Department of Computer Engineering
Faculty of Engineering
University of Sri Jayewardenepura

Course	Operating Systems
Course Code	CO2206
Title	Introduction to Linux/Unix
Practical Number	1
Outcomes	Get familiar with the Linux operating system and get to know some basic commands.
Deadline	19th August 2020

General Instructions:

- No food, drinks, backpacks, and bags are allowed to take inside the laboratory.
- Please save your work frequently during the practical session to avoid data loss due to unavoidable circumstances.
- Your files will be erased after the practical session. Therefore, please keep a backup for yourself.
- Please archive all files to a zip file, upload the zip file to LMS, and send as an attachment to coassignments@gmail.com.
- Use the following format when you are naming the zip file: yy_ENG_xxx_L.zip, yy_ENG_xxx is your registration number, and L stands for the practical number (e.g. 16_ENG_135_1.zip)

1. Task Overview

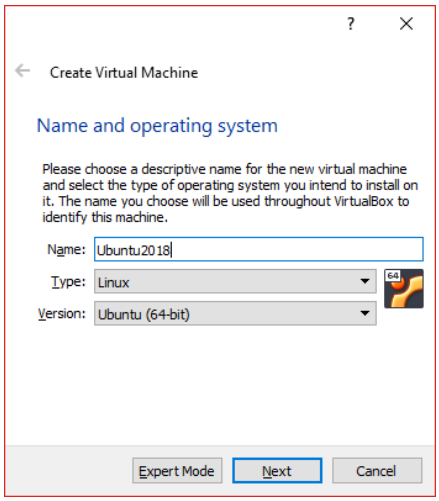
- Start the Oracle VM VirtualBox and install Linux in VirtualBox according to the given instructions.
- Practice basic Linux commands.
- Open a text editor and write a simple C program. Then compile and run it using the Terminal.

2. Installing Ubuntu in Oracle Virtual Box

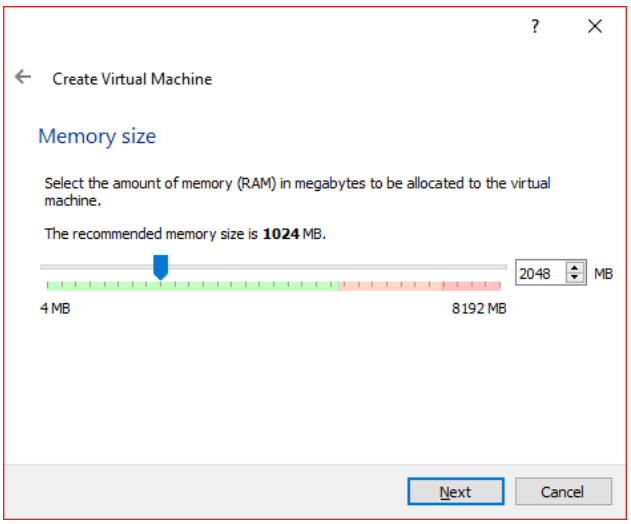
First, download VirtualBox and Ubuntu (2.6 GB) following the links. Then, install VirtualBox in your computer and follow the instructions given below to install Ubuntu on it. If you have already installed Ubuntu on your computer, you can skip this section.

Initial VirtualBox Settings

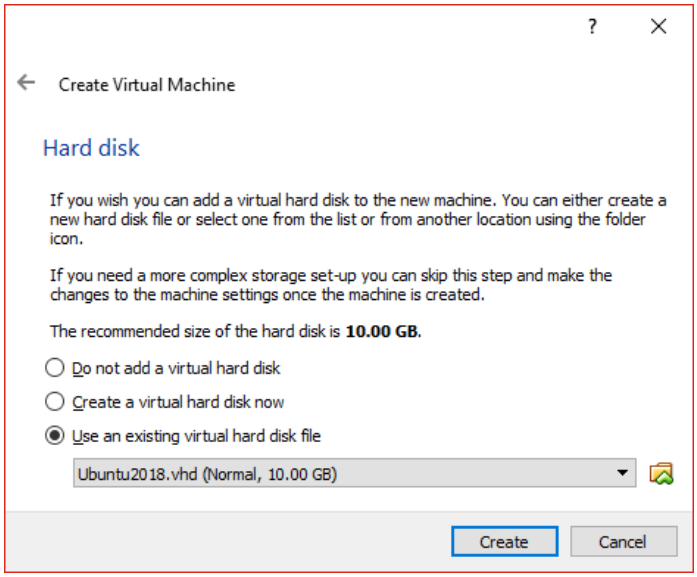
1. First, Start Virtual Box on your desktop, and click on the New icon. Give the virtual OS a proper name such as Ubuntu2018. Select Linux as Type and Ubuntu (64-bit) as Version. Then click on the Next button.



