IT 341 Introduction to System Administration

Project I – Installing Ubuntu Server on a Virtual Machine

Here we create a new virtual machine and install **Ubuntu 20.04 LTS Server** on it.

- In this instance, we follow most of the defaults, meaning that the virtual network spoofs the identity of your server to be that of the host (the real) computer. This is how most home networks work.
- A router attached to the internet service provider (ISP) uses Network Address Translation to fool the ISP into thinking all of the computers on your local network are actually just one, by
    - rewriting packets going out via the router with a single (spoofed) **MAC** address
    - keeping track of this in a table
    - using this table when packets come back from the ISP
        - to rewrite the destination MAC addresses
        - for the local computers the packets are really meant for.
- In the next project, we will change this configuration -- considerably!

Please read instructions in full before proceeding!

1. Decide which team will be first to create a VM. *One* member from *that* team should log into your physical host (**it2x**, where **x = 1-8**), using your Windows login.
    - This step assumes you have your Linux account **AND** your Windows login.
    - *If you do not have a Windows login, then please notify your professor.*

2. Check the *Ethernet outlets* next to your host:
    - If the CAT5 cable is plugged into the **top-side** CAT5 outlet associated with your host then the computer is connected to it20 on the IT Lab LAN, an Ubuntu server that acts as a router for the network ***it.cs.umb.edu***
    - If the CAT5 cable is plugged into the **bottom-side**) CAT5 outlet the computer is another network, which is not as relevant to our purposes.

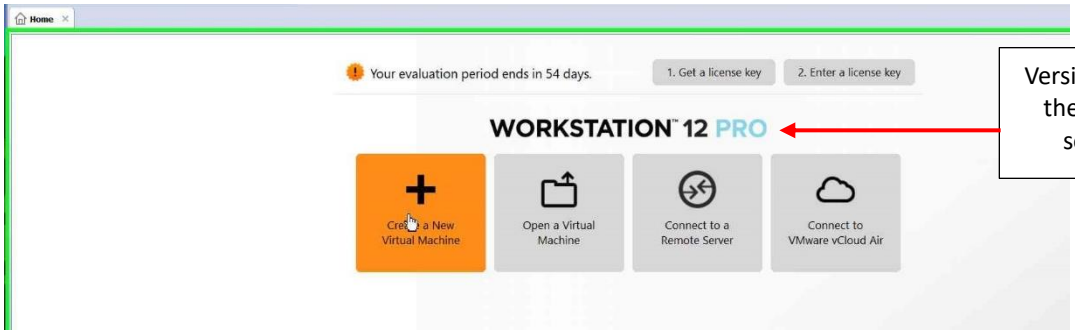
    If in doubt about this, *ask me*, and I can check your Ethernet connection for you!.

3. We want to install a virtual machine running **Ubuntu 20.04 LTS** Server. Fortunately, we have **ISO** images on our computers, so it will not be necessary to download them.

We begin by starting up **VMWare Workstation**. Use the **Start Menu**, or there may be a shortcut for this on the desktop. (*If you are unable to get VMWare Workstation working, then please see me.*)

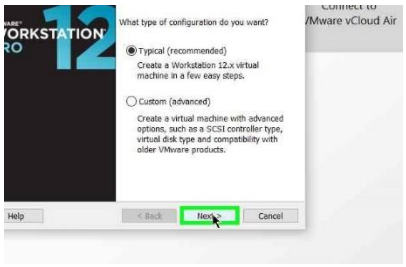
> At this point, you will almost certainly be sharing the physical machine with at least one other team, if not more. Each team must create a VM, but while one team is creating a VM, the other team(s) should sit and watch, as preparation for creating their own.

4. Create a new Virtual Machine.
   - Click **Create a New Virtual Machine** *or* **File > New Virtual Machine**



Version ***15***, as of the Fall 2019 semester

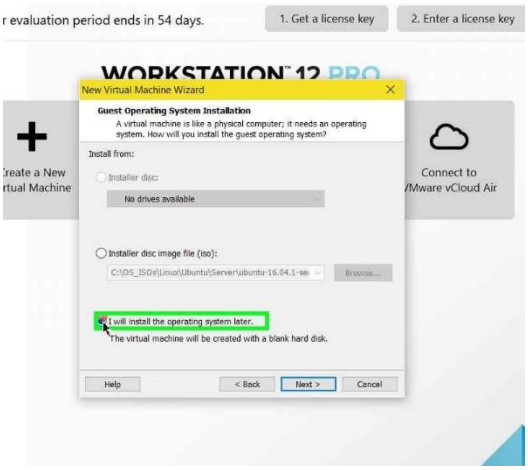
   - Make sure the radio button for **Typical** is highlighted, and then click the **Next >** button.

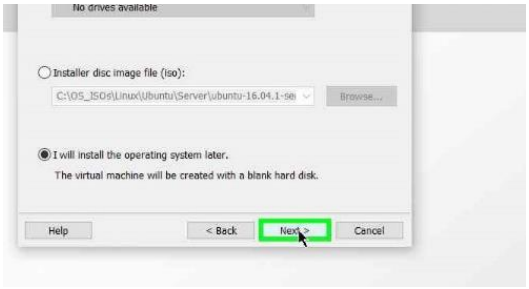


5. Now we have a choice. We can either let the installation proceed on its own after giving a few parameters – which is suitable if you've installed Ubuntu before – or we can **`install Ubuntu step-by-step`**. We will do the latter, which is suitable if you...
   - are installing Ubuntu for the first time
   - or just want to refresh your memory.

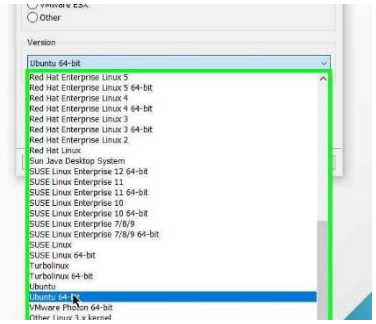
Here, we will first *create a VM* and then (later) *install Ubuntu*, proceeding step by step...

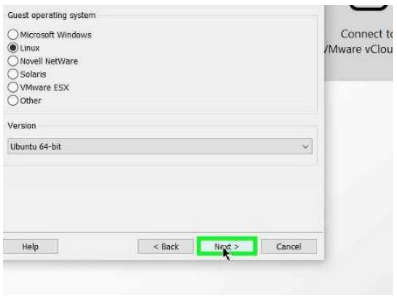
i. Choose I will install the operating system later. Then, click **Next**.





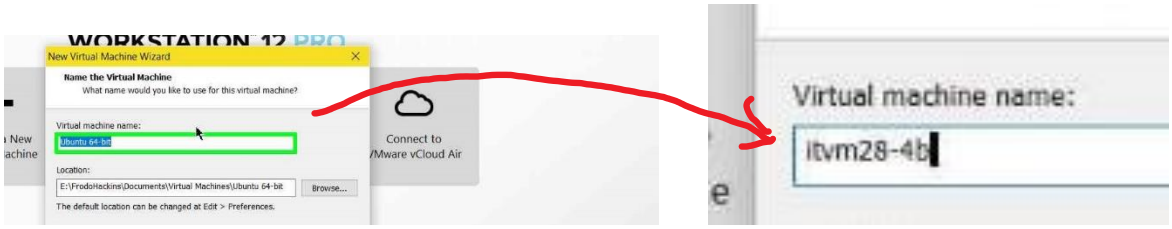
ii. For a Guest Operating System, choose *Linux*. For a Version, choose *Ubuntu 64-bit*. Then, click **Next**.





iii. Now, for a virtual machine name, we want (instead of the default "Ubuntu") a name that is meaningful to our network. Use your *team name*, based upon:

- The *name of your host*: **`it2x`**, where **x = 1-8**
- Your *section number* (or that number plus two)
- Your *group ID*: **`a`** or **`b`**
- For example, if you are sitting at host it28, in section 4 and group b, then use the name *itvm28-4b*

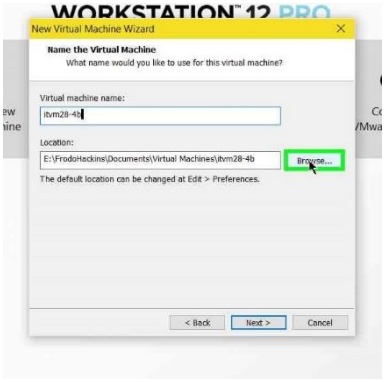


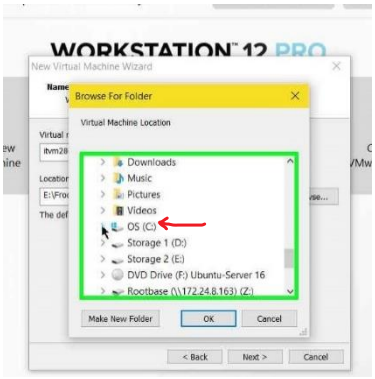
iv. There exists a subdirectory of **`C:/IT341`** with the name "**`sectionyz`**" where **`y`** is your section number (or plus two) and **`z`** is your group ID.

