Course: Operating Systems

Instructor: Dr. Raheel Ahmed Memon

Lab-1

Objectives

1. Installation of Ubuntu on virtual machine
2. Hands on experience to basic Linux commands
3. Updating and Upgrading System
4. Installation of a tool using command line
5. Compile and Run a C Program

Installation of Ubuntu

Download Ubuntu latest LTS (Long time support) version

- LINK: https://ubuntu.com/download/desktop

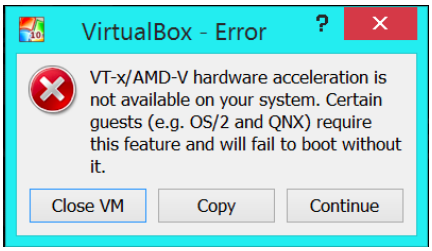
Download Virtualbox Latest version:

- LINK: https://www.virtualbox.org/wiki/Downloads

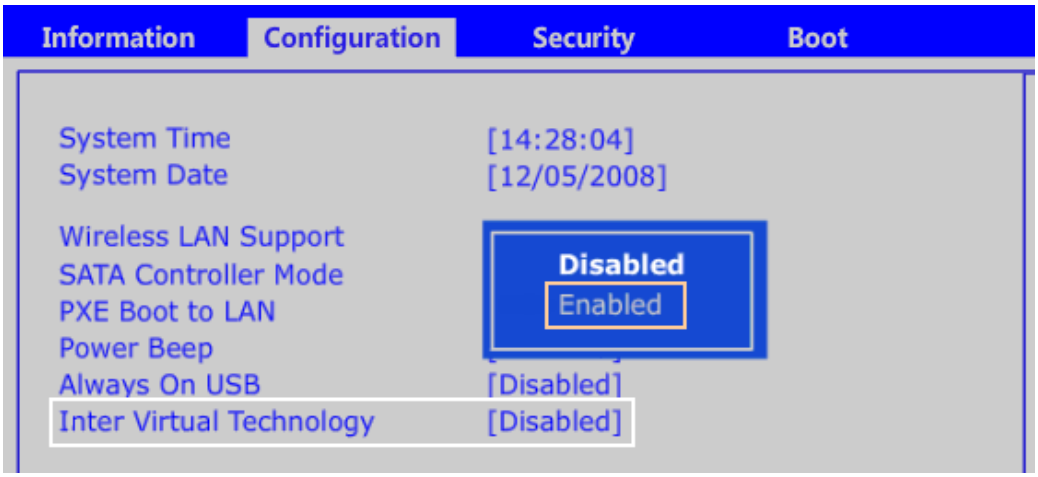
Step 1: Install Virtual Box

Step 2: Install Ubuntu

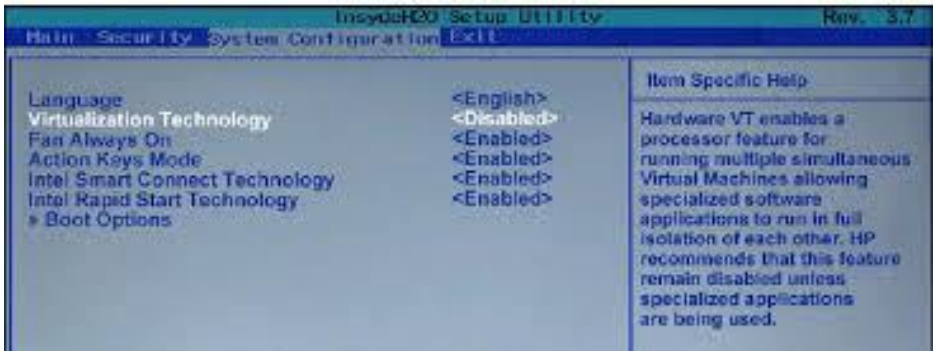
During Installation of Virtual box, or Ubuntu operating system, you might encounter following error:

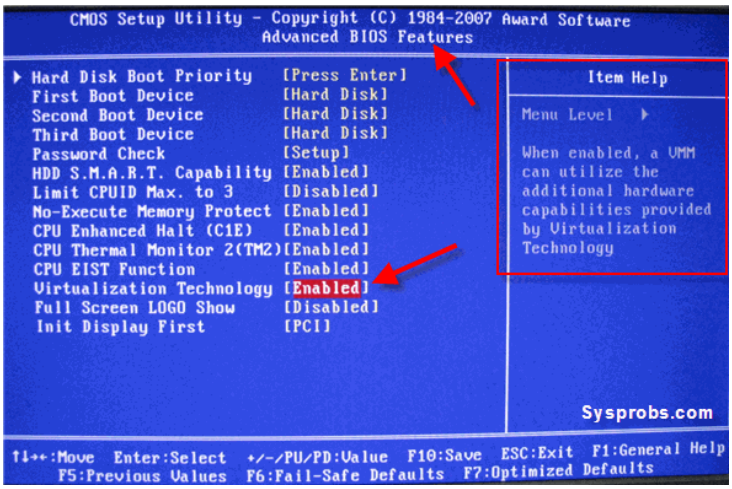


VT-x, VTx or Virtualization support error is due to disabled virtualization from BIOS, you need to reboot your system in BIOS mode and enable virtualization. This option may be available in system configuration, security, advanced settings or somewhere else, you need to locate it by yourself. However, some variations are shown in below given figures for your reference:

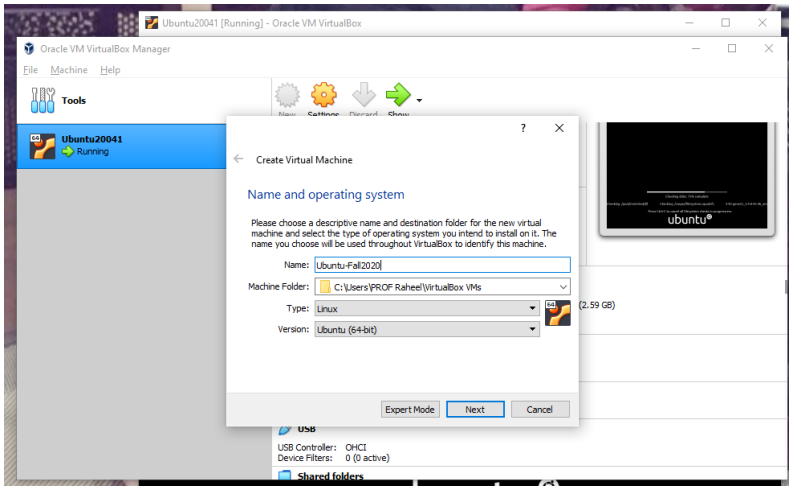

Information
Configuration
Security
Boot
System Time
[14:28:04]
System Date
[12/05/2008]
Wireless LAN Support
SATA Controller Mode
PXE Boot to LAN
Power Beep
Always On USB
[Disabled]
Inter Virtual Technology
[Disabled]
Disabled
Enabled

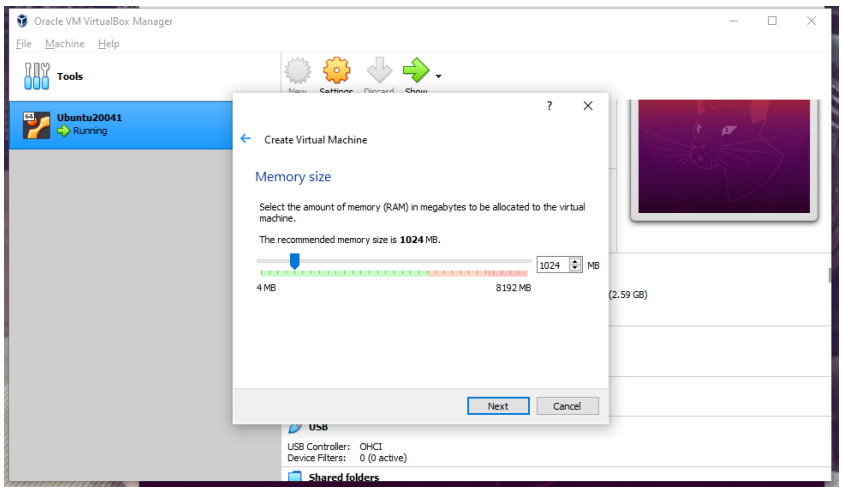
Hewlett-Packard Setup Utility
File Storage Security Power Advanced
Setup Password
Power-On Password
Device Security
USB
Slot
Netw
Syst
Syst
System Security
Data Execution Prevention ▶Enable
Virtualization Technology (VTx/VTd) ▶Enable
F10=Accept, ESC=Cancel