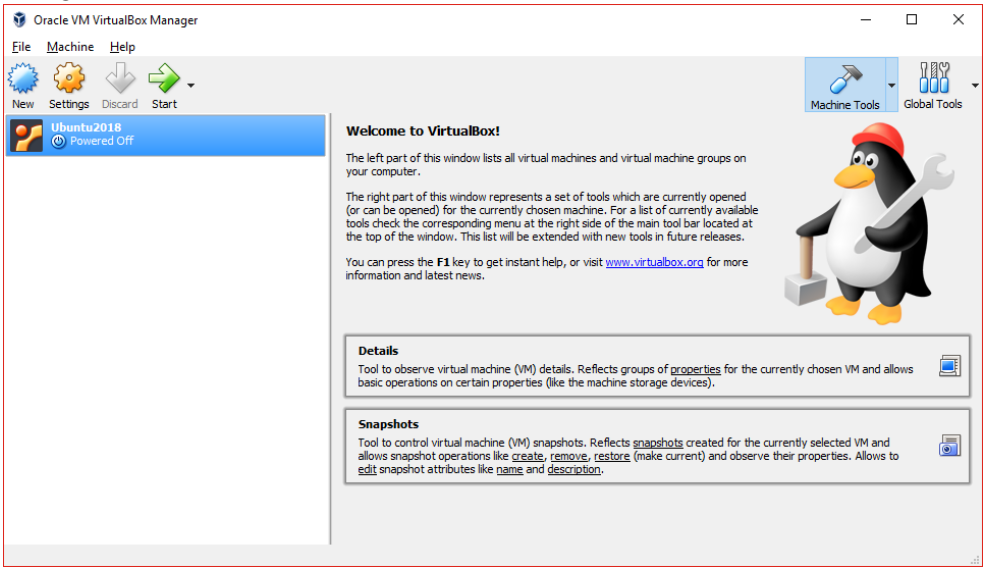
2. Set the memory size by moving the slider. The recommended size of memory for the virtual machine is 2 GB (2048 MB) as the system has only 8 GB of RAM. Then click on the Next button.



3. Now, select an existing virtual hard disk file. Use the third option and select the already created Virtual Hard Disk (E:\Linux2018.vhd) by clicking the folder icon. This works like the hard disk of the virtual Linux system. This is where the virtual system will store its files. Then click the Create button.



4. You will get a screen like this.



Virtual OS Settings

Now you are going to set the settings of Ubuntu by just clicking the Settings icon.

1. Go to System -> Processor
    a. Change as 2 processors

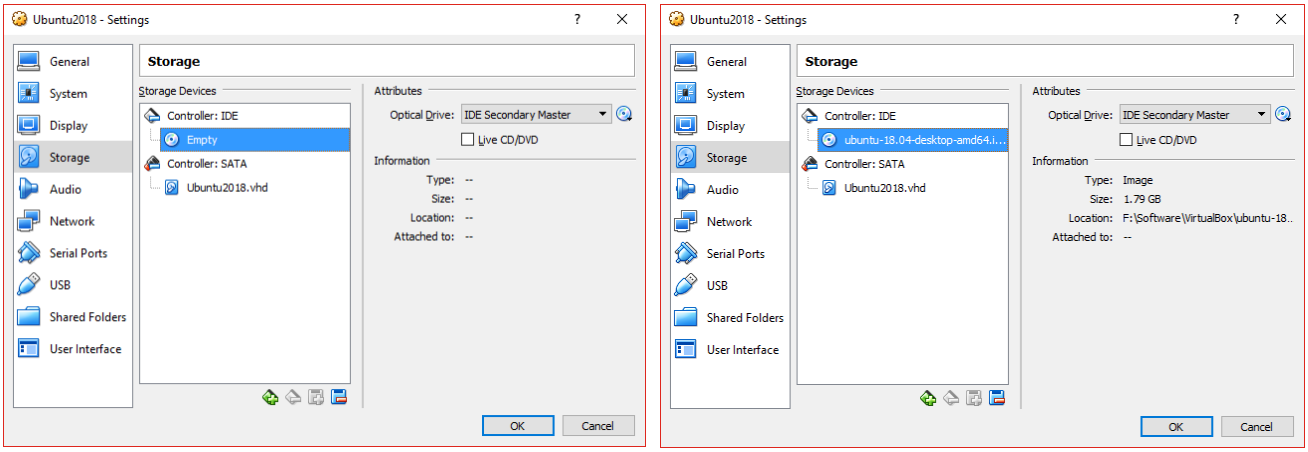
2. Go to System -> Motherboard
    a. Enable I/O APIC

