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I have installed Ubuntu Linux OS (Operating System) on windows computer as a dual boot --
- both windows OS and Ubuntu OS can be loaded at start. Such installations of Linux are much more powerful for computation over virtual machine. I used Ubuntu Release 20.04. Typing command 'lsb_release -a' on Terminal displays this information. *Please, note that a) text after '#' is for human not computer, b) text I greyed out is the command that needs to be typed on or copied to Terminal or other as the case maybe and c) after typing or copying the command hit Return/Enter key for it to execute.*

lsb_release -a #Displays version of Ubuntu d) Clicking on Terminal window and pressing Ctrl+C or Cmd+C ends any code running on Terminal. e) # Ref is used as abbreviation for word Reference

Here Installation of Ubuntu a Linux OS and different software for day to day use is described:

2.1.1 Install Ubuntu (linux OS) on Windows laptop/computer for dual boot on Ubuntu (linux OS), Windows OS or Apple Mac OS laptop/computer.

1. Ref : <https://www.how2shout.com/how-to/how-to-install-ubuntu-from-usb-stick-on-windows-10-pc.html>
2. Advantage of using Ubuntu over Windows is that its free & is coding friendly like Mac OS
3. Download Ubuntu iso LTS (long term support) file example ubuntu-20.04.2.0-desktop-amd64.iso or the latest file from <https://ubuntu.com/>
4. Create a bootable using free software rufus-3.1.exe on your windows computer follow prompts and use default settings.
Ref:<https://thetechhacker.com/2020/02/17/use-rufus-to-create-a-bootable-usb-drive/>
5. Press F11 to enter boot menu (or Del/F12/Esc or other F* key as per your computer model) and with arrow on keyboard select "USB boot" and hit enter.
6. Click "Install Ubuntu" to install Ubuntu. Select "Install Ubuntu in dual boot with windows".
7. Deselect "download updates during installation". Follow prompts and use default settings for other steps.
8. Restart computer and Press F11 to enter boot menu (or Del/F12/Esc or other F* key as per computer model) and with arrow on keyboard set boot order to Ubuntu first.
9. Ubuntu first time login setup Ubuntu user profile with your email and select yes for prompt to install security software "Livepatch".

10. Privacy preferences for Ubuntu select "Do not allow sharing of data" OR select "Allow". Similar to Windows and Mac OS, usage data is used by Ubuntu to fix bugs and improve OS performance, so this is not a red flag.
11. Press F11 to enter boot menu (or Del/F12/Esc or other F* key as per your computer model) and change "fast boot" to "disabled" to disable fast boot and hit enter. This ensured that Windows drivers mount correctly so that files on Windows drive can be edited from Ubuntu OS.
12. Done! Henceforth, computer will by default ask if it should load ubuntu or windows. Troubleshooting: If "Grub" terminal opens type "exit" or "normal_exit" hit enter key to select which OS to load Windows or Ubuntu. Ref : https://www.gnu.org/software/grub/manual/grub/html_node/normal_005fexit.html

2.1.2 Creating Desktop and Dock shortcuts on Ubuntu

1. Ref: Video: <https://www.youtube.com/watch?v=9qLc4WIL3L4>
2. Dock: Folders and software icons can be dragged, and dropped to the Dock to create a Dock shortcut from Applications
3. Dock: Right click software icon at "Show Applications" 9-dot icon > click "Add to favourites" to place on dock
4. Desktop: Folder desktop shortcut can be created by typing command with original path and to path. If link expires after shutdown needs to be do this again. Two examples described below.
5. Example to create DATA drive Windows folder shortcut on Ubuntu Desktop
`ln -s /media/shrad/DATA/ /home/shrad/Desktop`
6. Example to create Windows Desktop folder shortcut on Ubuntu Desktop
`ln -s /media/shrad/Windows/Users/shrad/Desktop/ /home/shrad/Desktop`
7. Desktop shortcut for other Software icon, go to Other Locations > Computer > usr > share > applications copy to Desktop. Then right click on the copied icon on Desktop and click allow launching. This creates software shortcut.
Ref: <https://ubuntuhandbook.org/index.php/2020/05/shortcut-desktop-ubuntu-20-04/>
8. If drag drop and copy/paste Ctrl+C/Ctrl+V doesn't work, or double click to get copy paste option doesn't work then right click mouse to click copy paste. Likewise, codes can be copied and pasted to/from Terminal with these standard operations.

2.1.3 Keeping Ubuntu system updated

1. Ref: <https://askubuntu.com/questions/94102/what-is-the-difference-between-apt-get-update-and-upgrade>
2. Update and Upgrade Ubuntu software/packages using the following commands on Terminal. This is equivalent of Mac or Windows updates and should be done regularly.
`sudo apt-get update && sudo apt-get upgrade`
`sudo apt -y upgrade && sudo apt -y dist-upgrade`

2.1.4 Install general software like music, photo, video, text editor, Libre Office and browser on Ubuntu

1. Start computer and load Ubuntu OS. Similar to Mac OS, Ubuntu comes with a Dock for applications and folders. In Ubuntu the Dock is on the left instead of bottom of the screen, where there is an icon that looks like a square with 9 dots called "Show Applications", click on this to find pre-installed application.