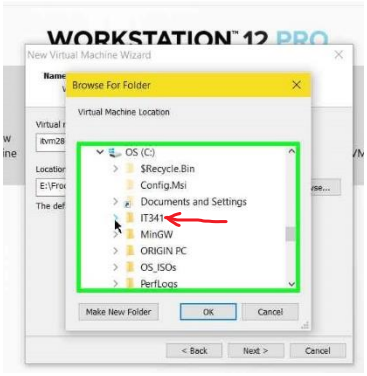
- For example, if your team name is "**`itvm28-4b`**", then your VM will be in the directory **`C:/IT341/section4b`** of machine **`it28`**

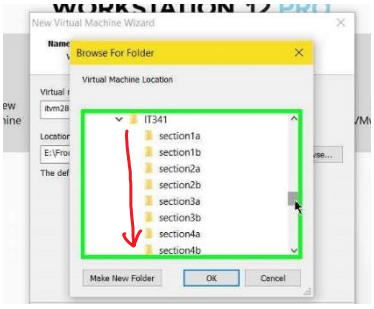
If this directory does not already exist, then I will need to create it for you...

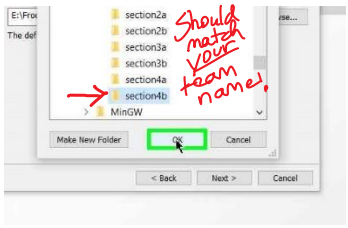
- The location where the virtual machine image will be stored is in the directory `C:/IT341/sectionyz` so browse to that location, and hit the **OK** button, followed by the **Next** button.
- You may get a prompt about the location containing another virtual machine. As long as you are following directions for naming your machine, this will not be a problem so click the continue button.

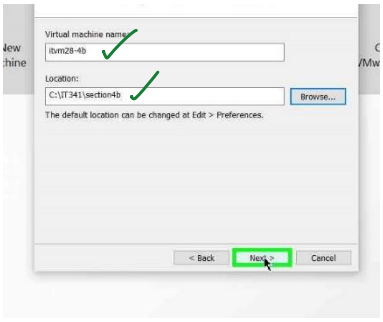




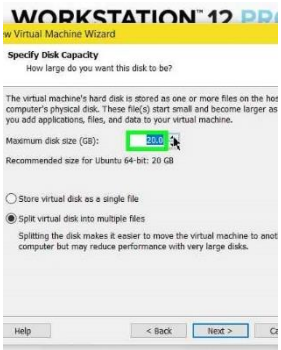


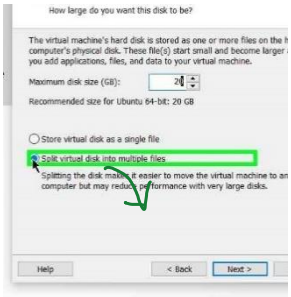




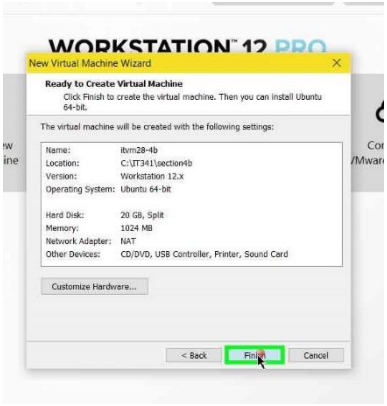


v. Go along with the default disk size and "Split virtual disk into multiple files". `20 GB` should be more than sufficient. Choose **Next**.



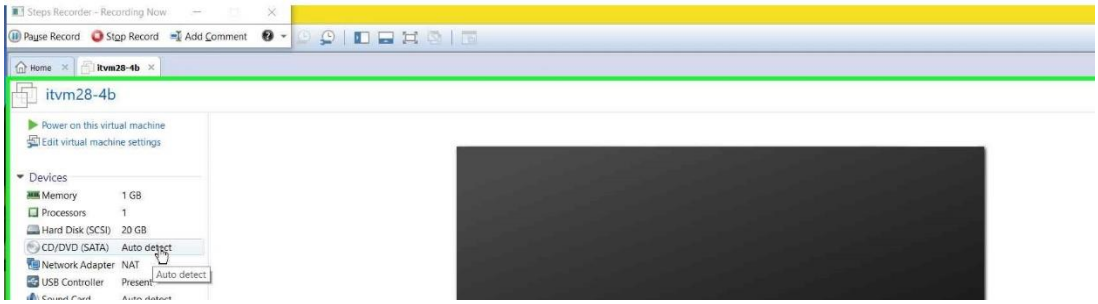


vi. We needn't customize any hardware. If we want to later, it is very easy, as long as our virtual machine has been ***shut down***. Click **Finish**.



vii. Now, under **Devices**, you will see that the CD/DVD drive has the value "**Auto detect**". We want to change this temporarily, so:

A. Double-click on **CD/DVD**. This will bring us to a panel where we can (temporarily) change the association so that we can install Ubuntu Server from an **ISO** image.