3. Go to System -> Acceleration
    a. Enable VT-x/AMD-V

4. Go to Display -> Screen

a. Enable 3D Acceleration

5. Go to Storage -> Controller: IDE
    a. Change the optical drive to the Ubuntu ISO file. Click the CD drive icon and then select the Choose **Virtual Optical Disk File…** option. Then locate the **Ubuntu-18.04-desktop-amd64.iso** (downloaded Ubuntu ISO) file.

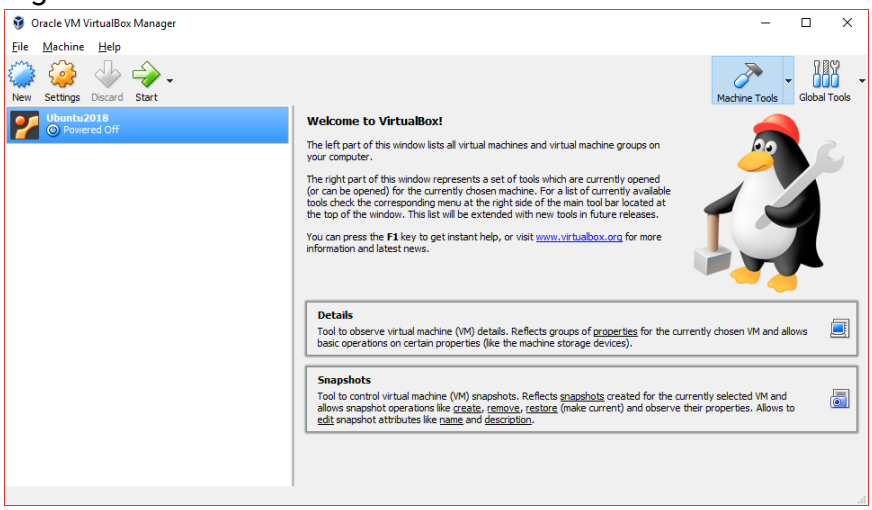


6. Go to Audio -> Enable Audio Input

7. Go to User Interface -> Enable Show at Top of Screen and click Ok.

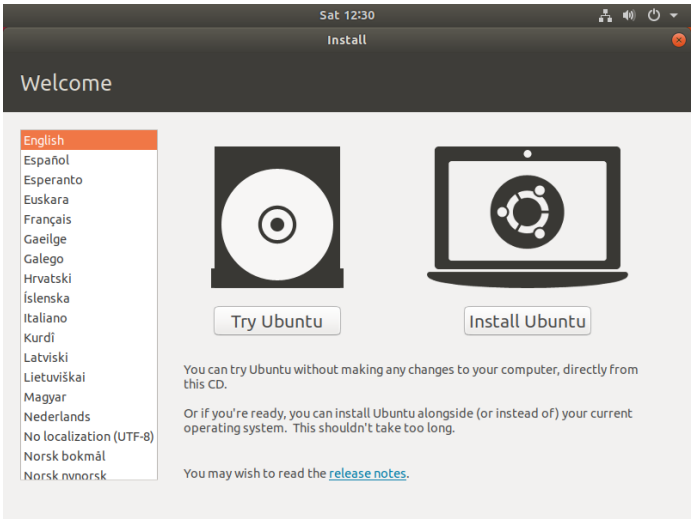
Installing Ubuntu

Once everything is in place, it is time to boot that ISO and install Ubuntu as a virtual operating system by clicking the Start button.

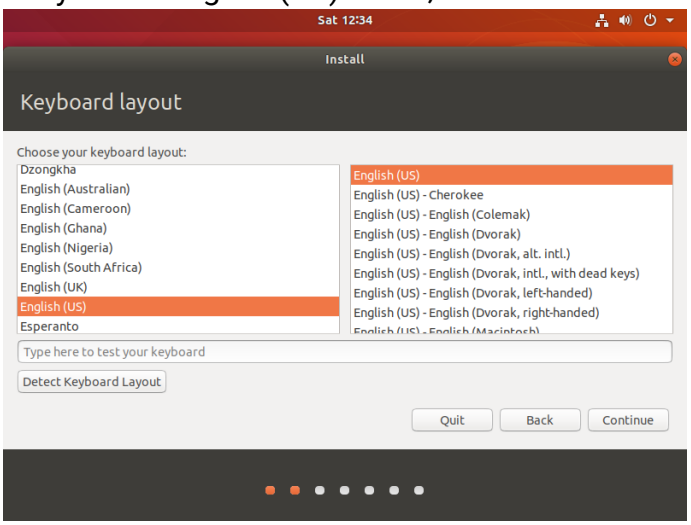


If Virtual Box doesn't detect the Ubuntu ISO file, browse to its location by clicking the folder icon. Then click on the Start button.

