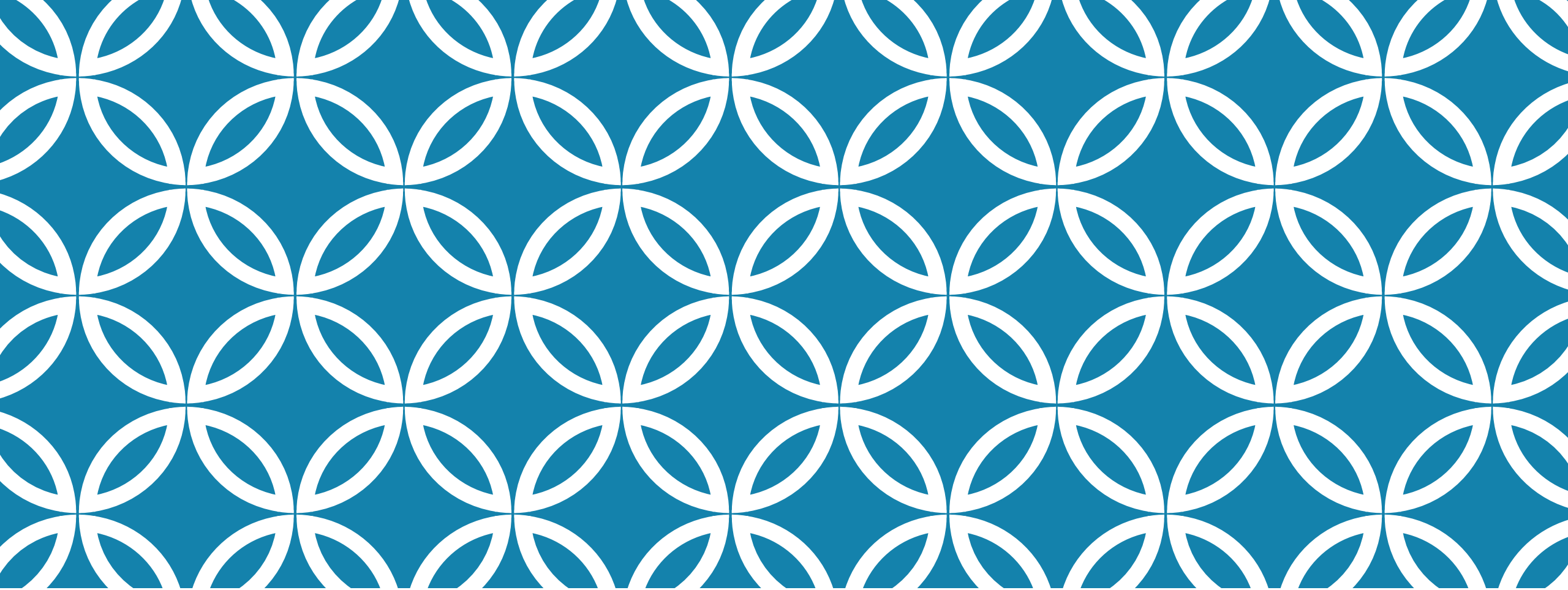


OPERATING SYSTEM LAB1

Tayyaba Fatima

WHAT IS OPERATING SYSTEM?

- No universally accepted definition

  "Everything a vendor ships when you order an operating system" is good approximation.

- But varies wildly

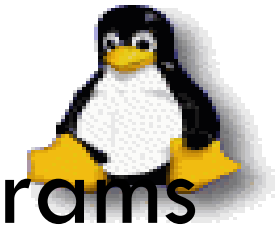
WHAT IS OPERATING SYSTEM?

The Operating system is system software that acts as an interface between the software and hardware.

The user can only communicate with hardware with the help of operating systems. So, we can say that computer hardware always required software to perform important useful tasks.

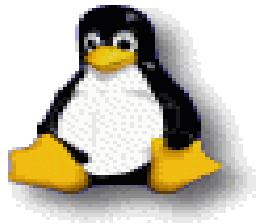
WHAT IS OPERATING SYSTEM?

