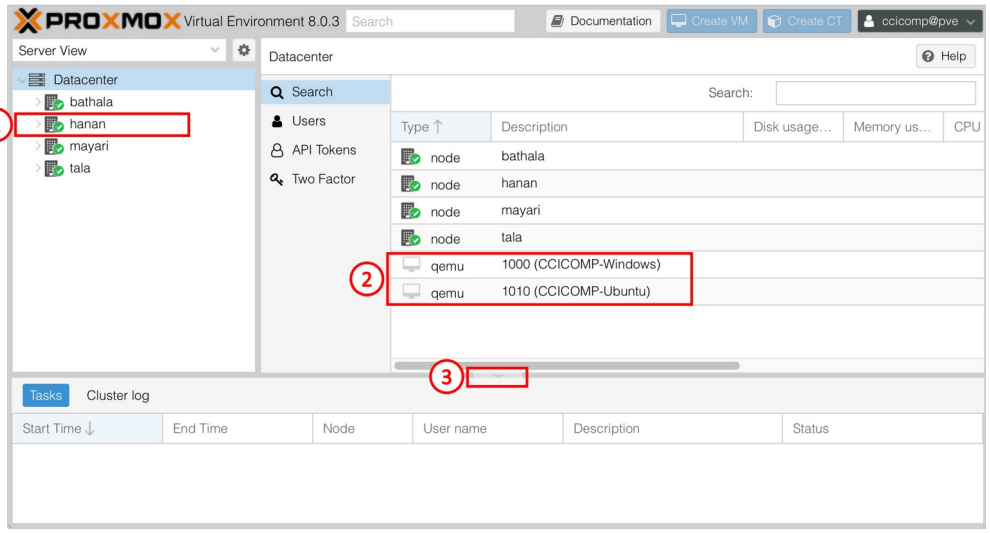

Figure 2. Data Center View after a successful login

Since virtual machines have already been created for our account, located under the ***hanan*** server, **click the arrow beside *hanan*** (1) in order to show your virtual machines inside it. Then select your first virtual machine with the label of Windows; this should have a label similar to something like **CCICOMP-SXX-##-Windows**. We would be using this first virtual machine when we install Windows 10 OS.

After clicking the Windows Virtual Machine, your main dashboard view should change into the Virtual Machine View. In that view, there are different features and functionalities that would be present.

4. **CCICOMP-SXX-##-Windows** – This is the first virtual machine assigned to your account. The Windows 10 Installer is already pre-loaded on the virtual CD/DVD Drive of that machine. The one below it, **CCICOMP-SXX-##-Ubuntu**, is also pre-loaded, but with the Ubuntu Desktop 23.04 Installer. The physical representation of this is as if the OS Installation disc is already inserted in the CD/DVD Drive of your assembled computer. This is also the same as loading the installer on a Flash Drive, creating a bootable installer, and connecting that to the computer.

What are the labels of your virtual machines in the space provided:

Windows Virtual Machine	VM ID:	3003	VM Name:	CCICOMP-S13-03-Windows
Ubuntu Virtual Machine	VM ID:	3013	VM Name:	CCICOMP-S13-03-Ubuntu

5. **Virtual Machine Navigation Tab** – This shows the different views and additional information that you can access and configure for your virtual machine. Feel free to explore the different views, but do not change any settings for now. Later on we would be using the Console, allowing us to view the interface of the computer.
6. **Start** – This allows us to start up the computer. The physical representation of this is as if we are powering on the computer. We would run the machine in a moment, after discussing the other functions in the view.
7. **Shutdown** – This is the power menu, allowing you to Shutdown, Reboot, Hibernate, Pause, Stop, and Reset a computer. Think of this as the physical power button of the computer. Note that it is always best to turn off your computer via the software interface, but when all else fails, you can turn off your computer via the hardware buttons anyway. This is especially useful when your computer hangs or does not respond.
8. **Console View (Top/Popup)** – The Console view can be seen as the monitor or display of your virtual machine. Since we are going to be installing the Desktop version of both Windows and Ubuntu, this would allow you to see the graphical user interface or GUI of the computer. The difference of using this button, as that of the one on the Virtual Machine Navigation Tab (5), is that the GUI would be a separate browser window or tab, thus allowing a larger display, when interacting with the machine.
9. **Virtual Machine Summary** – This simply shows the status and resource utilization of your machine. Notice that the resources are currently at 0% utilization, since the machine is turned off, but this would start changing as the machine is running.