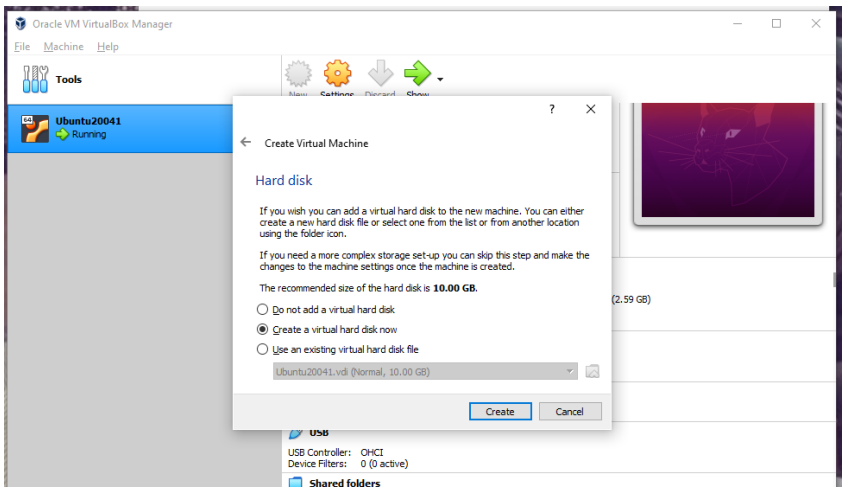

Main Security System Configuration Exit
Language <English>
Virtualization Technology <Disabled>
Fan Always On <Enabled>
Action Keys Mode <Enabled>
Intel Smart Connect Technology <Enabled>
Intel Rapid Start Technology <Enabled>
» Boot Options
Item Specific Help
Hardware VT enables a processor feature for running multiple simultaneous Virtual Machines allowing specialized software applications to run in full isolation of each other. HP recommends that this feature remain disabled unless specialized applications are being used.