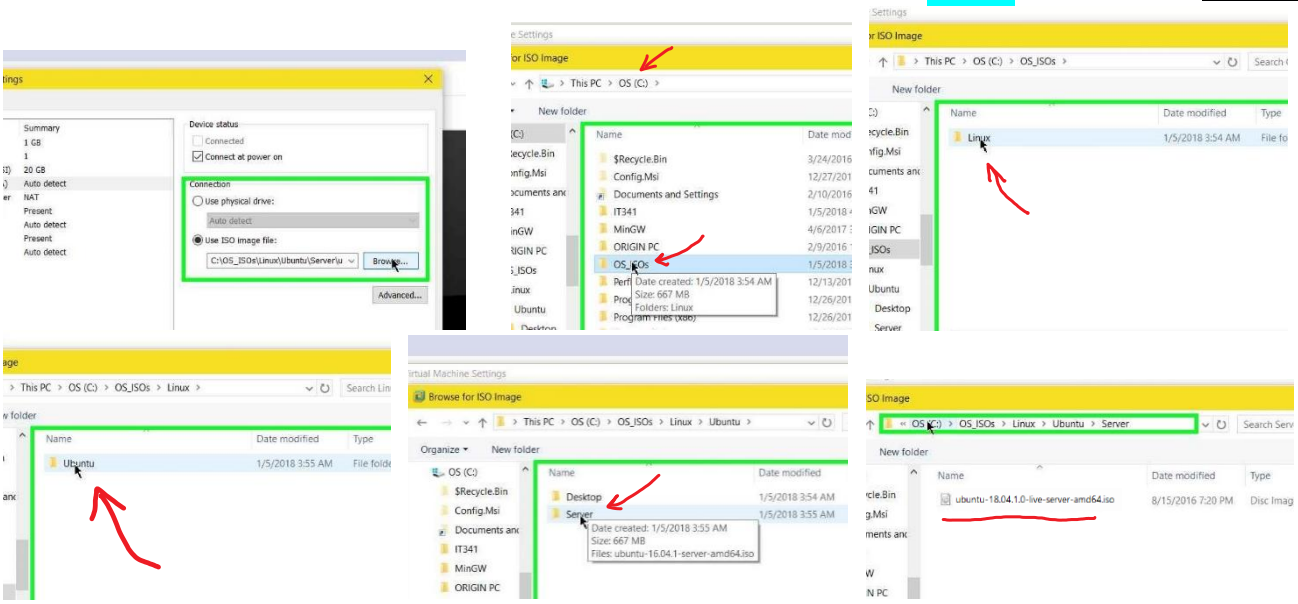


B. Choose **Use ISO image** ; and then browse to (from File System)

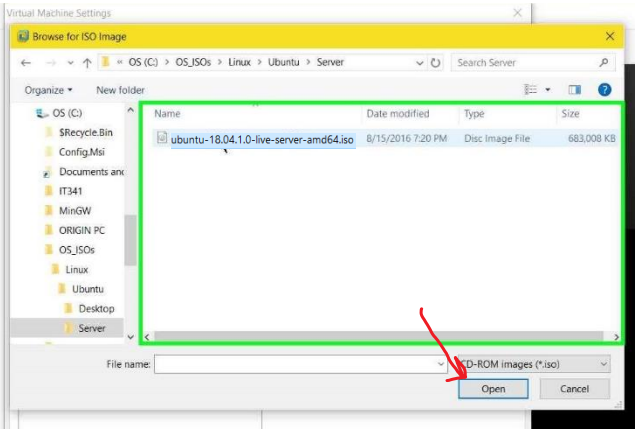
(*NOTE: The exact file path may differ from what you see here!*)

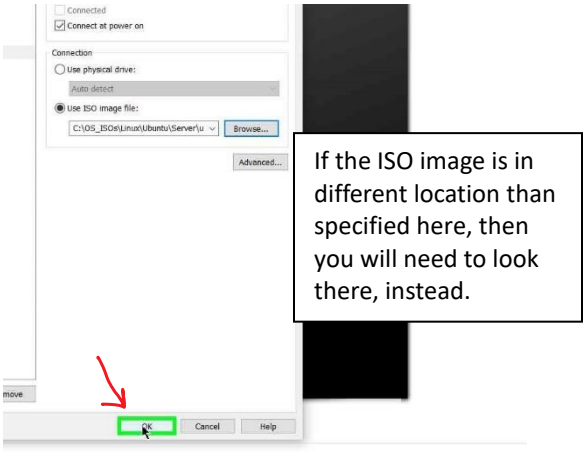
C:\OS_ISOs\Linux\Ubuntu\LTS\Server\ubuntu-20.04.1-live-server-amd64.iso

Make sure you have "**20.04**"! If in doubt, ***ask me*** !



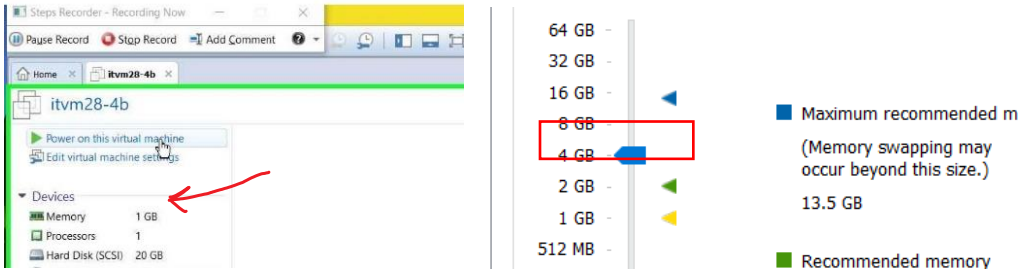
C. Once **ubuntu-20.04.1-live-server-amd64.iso** is highlighted, choose **Open**, and then **OK**.



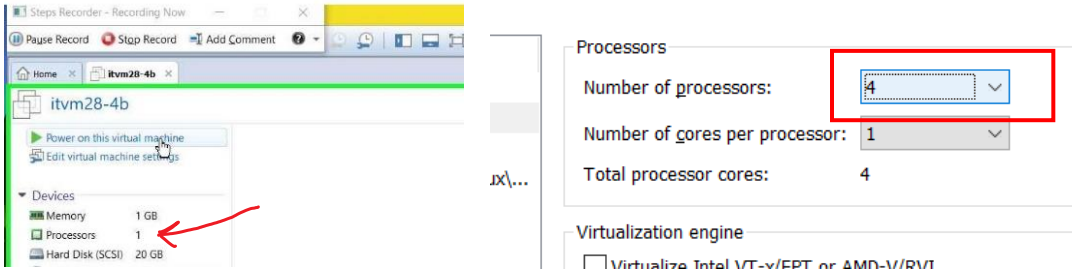


If the ISO image is in different location than specified here, then you will need to look there, instead.

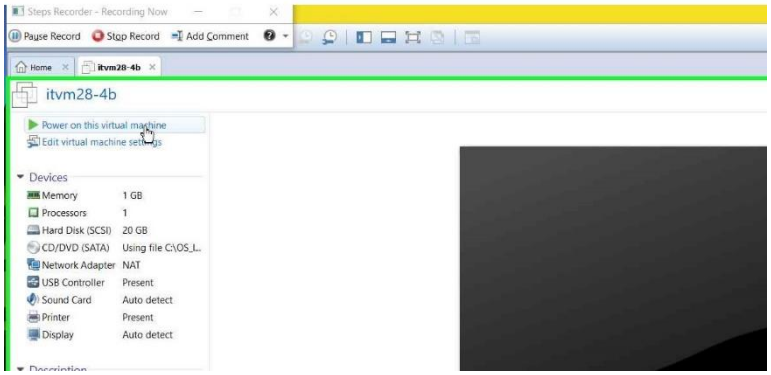
D. Now, our (virtual) CD/DVD reader is associated with the **ISO** image for Ubuntu Server, so we can now install the OS on our VMs. Next, make a note of your VM's current memory, likely at **4 GB** .



i. Your VM should have only 2 processors right now. Click on **Processors**, and increase processors to **4**, and do not worry about cores. Click **OK**.

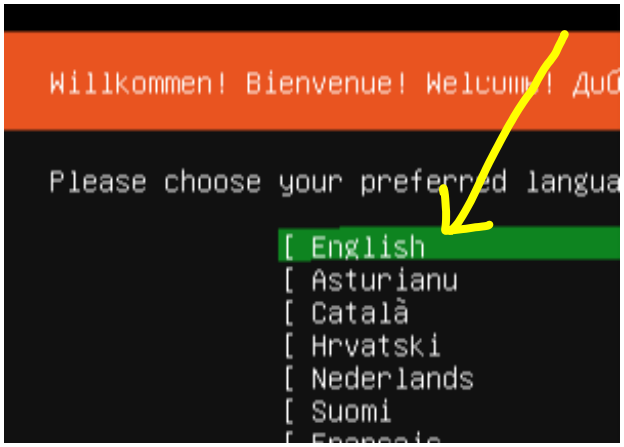


ii. Choose ***Power on this virtual machine***. You will be led, step-by-step, through the installation.

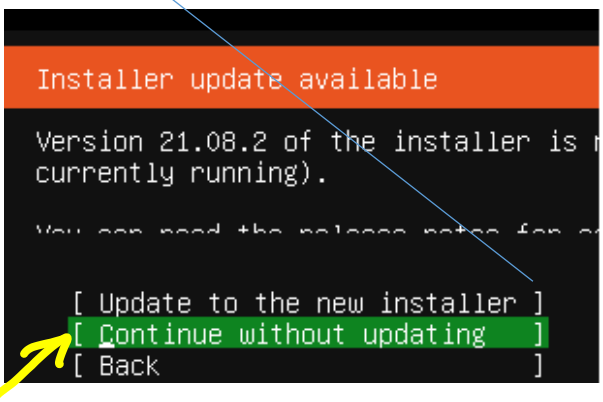


iii. To give control of your keyboard and mouse over to the virtual machine, click on its screen. (Whenever you want to give control back to your host, press **Ctrl-Alt** . A reminder of this simple sequence is on the lower-left corner of your VMware Workstation window.)

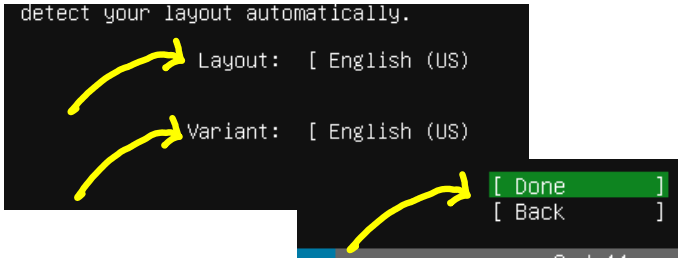
iv. For a Language, choose **English** and hit **Enter**.