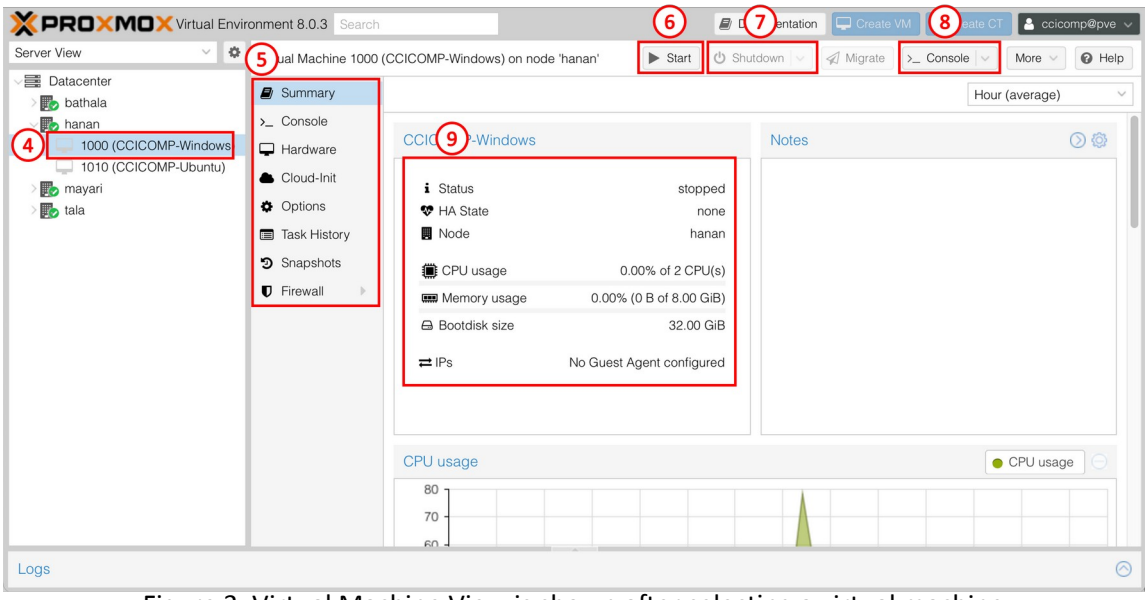

Figure 3. Virtual Machine View is shown after selecting a virtual machine

Next up is to, **click Start** on the Windows virtual machine to boot it up. As the machine is now booting up, you should see that the Status on the Virtual Machine Summary (9) has changed from stopped to running. You should also be able to see that some of the resources are now being used.

You can start interacting with the interface of your computer by selecting the Console button on the Virtual Machine Navigation Tab (5). This should change your view to the Console view. As previously discussed, the Console view allows you to interact with your computer, but since we are using a Desktop, you would have a graphical user interface or GUI to interact with your computer. Remember that the Console view can be seen as the monitor or display of your computer, thus you can image seeing the graphical output of your computer using that view. This also allows you to use your own keyboard and mouse as interfaces to the virtual computer being accessed in the console.

10. **Console View (VM Navigation Tab)** – Similar to the Console View (Top/Popup) (8), this allows you to view the display of your virtual machine, but within the inner view of the interface of the web platform.
11. **Display** – Using either Console View (8,10) shows the display of your virtual machine running. Interact with it by clicking or setting your focus on the display, then use your own mouse or keyboard.