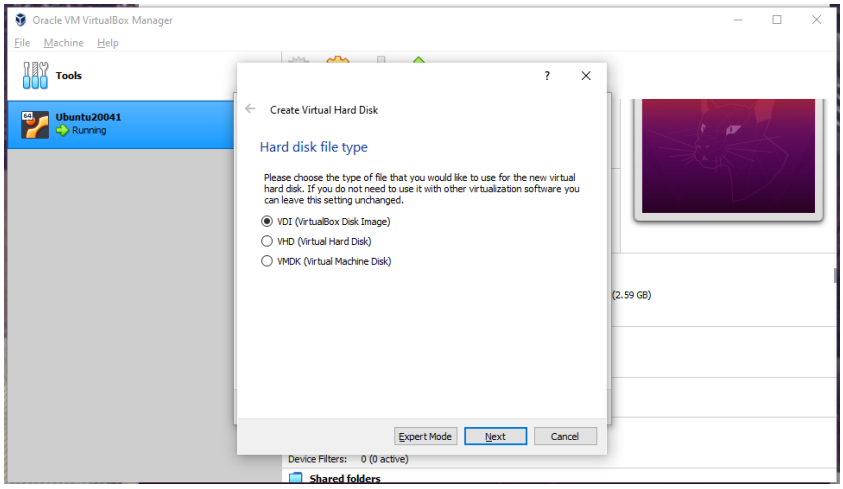


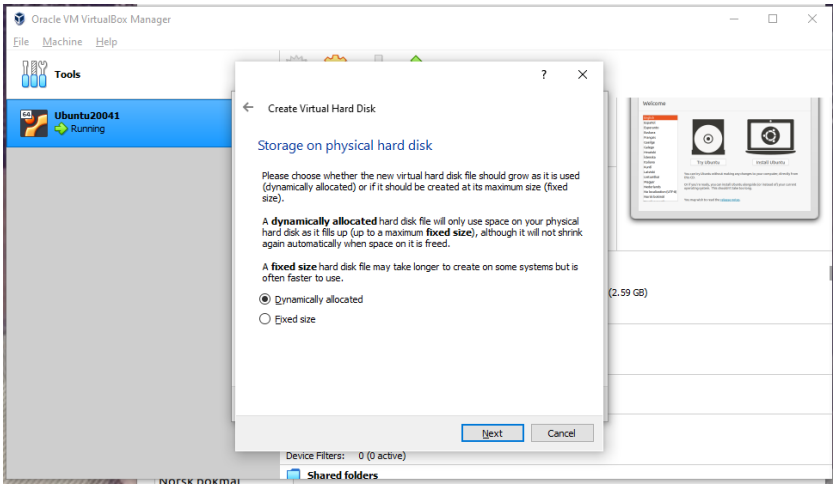
Installation of Ubuntu

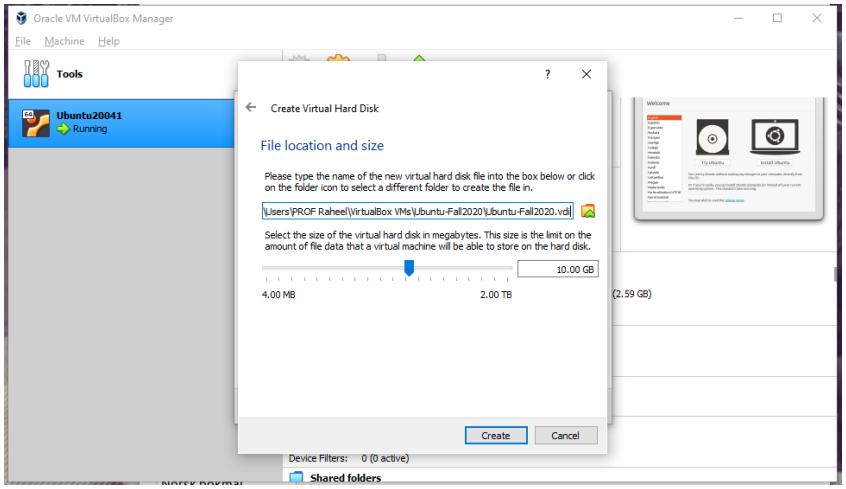


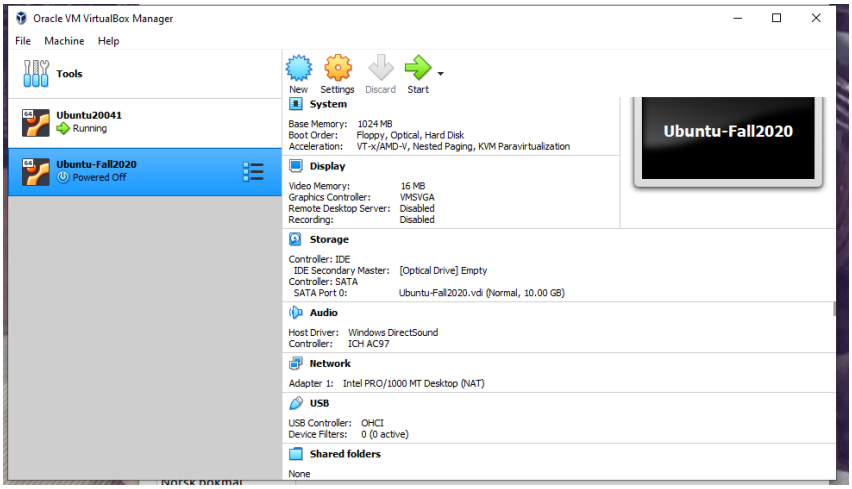


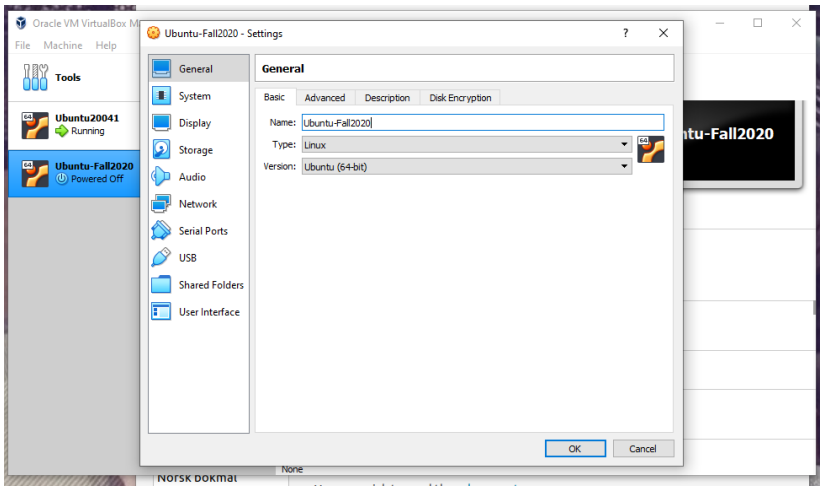

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Create Virtual Machine
Hard disk
If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.
If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.
The recommended size of the hard disk is 10.00 GB.
Do not add a virtual hard disk
Create a virtual hard disk now
Use an existing virtual hard disk file
Ubuntu20041.vdi (Normal, 10.00 GB)
Create
Cancel
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders

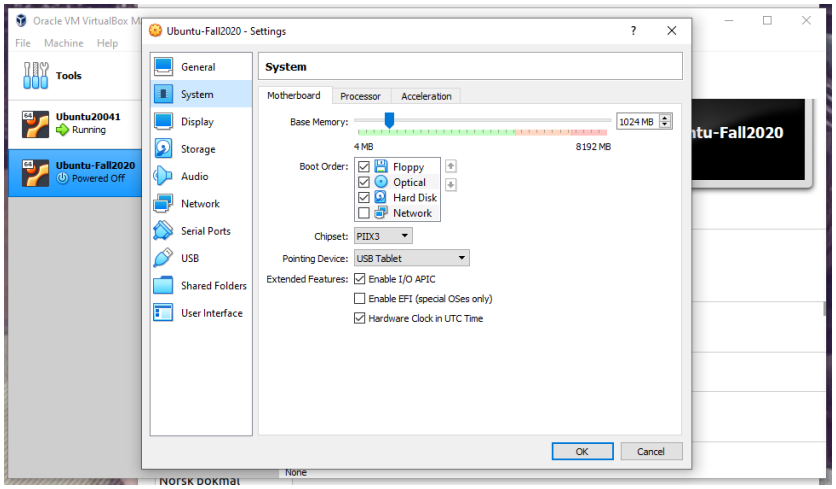

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Create Virtual Hard Disk