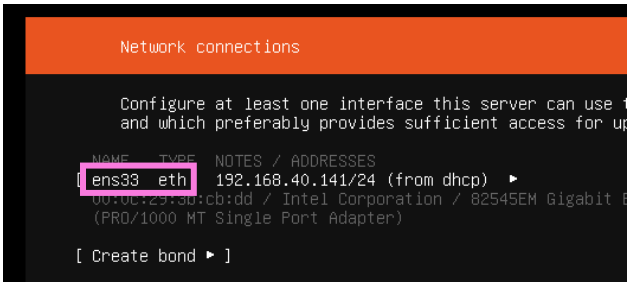
v. When you receive the Installer update available screen, choose **Continue without updating**, and hit **Enter**.

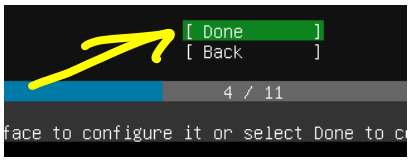


vi. For "Layout" and "Variant", choose **English (US)**, arrow to "Done", and hit **Enter**. (*steps cont'd rt. column*)



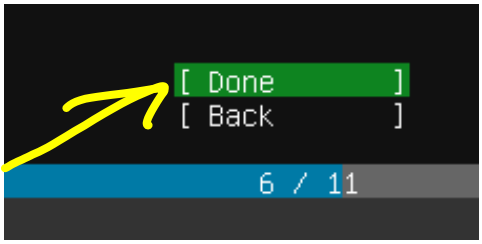
vii. If you see **ens33** and **eth** for NAME and TYPE, arrow to "Done" and hit **Enter.**



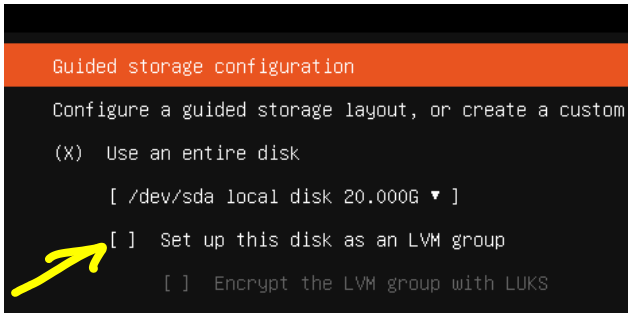


viii. We **don't** want a proxy, so leave **Proxy address** *blank* and hit **Enter**.

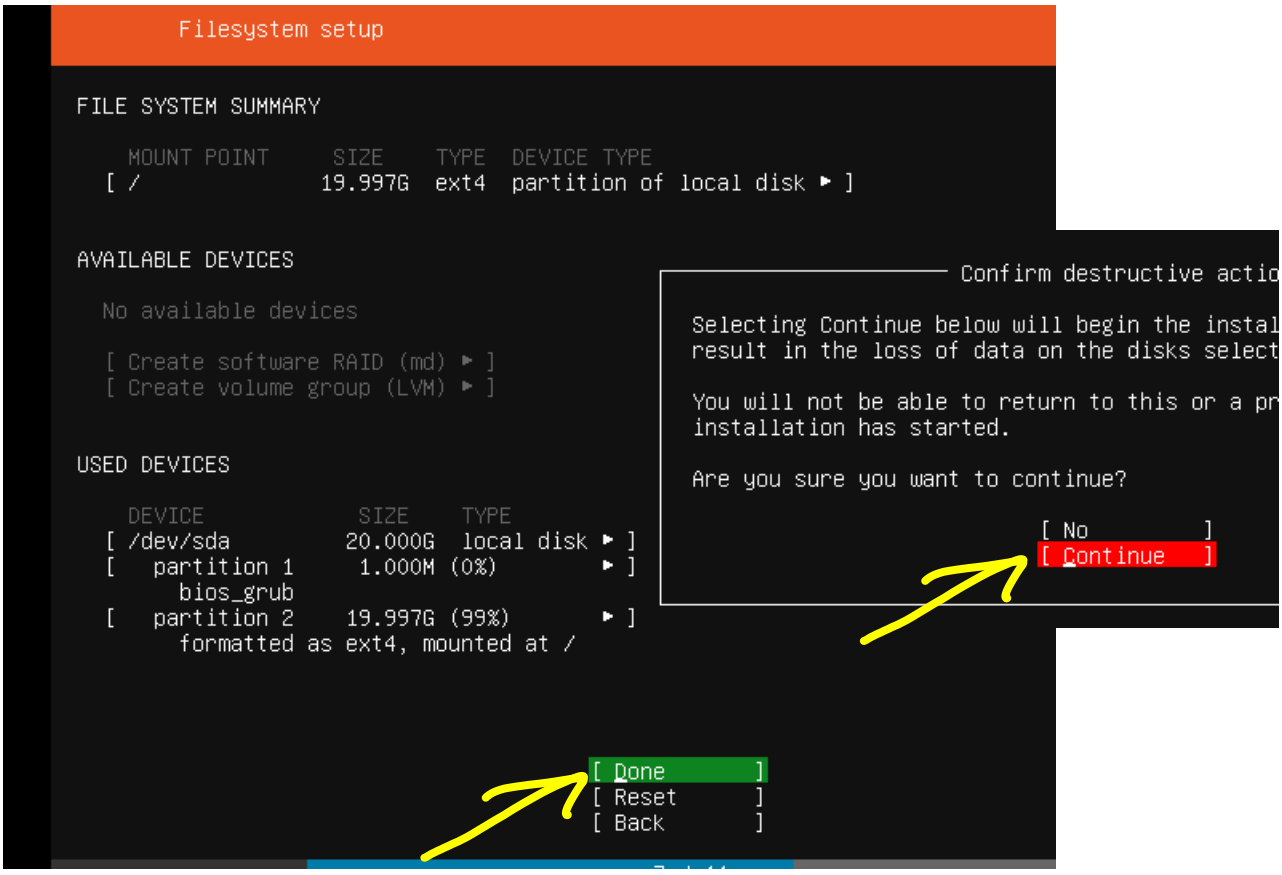
ix. If **Mirror address** matches the below, then arrow to "Done" and hit **Enter**.



x. Use the arrow to choose "**Use an entire disk**" and hit **Enter**. **Uncheck the LVM option!** (*See end-of-report questions.*) Tab/choose **Done**



xi. Assuming things are in order as indicated below, arrow to "Done" and hit **Enter**. When asked to confirm, arrow to "Continue" and hit **Enter**.