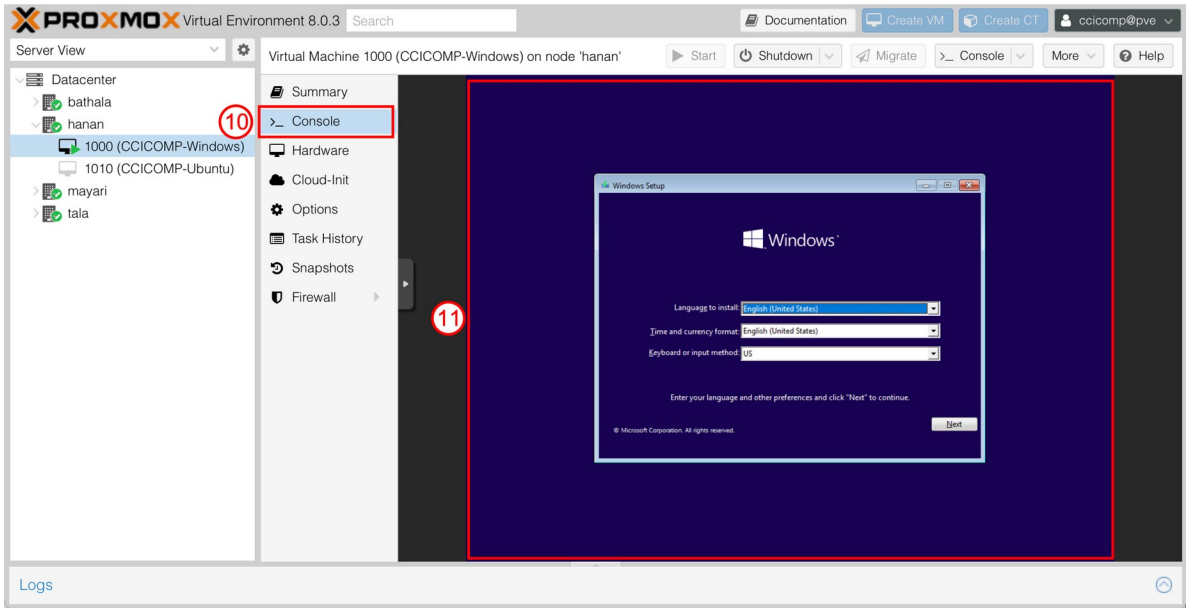

Figure 4. Console View is shown after selecting the Console button of a virtual machine

With that brief discussion of some functionalities that we would be using, booting up your first virtual machine, you should now see the Windows 10 Installer running. From here on, follow the next steps in order to install the OS.

3.1 Windows OS Installation Steps

1. In the language and other preferences setup, choose the following options, then select Next:
   - Language to install: **English (United States)**
   - Time and currency format: **English (United States)**
   - Keyboard or input method: **US**
2. After selecting Next, click the **Install now** button to start the installation wizard.
3. Windows would ask the activation key, however since we are only installing the Windows 10 OS as a test setup in our laboratory activity, we would be skipping this option for now, so select the **I don't have a product key**. However if you would install it on an actual computer you would need to purchase a license, to ensure that you are using an authentic Windows 10 OS.

   Note that you may also register the activation key even after you have installed the OS. This allows you to be able to use the Windows OS even without the activation key.
4. The Windows OS installer may contain multiple versions of the OS. Windows 10 Pro would have more features and customizability than the Windows 10 Home. However for a typical home setup, Windows 10 Home contains the basic features that an average home user would typically need, so select **Windows 10 Home** and then **Next**.

   Note that you should also see the Architecture of x86 or x64, which refers to a 32-bit or 64-bit CPU respectively. To simplify things for now, just imagine that the 32-bit system means that the maximum addressable memory is about 4GiB, which is literally 32-bits or 2^32. So if your computer has 4GiB memory or more, you should use a 64-bit system instead, so that you can use the entire available memory of your computer.
5. After choosing the OS version of your choice, carefully read the Microsoft Software License Terms, then tick the checkbox for **I accept the license terms** and then select **Next**.

   Now we all know that no one reads the license agreement because its too long, however it would be good to at least be familiar with the agreement. Since this is just an activity, you can choose to skip it for now, but at least try to familiarize yourself with the license terms next time alright ;D
6. After agreeing with the license terms, choose the installation type of **Custom: Install Windows only (advanced)**. This option would allow you to install Windows OS on a new computer, while the other option is for upgrading a currently installed Windows OS that is a lower version (ie. Windows 7, Windows 8, etc).

7. When asked where to install Windows, you should be able to see the existing storage devices in the list. Since we are using an existing virtual machine with a 32GiB hard disk, it should be shown as **Drive 0 Unallocated Space** with a total size and free space of 32GiB. Select the disk and choose **New**, then you can opt to use the entire disk space of **32768MiB** or choose to partition the disk into multiple disk partitions, however to simplify the process for now, simply use the entire disk by leaving the default value and select **Apply**.

   A popup would show indicating that additional partitions would be created by Windows to ensure that features would work correctly, which is present on recent versions of Windows. Simply select **OK** to proceed, then you should see that there are now 2 partitions on Drive 0; one is System Reserved, and the other is the Primary partition. Select **Drive 0 Partition 2** which is the **Primary** partition, then select **Next** to proceed with the installation.