Hard disk file type
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.
VDI (VirtualBox Disk Image)
VHD (Virtual Hard Disk)
VMDK (Virtual Machine Disk)
Expert Mode
Next
Cancel
Device Filters: 0 (0 active)
Shared folders

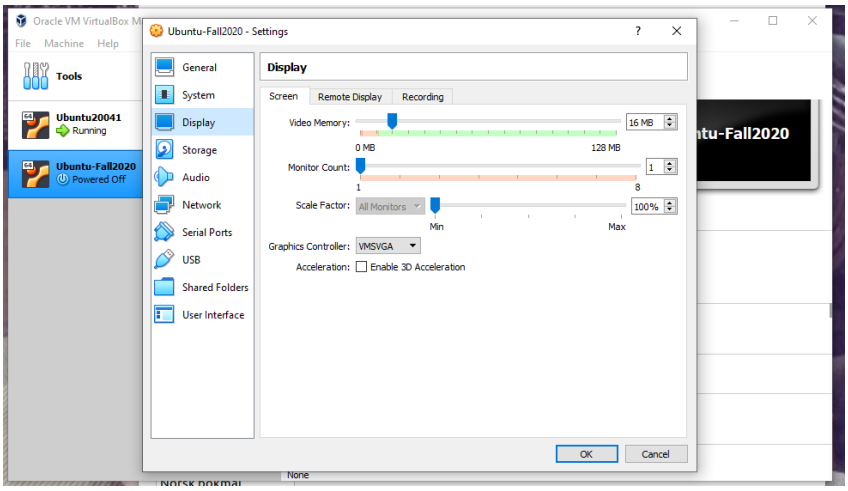

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Create Virtual Hard Disk
Storage on physical hard disk
Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).
A dynamically allocated hard disk file will only use space on your physical hard disk as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed.
A fixed size hard disk file may take longer to create on some systems but is often faster to use.
Dynamically allocated
Fixed size
Next
Cancel
Device Filters: 0 (0 active)
Shared folders