2. Under Ubuntu "Show Applications" music player (Rhythmbox), Shotwell (photo viewer), Text editor gedit and default Video player (Videos) are available ready to use. Type in magnifying glass icon to search for these and other Ubuntu applications. Right Click on the application click "Add Favourites" then it'll show on the Dock.
3. Also the application shortcut can be put as shortcut on Desktop, go to Other Locations > Computer > usr > share > applications copy to Desktop. Then right click on the copied icon on Desktop and click allow launching. This creates software shortcut. Ref: <https://ubuntuhandbook.org/index.php/2020/05/shortcut-desktop-ubuntu-20-04/>
4. Firefox browser is pre-installed on Ubuntu.
5. Additionally, I installed Brave browser which is a safety and privacy focused browser and also uses Tor browser technology <https://brave.com/linux/>. In Terminal type the following 5 lines of commands to install Brave Browser. Once installed Brave can be found under "Show Applications".

```
sudo apt install apt-transport-https curl
```

```
sudo curl -fsSLo /usr/share/keyrings/brave-browser-archive-keyring.gpg https://brave-browser-apt-release.s3.brave.com/brave-browser-archive-keyring.gpg
```

```
echo "deb [signed-by=/usr/share/keyrings/brave-browser-archive-keyring.gpg arch=amd64] https://brave-browser-apt-release.s3.brave.com/ stable main"|sudo tee /etc/apt/sources.list.d/brave-browser-release.list
```

```
sudo apt update
```

```
sudo apt install brave-browser
```

6. Brave can also be installed without Terminal from Ubuntu Applications <https://linuxhint.com/install-brave-browser-ubuntu/>
7. Installed browser "Chromium" as an additional browser option. Ref: Ubuntu browsers <https://www.ubuntupit.com/best-ubuntu-web-browsers-which-one-is-right-for-you/>

2.1.5 Install ntfs-3g for Ubuntu to Windows file transfer (dual access)

1. Windows drives (ntfs) are accessible from Ubuntu and vice-versa, and files can be created by both in drives.
2. Update ntfs to ensure the above sharing is smooth.
Ref: <https://www.fosslinux.com/19265/how-to-share-and-transfer-files-between-linux-and-windows.htm> Ref: <https://vitux.com/how-to-install-and-configure-samba-on-ubuntu/>
3. Type the following commands in Terminal to get this done.

```
sudo apt-get update
```



```
sudo apt-get install ntfs-3g
```
4. At every startup of computer ubuntu system, go to File sharing manager that is the "Folder icon on dock" > Computer > Other Locations > click on all hard drives and external drives such as C Drive, D Drive will mount and be minimized on the Dock.

2.1.6 (Optional) Install to create SharedFolder for Ubuntu to Windows file transfer (dual access)

1. This is optional, as we have already setup ntfs-3g above to allow for smooth access edit and modification of Windows folders from Ubuntu and Windows operating systems. However, the Desktop or other folders on Ubuntu are not accessible from Windows operating system, this is solved by samba. A sambashare folder on Ubuntu Desktop can be accessed by Windows operating system too.
2. samba is another option that allows for dual access from Ubuntu and Windows operating systems as follows. Ref: <https://ubuntu.com/tutorials/install-and-configure-samba#1-overview>
`sudo apt update`
`sudo apt install samba`
`whereis samba` #displays location of installed samba
3. Now create a folder on Ubuntu Desktop "sambashare" for samba sharing with windows i.e. files or folders created here in Ubuntu's Desktop will be accessible in Windows. Type the following commands on Terminal,
#This command takes to Desktop folder in Terminal
`cd Desktop`
#Make sambashare folder
`mkdir /home/shrad/Desktop/sambashare/`
#This next command will open the conf file
`sudo nano /etc/samba/smb.conf`
#At the bottom of the conf file type the following
[sambashare]
comment = Samba on Ubuntu
path = /home/shrad/Desktop/sambashare/
read only = no
browsable = yes
#Press Ctrl+O (save) and Ctrl+X(exit) nano editor
#Restart Samba with new config and tell firewall that Samba sharing is allowed
`sudo service smbd restart`
`sudo systemctl restart smbd.service`
`sudo ufw allow samba`
#Specify password for samba same username here shrad with whom folder is shared
`sudo smbpasswd -a shrad`
#Next check ip address using command below. The number next to inet example inet 192.168.1.101. This is ip address needed for samba sharing
`ifconfig`
4. Now open the "folder" icon on the dock, its called "file sharing manager", and type the address to access samba folder `smb://192.168.1.101/sambashare` (replace ip address with your ip address)
5. Alternatively, the folder is also accessible on Desktop of Ubuntu where it was created in windows samba folder can be access by typing full address
`\192.168.1.101\sambashare` (replace ip address with your ip address) under "This PC" called file sharing manager

2.1.7 (Optional) Learning typing commands (unix/commandline) in Terminal on Ubuntu Linux and Mac Operating Systems

1. Ref: <https://stackoverflow.com/questions/8051145/what-are-the-differences-between-using-the-terminal-on-a-mac-vs-linux>
2. (Video) Tutorial Learn Commandline <https://youtu.be/GFGImSdJNWk>
3. (Video) Tutorial Learn as Beginner become advanced <https://youtu.be/2PGnYjbYuUo>
4. (Video) Tutorial Crash Course <https://youtu.be/yz7nYInXLfE>
5. Written: <https://www.learnenough.com/command-line-tutorial/basics>
6. Written+Video: <https://www.udemy.com/course/command-line/>
7. Written+Video: <https://www.udemy.com/course/linux-shell-scripting-free/>
8. Written: https://www.tutorialspoint.com/unix/shell_scripting.htm
9. Written: <https://www.w3resource.com/linux-system-administration/linux-commands-introduction.php>
10. Written: <https://linuxconfig.org/bash-scripting-tutorial-for-beginners>

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