8. Wait for the Windows 10 OS installation to complete. Note that this may take a few minutes. After installation, your machine should reboot automatically, and perform final setup of the OS. During the final setup, Windows would be asking you some preferences and settings. Choose **Philippines** as your region as well as the **US** keyboard layout. When asked for a second keyboard layout, simply choose **Skip**. Note that depending on your actual keyboard layout, you may choose a different option here.

9. The setup would then ask you to connect to a network, you can select **I don't have internet** for now. Then choose **Continue with limited setup**. Note that you can always change the settings later.

10. When asked who's going to use this PC, using the following information below:
    1. Name: **student**
    2. Password: **DLSU1234!**
    3. Confirm Password: **DLSU1234!**
    4. Security Question: **<just input anything for now>**

11. Afterwards, you may choose to customize your privacy settings depending on your preferences. It is always advisable to read the descriptions of the settings and customize them so that you are aware of the information that Windows would be collecting from you, enabling you to choose which information to share and which to keep, however for simplicity since we are working in a laboratory environment only, you can just leave everything as the default and choose **Accept**.

12. After choosing your preferences and settings, your computer would reboot for one last time, completing the installation of your Windows 10 OS. Once the computer boots up, it would ask if you already have an existing Microsoft Account, however since we are on a laboratory setup, click **Skip this step** for now. If you are using your own computer, feel free to use your Microsoft Account, so that your account information and other preferences would be loaded.

13. After skipping the Microsoft Account login, since we did not use an existing Microsoft Account, let's create a new account using the following information:
    - Username: **student**
    - Password: **DLSU1234!**
    - Password Hint: **DLSU Password**

14. You have finally completed the installation and setup of your Windows 10 machine. A few introductory messages would be shown on your screen as the final setup is being performed. Wait for a few minutes for the machine to be ready for use, then once you see the Windows 10 Desktop screen, your OS installation has been a success!

    Note that if a popup is shown regarding the network discoverability, for now select **No**, this would simply block the network discovery on your computer, however if you are using your computer at home or on a secured network, you can choose to select Yes.

Answer the following questions below:

i. Record the hardware specifications of your virtual machine

How many processors do you have?	2
How much memory (RAM) do you have?	8.00 GiB
What is the size of your hard disk drive?	32 GB
Do you have a CD/DVD drive? What is inside?	Yes / Windows 10 21H2 English x64
What is the MAC address of your network card?	92-08-F1-FC-32-16

Note that you can use the Virtual Machine Navigation Tab (5) to check for the hardware information, but try to investigate your Windows 10 OS first and look for applications or commands that would allow you to view these information. You can use your browser to search on how you can see those information on your computer.

ii. Click the Start button and run the **System Information** program. Record the values for the following items:

Host Name	DESKTOP-OHSNGD2
OS Name	Microsoft Windows 10 Home
OS Version	10.0.19044 Build 19044
OS Manufacturer	Microsoft Corporation
Original Install Date	11/16/2023
System Boot Time	11/27/2023, 6:33:30 AM
System Manufacturer	QEMU
System Model	Standard PC (i440FX + PIIX, 1996)
Processor	QEMU Virtual CPU version 2.5+ (2.39 GHz, 2 cores, 2 logical processo
BIOS Version	rel-1.16.2-0-gea1b7a073390-prebuilt.qemu.org
Installed Physical Memory (RAM)	8.00 GB
Total Physical Memory	8.00 GB
Available Physical Memory	5.78 GB
Total Virtual Memory	9.25 GB
Available Virtual Memory	7.17 GB

iii. What other information can you gather form the **System Information** application?

System Information provides information about other properties of the system. This includes hardware resources (i.e., conflicts, DMA, forced hardware, input/output, IRQs, and memory), components (multimedia, CD-ROM, sound devices, display, infrared, input, modems, networks, ports, storage, printing, problem devices, and USB connections), and the software environment (system drivers, environment variables, print jobs, network connections, running tasks, loaded modules, services, program groups, startup programs, OLE registration, and Windows Error Reporting features).

iv. How was your experience in installing the Windows 10 OS?