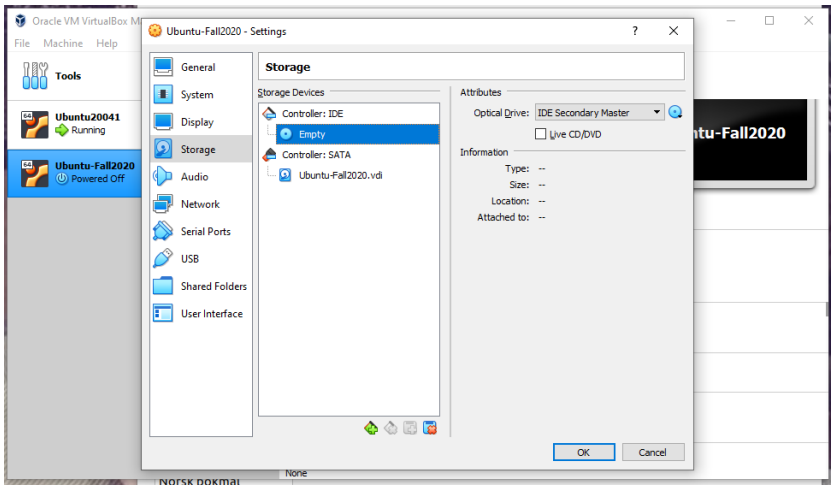

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Create Virtual Hard Disk
File location and size
Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.
\Users\PROF Raheel\VirtualBox VMs\Ubuntu-Fall2020\Ubuntu-Fall2020.vdi
Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.
10.00 GB
4.00 MB
2.00 TB
Create
Cancel
Device Filters: 0 (0 active)
Shared folders

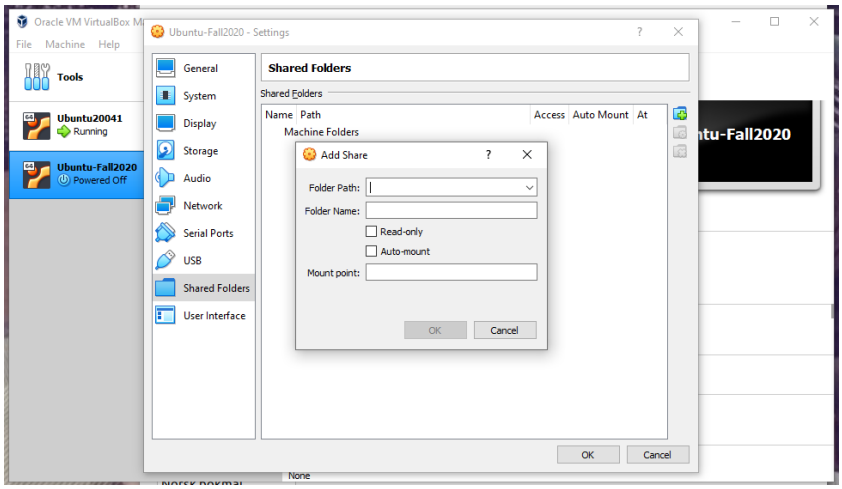

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Ubuntu-Fall2020
Powered Off
New Settings Discard Start
System
Base Memory: 1024 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Secondary Master: [Optical Drive] Empty
Controller: SATA
SATA Port 0: Ubuntu-Fall2020.vdi (Normal, 10.00 GB)
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
Network
Adapter 1: Intel PRO/1000 MT Desktop (NAT)
USB
USB Controller: OHCI
Device Filters: 0 (0 active)
Shared folders
None


Ubuntu-Fall2020 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Basic Advanced Description Disk Encryption
Name: Ubuntu-Fall2020
Type: Linux
Version: Ubuntu (64-bit)
OK
Cancel