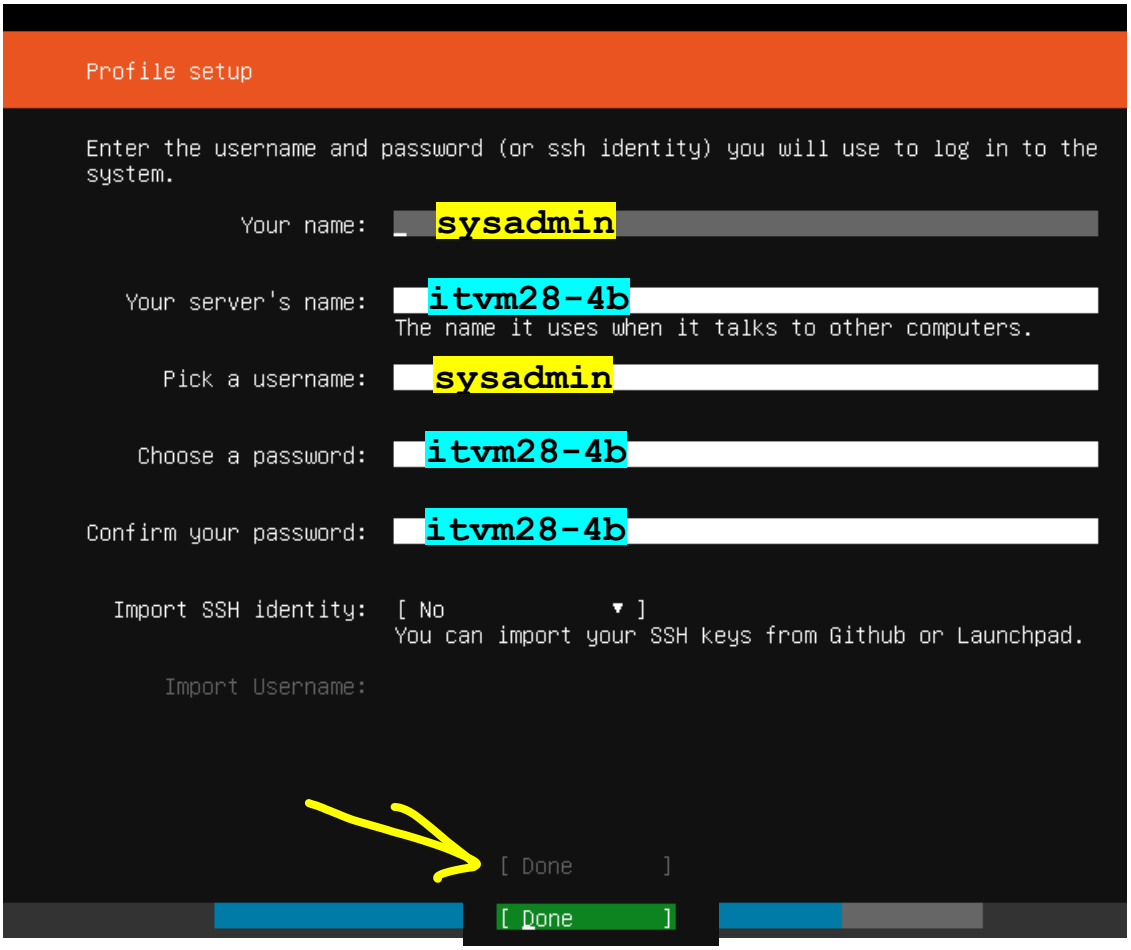


xii. At this point, the install will start to commence, and you will be given a "Profile setup" screen. Here, it is extremely important that you provide the **correct** information to define your *hostname*, admin *username*, and admin *password*. Carrying out these steps

correctly NOW saves you the trouble of having to fix mistakes later! To make it easier, remember you are using the following two pieces of (*case-sensitive*) information:

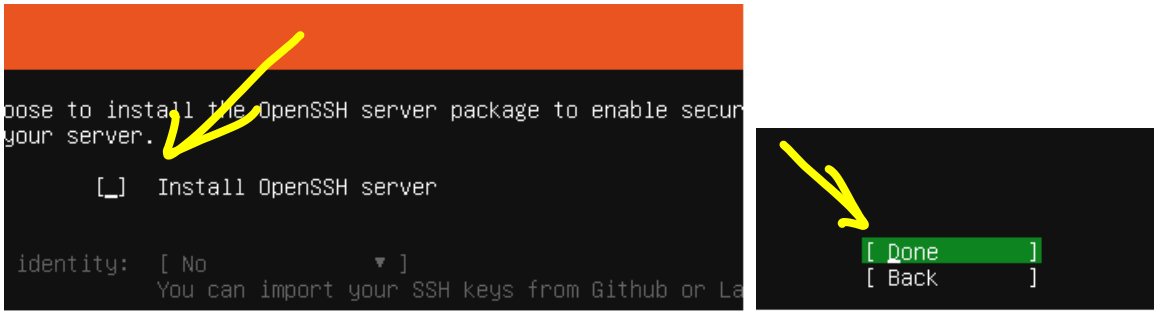
The name **sysadmin** Your team name (ex. **itvm28-4b**)

Enter the relevant information below. (**Replace** **itvm28-4b** with your own team name, naturally.) Then arrow to "Done" and hit **Enter**.



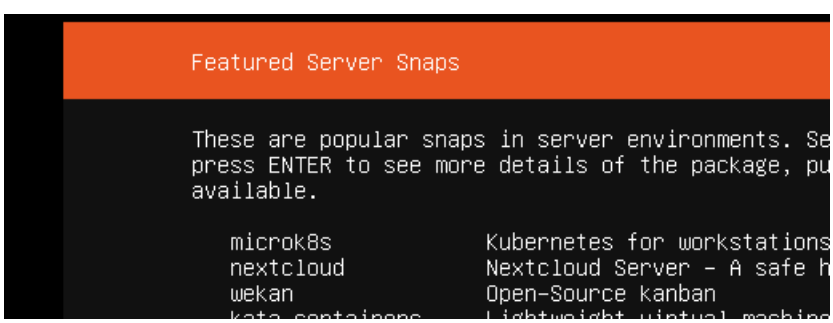
(*Notice that your team name is serving as your hostname and as your admin password!*)

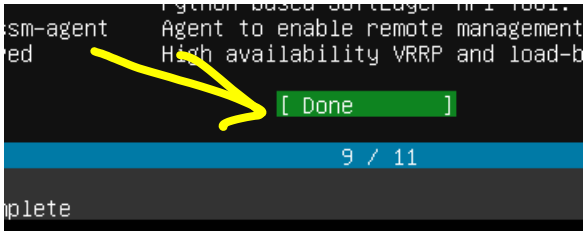
In response to the following prompt, leave ***UN-selected***, tab to **Done**, and press **Enter**:



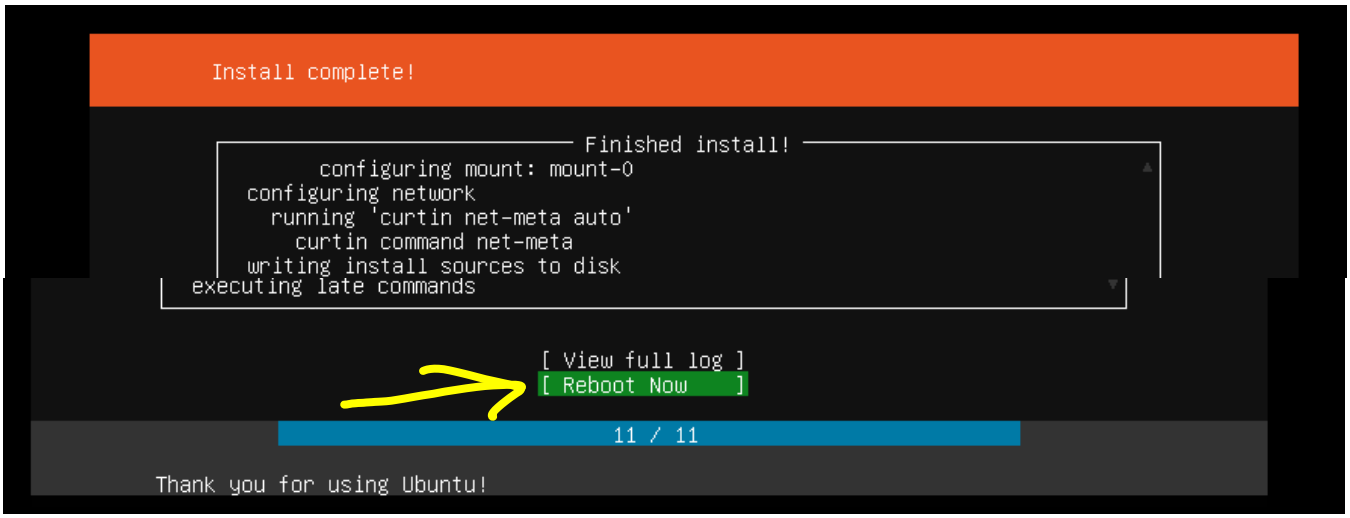
xiii. We do not want to add any snaps, hit **Tab** – which should move focus directly to

"Done" – and hit **Enter**. (**Installation will take a while!**)