Windows 10 bombards the user with a flurry of new features from Microsoft that are most useful for users who are not familiar with the OS's technologies under the hood. Nonetheless, this also results in a fairly user-friendly experience that enables anyone to use Windows for their daily computer use.

Note that this virtual machine may be reverted back to the original state (through snapshot rollback) for use of the other batch (if any), so review your answers in the spaces provided and ensure that you did not miss anything. If there are any problems or if you need more time to complete the activity, inform your teacher as soon as possible.

After completing the Windows 10 OS installation, you should now know how to install an operating system on a computer. The steps are pretty much the same for any kind of operating system, wherein you would need a computer first that you would want an OS to be installed, then plug in an installation media, run through the OS installation process, wait for the installation to complete, then *poof!* you now have a running computer, that is good as new.

This would also be the same steps when you would be performing a **computer reformat** or a fresh install, which is usually something that is done to a computer when you would either be selling your computer, as a last resort when you encounter a nasty malicious software, or when you would just want to clean your computer and start from scratch.

The previous set of instructions focus on installing Windows 10 OS, which is an OS that was developed by Microsoft. Other than Windows, there are also a lot of other OS out there; some common examples would be MacOSX, created by Apple and is derived from Unix, another would be Debian, which is a Linux distribution that is Unix-like. Although we would highly recommend and prefer the use of open-source platforms (such as Linux) due to a multitude of reasons ;D

Most home computers are typically running either Windows or MacOSX, so in order to appreciate other existing OS out there (such as our highly recommended Linux Distributions), we would be trying out Ubuntu, a widely used Linux distribution that is based on Debian, and is well known for its stability and great community support. Ubuntu has generally two (2) types, a server distribution and a desktop distribution, wherein the former is typically used in servers by data centers and system administrators, while the latter is used for personal computer and home users.

For this next part of the laboratory activity, we would be using the second virtual machine, **CCICOMP-SXX-##-Ubuntu**. Note that this virtual machine is quite similar to the first one, but is loaded with the **Ubuntu Desktop 23.04 Installer**. Let us start by booting up the **C CCICOMP-SXX-##-Ubuntu** virtual machine, by selecting the said machine on the Virtual Machine Navigation Tab (5), click **Start**, then open up the **Console view** (8,10).

3.2 Ubuntu Desktop OS Installation Steps

1. Upon boot, for this laboratory activity we would want to install the OS, so select **Try or Install Ubuntu**. Kindly wait for a moment until the installer completes its start up, then select the language of **English**, which is the default, then press **Next**.
2. After which, an **Install Ubuntu** and **Try Ubuntu** options would be available, select **Install Ubuntu** then press **Next**. Note that **Try Ubuntu** would boot an ephemeral version of the Ubuntu Desktop, allowing you to try out the OS, without saving any changes. This would be beneficial for those who would like to try out Ubuntu Desktop.
3. For the Keyboard Layout, leave it as the default value of **English (US)** in the Keyboard Layout as well as **English (US)** in the Keyboard Variant then select **Continue**. Note that depending on your actual keyboard, you may choose a different keyboard layout or if you are unsure, you may also select Detect.
4. Next up is to setup the network connection, you can just choose **I don't want to connect to the internet just now** option, then select Next. Note that you can setup the network connection later on.
5. You would then be asked what apps you would like to be installed at the start. For new users, it would be advisable to choose Normal installation, as it includes basic utilities and software, however more experienced users may choose to select Minimal installation, which contains the bare minimum for the Desktop version, allowing them the discretion to choose which software to install. For simplicity, select **Normal installation** then choose **Next**, this would install basic software that typical home users may use.
6. In the type of installation, choose **Erase disk and install Ubuntu** then select **Next**. For advanced users, the additional option for setting up Manual partitioning allows for more customization of the drive partitions, while the option for use of LVM allows for dynamic adjustments of the storage. For now, let us leave it at the just the basic setup since we are only working on a laboratory environment and to make things simple for now.

   Upon selecting **Next**, a popup may show, confirming the action that the storage device would be erased. Note that the disk would be formatted as ext4 file system (Windows would typically use NTFS). We would defer the discussion of file systems for now. Choose **Install** to proceed with the installation.

7. While the disk is being formatted, The installer would allow us to proceed with the installation wizard, to provide further details of our setup preference and configuration. When asked for your location, simply select the geographical location of **Metro Manila** or somewhere in the same area in the map provided, then select **Continue**. This configures the timezone that the OS would use.