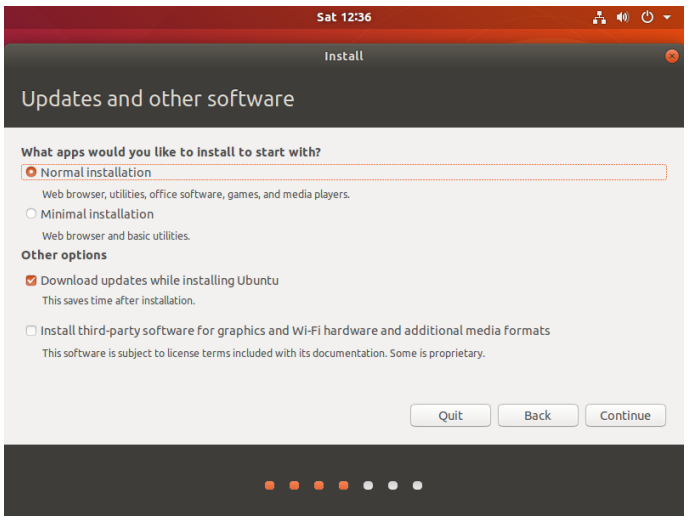
1. Soon you'll find yourself inside Linux. You should be presented with the option to install it by pressing the Install Ubuntu button.



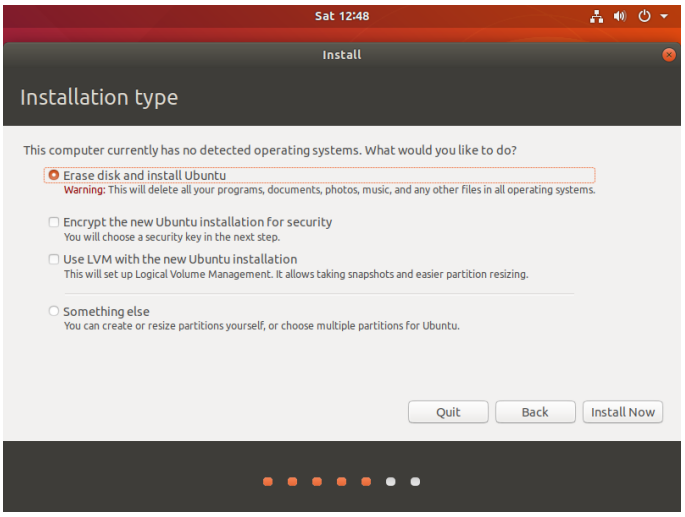
2. Select the keyboard layout as English (US). Then, click on Continue.



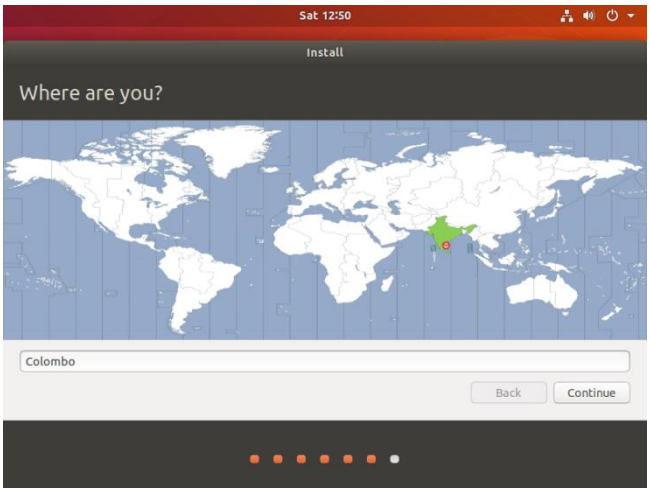
3. Now select the Normal installation and Download updates while installing Ubuntu. Then click on Continue.



4. Select 'Erase disk and install Ubuntu'. Don't worry. It won't delete anything on the Windows operating system. You are using the virtual disk space of 10 GB that we selected in previous steps. It won't impact the real operating system. Then select Install Now. Just click on Continue.