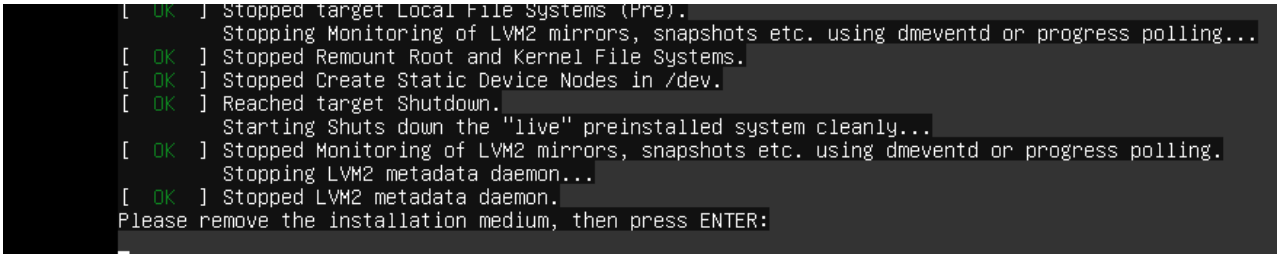




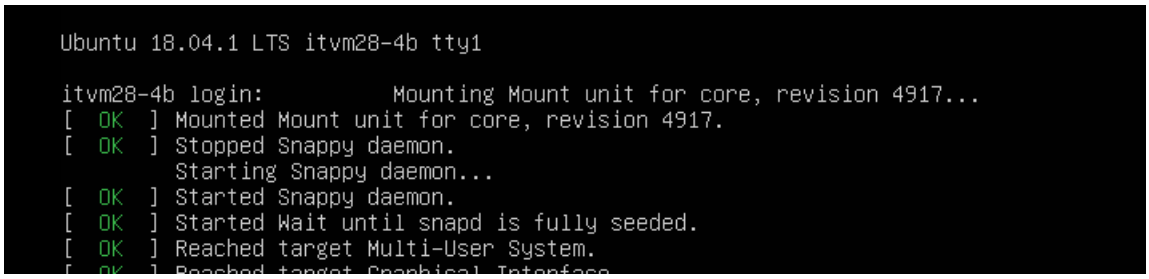
xiv. Choose "Reboot Now" (*only* "Reboot Now", specifically) and hit **Enter**.



xv. You should click "I Finished Installing". Then, click inside your VM, so that you can press **Enter** in response to the prompt:



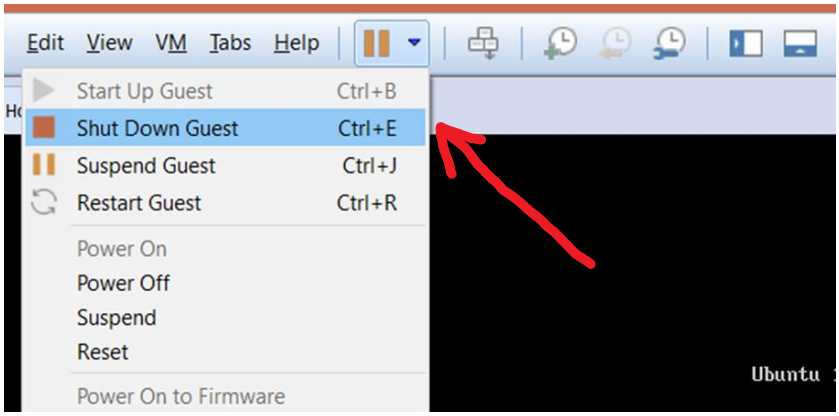
xvi. (After a wait...) The system will reboot, and your screen may look something like this:



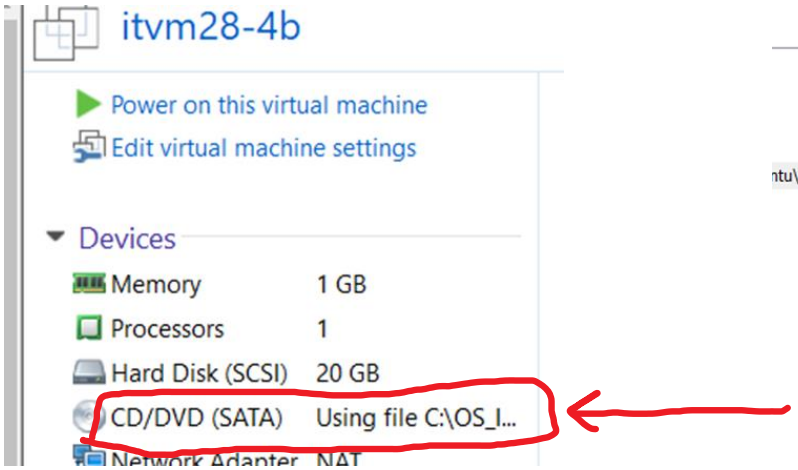
Though it may not be exact. If in doubt, just *ask me*!

1. **Ctrl-Alt** to return focus to the host.

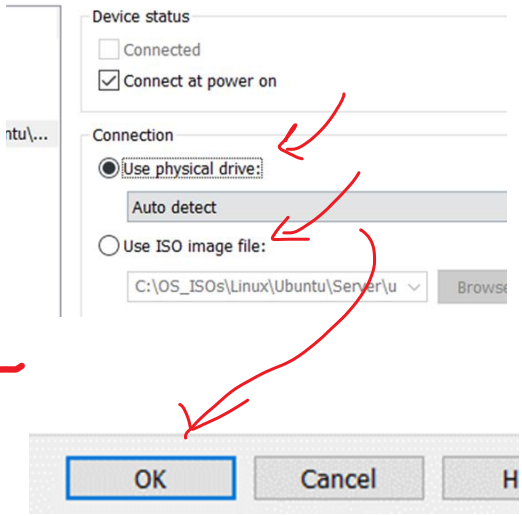
2. Click the icon indicated below, and choose **Shut Down Guest**; confirm to shutdown.



3. Double-click on **CD/DVD**. This will let us change the association back.

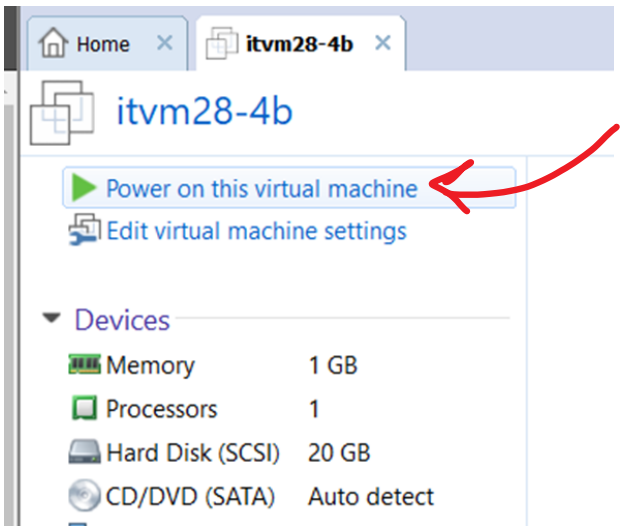


4. Choose **Use physical drive** and "**Auto detect**" for the device. Click **OK**.

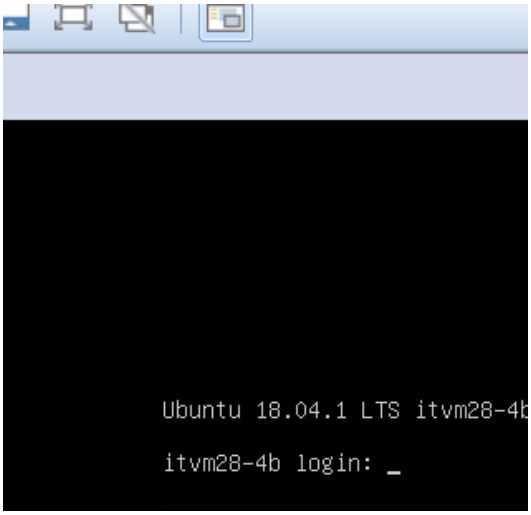


5. Now we are ready to turn the virtual machine *back on*...

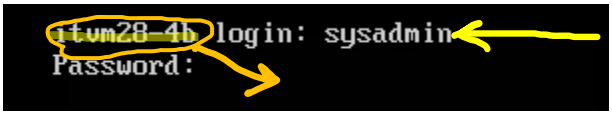
Choose **Power on this Virtual Machine**.