8. After selecting the location, the installation wizard would prompt you of information regarding the identity of the user and computer. Use the following information:
   - Your Name: **CCICOMP Student**
   - Computer Name: **CCICOMP-SXX-##-Ubuntu**
   - Username: **student**
   - Password: **DLSU1234!**

   Leave the radio button as default, pointing to **Require my password to log in**. This would provide better security for your machine, so that when the machine starts-up, you would need to indicate the password in order to gain authorization to access the user account. Proceed with the configuration by selecting **Next**. In addition, you may choose Light or Dark mode for your appearance, depending on your preference. Note that for the computer name, use the assigned VM Name of your Ubuntu Desktop machine, replace the XX with your section number and the ## with your group number.

9. Wait for the Ubuntu Desktop OS installation to complete. Note that this may take a few minutes. After installation, your machine should request for a restart once it is complete. While waiting for the installation to be completed, you can check out some information that is shown on the screen. You can navigate through the different pages using the arrows on the view.

10. Once the installation is complete, the window requesting a restart should show up. Select **Restart now**, to restart the machine. Normally you would want to remove the OS installer CD/DVD or drive, however the virtual machine is configured to boot the contents of the Hard Disk first before the CD/DVD, so you can leave it as. When asked to press Enter once the installer disk is removed, simple press **Enter** to proceed with booting up.

11. Your Ubuntu Desktop machine should boot up and after booting, the system would require you to login. Select the account name **CCICOMP Student**, then write the password **DLSU1234!**

12. You have finally completed the installation and setup of your Ubuntu Desktop machine. Your machine is ready for use, however note that a few introductory messages would be shown on your screen. You can simply choose **Next** until the introductory messages closes. You may also choose not to send any information to Ubuntu, in one of the pages, if you would like to keep your usage more private.

13. Note that if you would be installing Ubuntu Desktop on your own machine, feel free to use the latest version with the label of LTS, which stands for Long Term Support, ensuring that the version would be maintained for quite a few years. With that, you should now have a running Ubuntu Desktop OS, similar to your Windows 10 OS, this should have somewhat similar features and functionality. Feel free to play around with it!

Answer the following questions below:

i. Record the hardware specifications of your virtual machine

How many processors do you have?	
How much memory (RAM) do you have?	
What is the size of your hard disk drive?	
Do you have a CD/DVD drive? What is inside?	
What is the MAC address of your network card?	

Note that you can use the Virtual Machine Navigation Tab (5) to check for the hardware information, but try to investigate your Ubuntu Desktop first and look for applications or commands that would allow you to view these information. You can use your browser (if you have Internet connection) to search on how you can see those information on your computer.

ii. Open the **Ubuntu Software** then click the search button and look for a program to help extract the system information from your computer, you may use your browser to search for one. Record the values for the following items, write N/A if none:

Host Name	
OS Release Name and Version	
GNOME Version	
Kernel	
OS Type	
CPU Vendor	
Number of CPUs	
CPU Model Name	
CPU Frequency	
Total Physical Memory (in MiB)	
Total Swap Memory (in MiB)	
SCSI Storage Device Vendor	
SCSI Storage Device Model	

iii. What other tools or command line scripts can you use to find out your system information?

iv. How was your experience in installing the Ubuntu Desktop 23.04?

3.3 Conclusion

With all the tasks given to your group for this Laboratory Activity, can you summarize your learnings and findings by providing a Conclusion. The Conclusion may discuss some realizations with regards to the differences that you have encountered with Windows compared to Ubuntu Desktop, it may also include information regarding the ease of use, the graphical user interface, among other things:

There are various operating systems available for a wide range of use cases. Windows, having been dominant in the scene for decades, remains the primary OS of choice (alongside Apple's macOS) for many industries. It is accessible to most users, even those who are not technologically literate. However, Linux distributions such as Ubuntu remain popular, albeit with a higher barrier to entry. Such OS's are usually more popular among technology enthusiasts for desktop use (in addition to their use as server operating systems), but have seen a rise in general-purpose use among the broader population in recent years. What one chooses for their OS is ultimately a matter of needs and personal preferences, as certain workloads work best with certain operating systems; for instance, a gamer might find the larger library of native games on Windows appealing, while a developer might find the Unix-like nature of a Linux distribution such as Ubuntu better suited for their work.