5. Now you must select the correct location (Colombo) from the given map. Then click on Continue.



6. Choose a username and password.

7. You are almost done. It should take 10-15 minutes to complete the installation.

8. Once the installation finishes, restart the system.

9. If it gets stuck on the screen, you may press the Enter, or you may close the VirtualBox and just click on the installed Linux virtual machine. You'll be able to use it directly.

10. Login by entering your login password. A KDE (Kool desktop environment) should spring up.

3. Practising Basic Linux Commands

1. Start a Terminal window by using the App Drawer (Or Press Ctrl+Alt+T).

2. Use the following command to check your current location. What does it say?

   $ pwd

/home/dhanushka/desktop

3. If you are not in your home directory, change your current location to your home directory.

   $ cd /home/student
   or
   $ cd ~

4. Use the following command to list all files in your current location. What are the files you have?

   $ ls

Desktop Documents Downloads Music Pictures Public Templates Vedios

5. If you don't already have one, create a directory called "**Labs**", then go into that folder,

   $ mkdir Labs
   $ cd Labs
   $ mkdir Lab1

6. Change directory to **Lab1**. What is the command you must use?

$cd Lab1

7. Check the address of your current location and write it below.

$ pwd home/dhanushka/Labs/Lab1

8. Go back to **Labs** directory using the following command.
   $ cd ..

9. Go back to the home directory. What is the command you must use?

Use the $cd .. command twice Or $ cd~

10. Examine the differences between **ls** and **ls –l**. What does column 8 show?

ls command only shows the name of the files and directories which are not informative.But ls-l shows the file type,file permission,File owner,file group,File size,Date and Time and File Name is displayed.

11. Make subdirectory named as **Lab2** inside the **Labs** directory while staying at the **home** directory. What is the command you have to use?

$mkdir -p Labs/Lab2(sometime this might not work because access permission cases)

12. Run the following command. Explain what happens.

    $ clear

It will clear the all commands we used in the terminal previously.

4. Compile and Run a C Program

1. Open the terminal window and run the following commands to install the C compiler.
   $ sudo apt install gcc
   $ sudo apt install make

2. You may have to enter the password of the user account (Password is not visible when you type it).

3. Move to the **Lab1** directory and create a new source file named as **Hello.c** using the following command. It will open the file in a text editor.
   $ gedit Hello.c

4. Write a simple C program to print “Hello World..!!” to the terminal

```
#include <stdio.h>
int main()
{
        printf(“Hello World..!!\n”);
```

```
        return 0;
}
```

Save the changes and close the text editor.

5. Run the following command to compile the source code. It will create an executable file name as “Hello” in the same folder.

   $ make Hello

6. Run the following command to execute the program

   $ ./Hello

7. Edit your code, compile it, and run again to practice.

5. Examine and Manipulate Files

1. Go into the **Lab1** directory and run the following command. What is the output?

   $ more Hello.c

```
#include <stdio.h>
int main()
{
        printf(“Hello World..!!\n”);
        return 0;
}
```

2. Copy your **Hello.c** file to **Lab2** sub-directory.

   $ cp Hello.c ../Lab2/

3. Move to **Lab2** directory and run the following command. Then check what has happened using the **ls** command.

   $ mv Hello.c Hello2.c

Display Hello2.c only no Hello.c file

4. Move the **Hello2.c** file to **Lab1** directory using the following command.

   $ mv Hello2.c ../Lab1/

5. Delete the **Lab2** directory. First, you have to move out of the **Lab2** directory.

   $ cd ..
   $ rmdir Lab2

6. Delete the **Hello2.c** file from **Lab1** directory.

   $ rm Lab1/Hello2.c

7. Go into the **Lab1** directory and check the content of it. What are the commands you have to follow?

```
$cd Lab1
$ls or $ls-l
```

6. Some Helpful Linux commands

man	Manual. Give this command along with the command you need more information on, and a series of the manual will appear that describes how to use the specified utility.
cd	Change Directory. Use cd to move to different directories on the network.
cd ..	Moves you up one directory in the tree.
cd ~	Moves you to your “home” directory.
pwd	Present Working Directory. Use pwd to see the name of the directory you are currently in.
ls	Show list. Use ls to see the contents of your current directory.
ls –l	List (Long option). Use **ls –l** to see file properties.
ls –a	Will list all files in the directory (including “hidden” files).
rm	Remove files.
mv	Moves a file from one directory to another or rename a file.
cp	Copy. Copies a specified file or files from a specific location to another specific location (directory). Source and destination files, with paths, must be specified.

mkdir	Make a directory.
rmdir	Remove a directory.
more	Will display an ASCII text file on the screen.