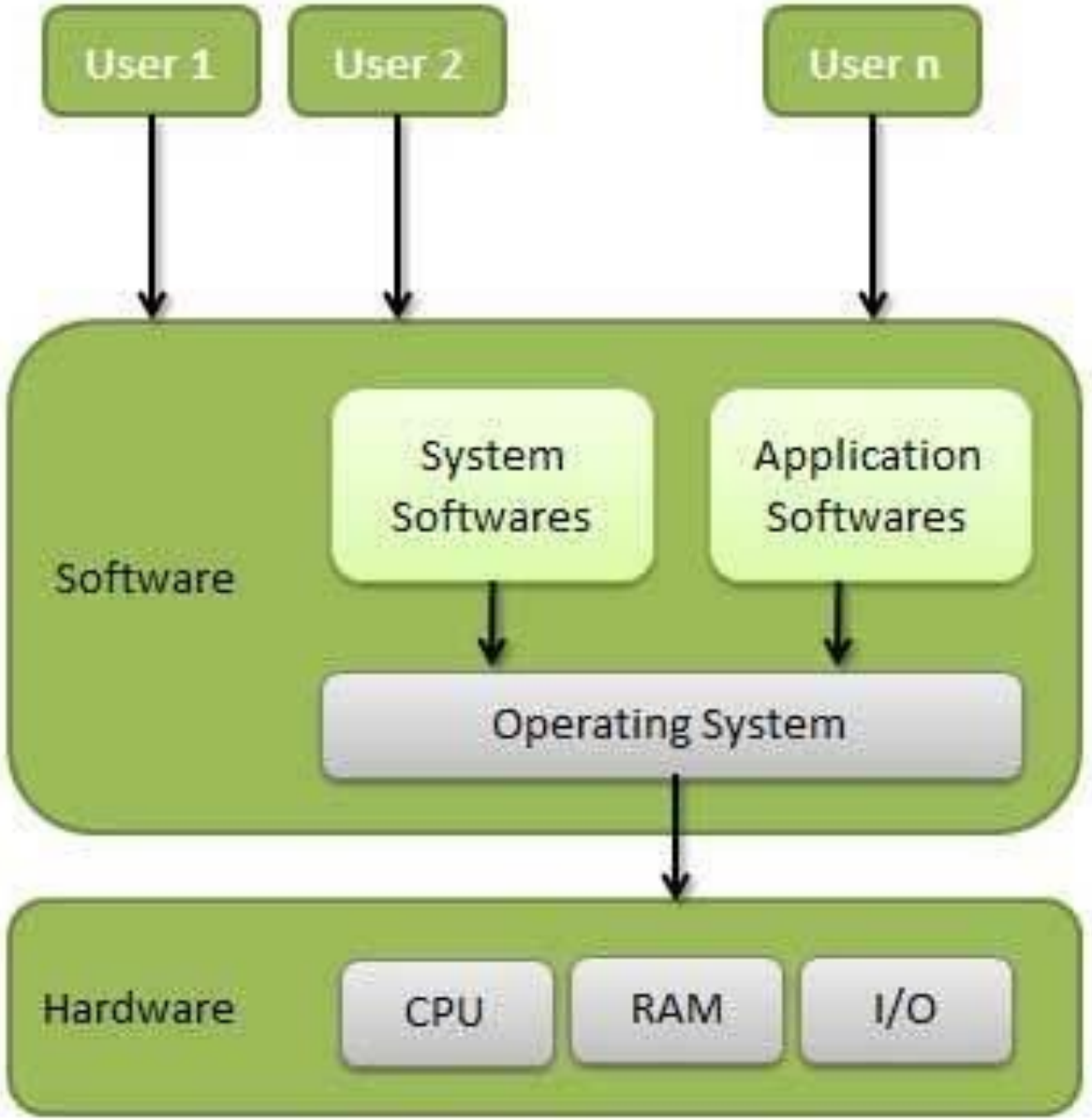
- A program that controls the execution of programs
- Acts as an interface between the user and hardware
- Responsible for the management and coordination of activities of hardware and software.
- Provides common services for computer programs



WHAT IS OPERATING SYSTEM?

- Operating System is a resource allocator
- Manages all resources
- Decides between conflicting requests for efficient and fair resource use
- Operating System is a control program
- Controls execution of programs to prevent errors and improper use of the resources




User 1
User 2
User n
Software
System Softwares
Application Softwares
Operating System
Hardware
CPU
RAM
I/O

WHAT TASKS AN OS PERFORM?

- Processor management
- Memory management
- Device management
- Storage management
- Application interface
- User interface

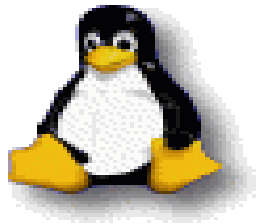
TYPES OF OPERATING SYSTEMS

- Linux
- Windows 10, Windows 8, Windows 7, Vista, XP
- Mac

OPERATING SYSTEM EXAMPLES

WHAT IS KERNEL?

- The one program running at all times on the computer, is the kernel.
- Everything else is either a system program (ships with the operating system) or an application program



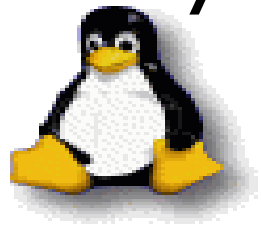
Linux Operating System

WHAT IS LINUX?

- A fully-networked 32/64-Bit Operating System
- Multi-user, Multitasking
- Coexists with other Operating Systems
- Includes the Source Code
- Open Source

WHAT IS LINUX?

- Linux is licensed under the General Public License
- General Public License is a widely used free software license
- Ensures that the source code will always be freely available to anyone wants it.