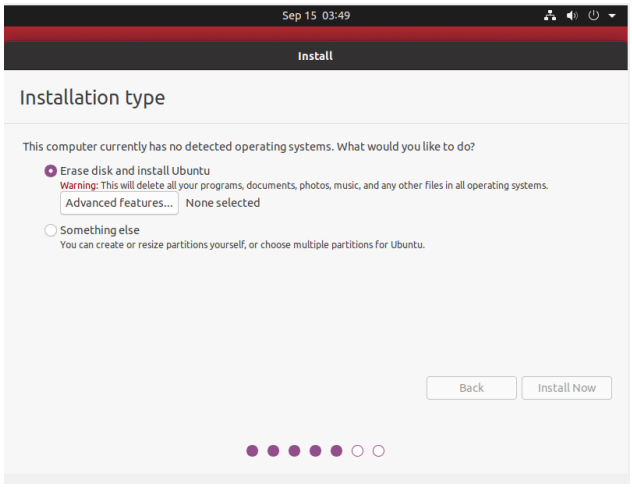

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Ubuntu-Fall2020
Powered Off
Ubuntu-Fall2020 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
System
Motherboard
Processor
Acceleration
Base Memory:
1024 MB
4 MB
8192 MB
Boot Order:
Floppy
Optical
Hard Disk
Network
Chipset:
PIIX3
Pointing Device:
USB Tablet
Extended Features:
Enable I/O APIC
Enable EFI (special OSes only)
Hardware Clock in UTC Time
OK
Cancel

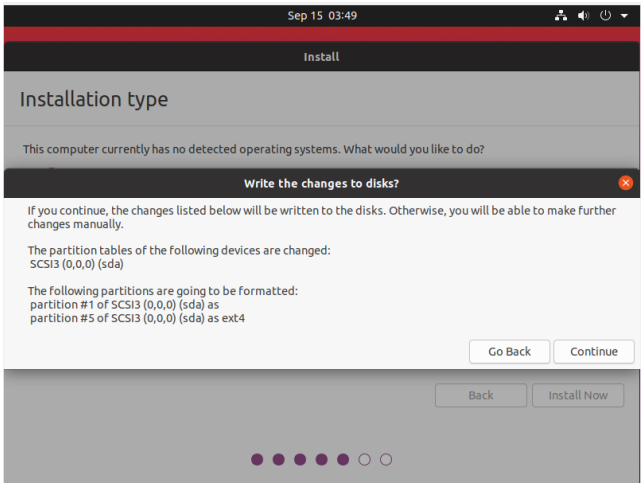

Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Ubuntu-Fall2020
Powered Off
Ubuntu-Fall2020 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Display
Screen
Remote Display
Recording
Video Memory:
16 MB
0 MB
128 MB
Monitor Count:
1
1
8
Scale Factor:
All Monitors
100%
Min
Max
Graphics Controller:
VMSVGA
Acceleration:
Enable 3D Acceleration
OK
Cancel


Oracle VM VirtualBox Manager
File Machine Help
Tools
Ubuntu20041
Running
Ubuntu-Fall2020
Powered Off
Ubuntu-Fall2020 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Storage
Storage Devices
Controller: IDE
Empty
Controller: SATA
Ubuntu-Fall2020.vdi
Attributes
Optical Drive:
IDE Secondary Master
Live CD/DVD
Information
Type:
Size:
Location:
Attached to:
OK
Cancel



Some warning might occur while selecting type of installation (erase disk), continue with that warning.





Basic Linux Command

From the command prompt simply type the name of the command:
`$ command`
Where $ is the prompt character for the Bourne shell.
Or if the command is not on your path type the complete path and name of the command such as:
`$ /usr/bin/command.`

1. su

Description: "su" stands for "super user". Runs a new shell under different user and group IDs. If no user is specified, the new shell will run as the root user.

sudo: runs single command as a root, while su changes to super user.

sudo –i // login with password of root (specified by target user's password)

sudo –s // password for root (run the shell specified by Shell environment variable or shell's –c option)

Type **exit** to quit from root

Check the privileges using **whoami** command

2. pwd

Description: Displays the name of the current directory.pwd stands for present working directory. By typing this command you are informed of which directory you are currently in.
Syntax: pwd

3. ls

Description: Displays the listing of files and directories. If no file or directory is specified, then the current directory's contents are displayed. By default the contents are sorted alphabetically.
Syntax: To view the contents of user1 home directory use this:
`$ ls`

4. cd

Description: Changes the current directory to any accessible directory on the system.
Syntax: For instance to change from /home/user1 to a subdirectory of user1 wordfiles use the following:
`$ cd wordfiles`

Variations of cd

```
$ cd ..          // one step back in previous directory
$ cd .           // leaves you in same directory
$ cd ~           // bring you to home directory
$ cd ../..       // moves you two levels back
$ cd /           // bring you to root directory
$ cd /<path>     //at any location, it brings you to specified path directly
```