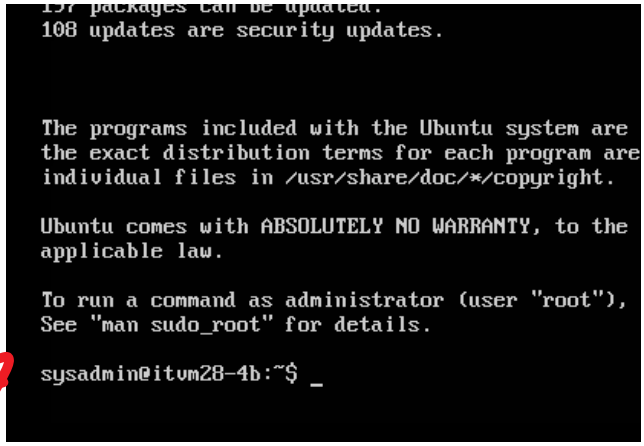
After your VM finishes booting, you will see:



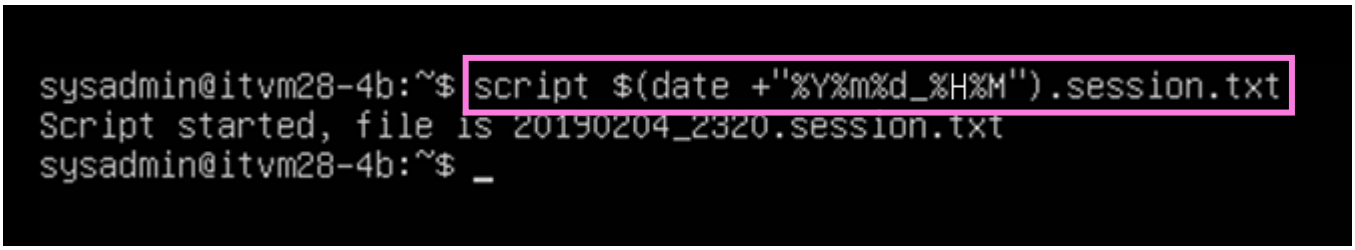
6. Log in as ***sysadmin***. Remember, the password is the same as your team name, same as your VM's name.



On successful login, you should see this

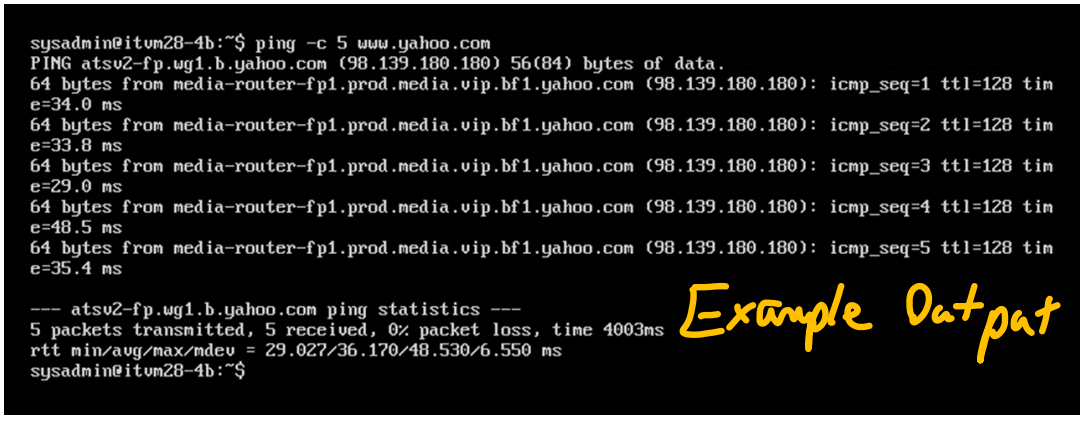


Before you continue, enter the `script` command as indicated below.



This will allow you to save the output of your CLI session to a text file, with a unique file name. You can export this file from your VM to another source, later, and have access to the material to use in your lab report.

7. Let's see if we can reach the outside. Enter the following command:
   `ping -c 5 www.yahoo.com`



Be sure to record success or failure as part of your lab report's daily entries.

8. We want to install some software; but we need to do some preparatory steps. For each of the four commands below, type the command and then press **Enter**. After the first

command, you will be prompted for **sysadmin**'s password because you invoked the sudo command. Hereafter, you need not re-enter the password because it has been "cached".

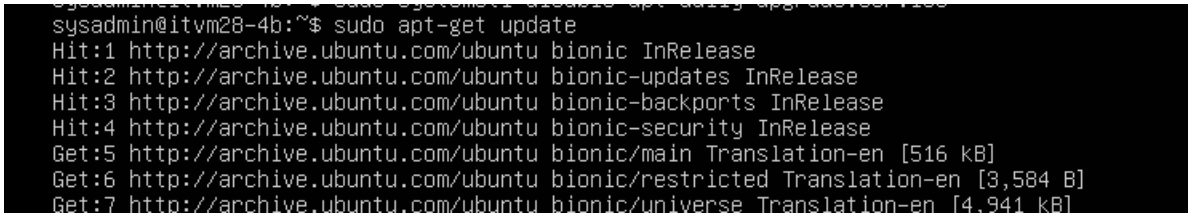
```
sudo systemctl disable apt-daily.service
sudo systemctl disable apt-daily.timer

sudo systemctl disable apt-daily-upgrade.timer
sudo systemctl disable apt-daily-upgrade.service
```

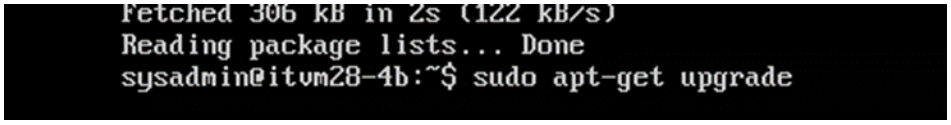
Also, it's always a good idea to do an update of your catalog before these installations.

This, too, will require invoking *administrative* privileges with the **sudo** command.

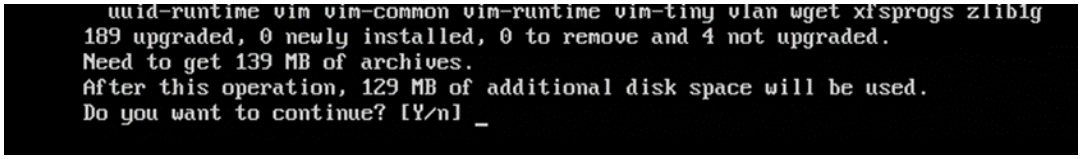
`sudo apt-get update`



Then we will do an upgrade → `sudo apt-get upgrade`



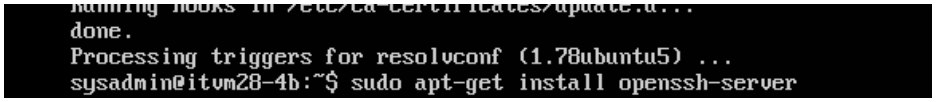
After lots of output, you are asked if you want to continue. Choose Y, or just press Enter



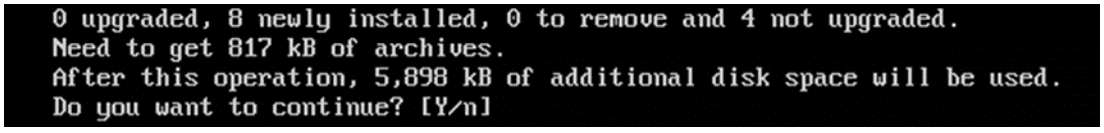
Much more output will follow...

(*Note that this is the ONLY time you will run an upgrade in this course. If you feel you have a compelling reason to run an upgrade at a later date, ask me before proceeding!*)

9. Then install the ssh server → `sudo apt-get install openssh-server`



(You will want to answer Y at the prompt)

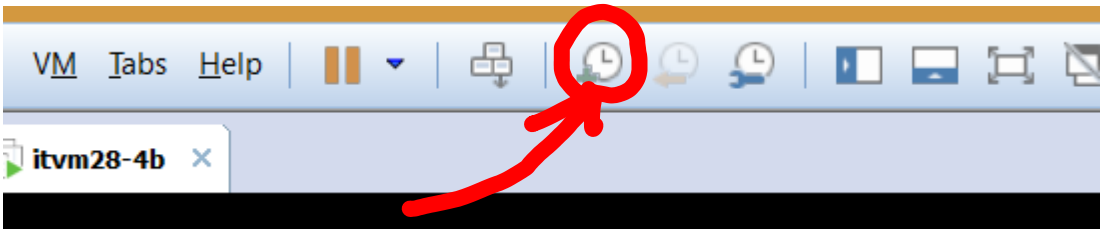


10. Be sure you are *documenting* all of this in your lab report's daily log entries. May be part of *exam questions*.
11. Now you can end your `script` session and log out.

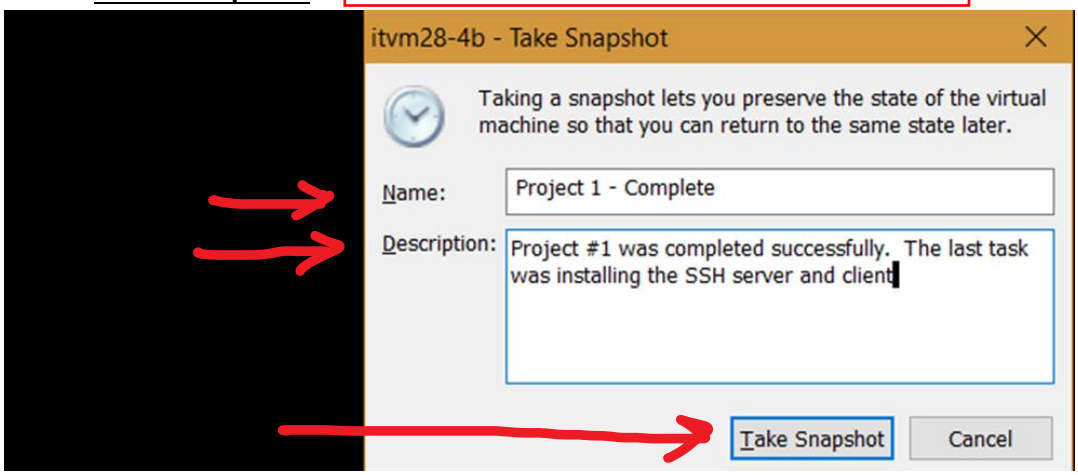
```
exit
logout
```

```
sysadmin@itvm28-4b:~$ exit
exit
Script done, file is 20190204_2320.session.txt
sysadmin@itvm28-4b:~$ logout
```

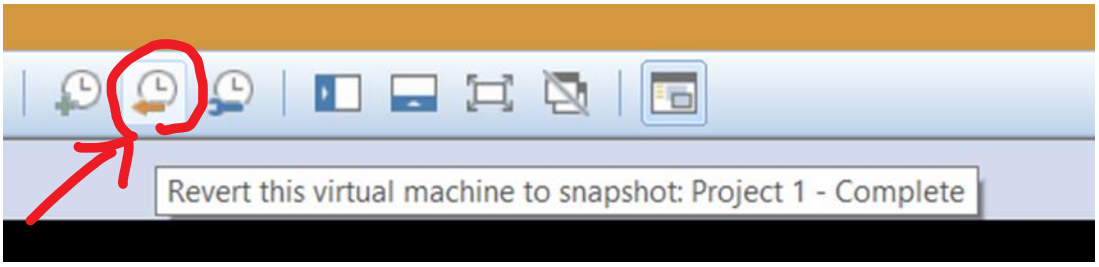
12. At this point, you should do two things: *Shut down* VM first!
    - First, recall how we made changes to the VM's specs for **Memory** and **Processors**.
        - Referring back to the step where you made these changes, you need to change the memory back to the original amount of **4 GB**.
        - You will also want to change the number of processors back to **2**.
        - When we "upgraded" your VM's specs back then, it was just to speed up the installation process. Now that installation is finished, we need to "downgrade" *so that your VM does not consume too many of the physical workstation's hardware resources!*
    - Second, you need to create your first **snapshot**. Ctrl-Alt to return focus to the host, and then click the first of the 3 clock icons below – the one with a plus sign.



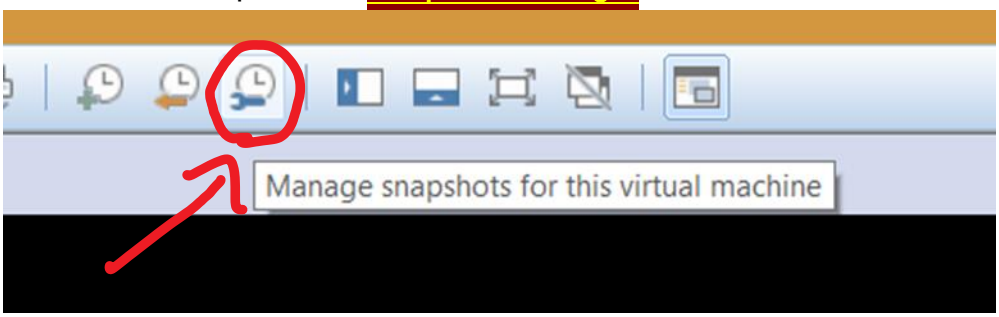
13. In the dialog box, give your snapshot **a meaningful name** and **a useful description**. Then, click **Take Snapshot**. *Shut down* VM before taking snapshots!



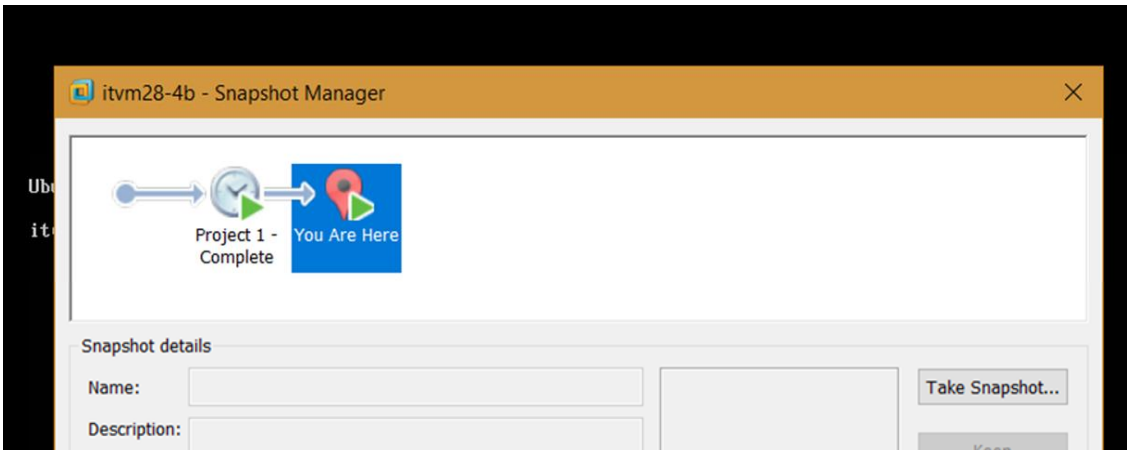
14. You can take a Snapshot of your VM at any time, and you can have several of them, representing the VM's **state** at various points in time. In order to **restore** your VM to the state as of the *latest* snapshot, click the second clock icon:



15. You can view and manage all of your snapshots for your VM by clicking the third clock icon, which opens the **Snapshot Manager**:



This will give you a dialog like the following:



Where was the snapshot saved? Figure this out and **write about it** in the indicated question below. You can change this, or you can copy it to a memory stick if you have one. Then you won't lose your work if you mess up!

FINALLY! It is imperative that you get in the habit of copying your VM files to an external memory source like a USB thumb drive. Accidental deletions of VMs DO happen, and you want to be prepared for this possibility!

Discussion Questions:

1. What does **`LTS`** *stand for*, and what does that *mean*? Please explain.
2. What is an **`LVM`**? (It stands for "logical volume manager".) Please explain what a **logical volume** is and what a **logical volume *manager*** does.
3. Please explain what the **`sudo`** command is, how it is used, and why we need it.
4. Please explain what **`apt-get`** is and why we use it.
5. Please explain what "snapshots" are ***and*** why they are useful to us.