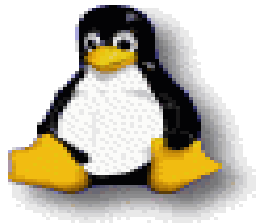


WHY IS IT SIGNIFICANT?

- Growing popularity
- Powerful
- Runs on multiple hardware platforms
- Users like its speed and stability

WHY IS IT SIGNIFICANT?

- No requirement for latest hardware
- It's "free"
- Licensed under GPL (General Public License)



LINUX VS WINDOWS

DIFFERENCES

- Financial Differences
- Technical Differences

FINANCIAL DIFFERENCES

COST		
	LINUX	WINDOWS
Online Downloads	Free	Not Available
Retail Price, CD	$50	$300

FINANCIAL DIFFERENCES

Cost for Businesses

- Companies have to spend millions for licenses for ever individual windows computer

- For Linux companies don't have to spend
- anything

TECHNICAL DIFFERENCES

- Keeping up to date
  - By Upgrading
  - Linux upgrades faster than Windows
- Compatibility
  - Linux is Backward Compatible unlike Windows

CONCLUSION

When is it best to use Linux and when should some other operating system be preferred?

- It all depends on the user

Comparison

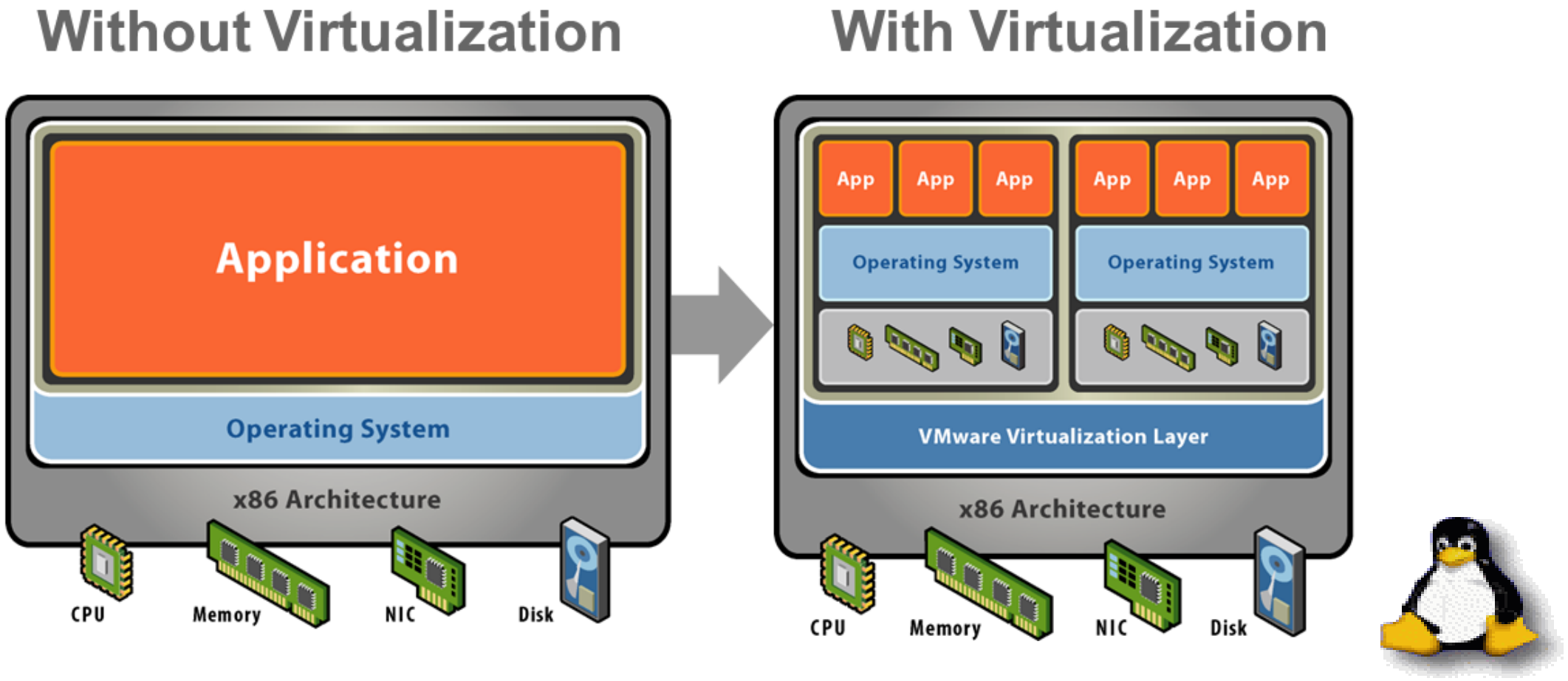
Linux	Windows
Open Source	Closed Source
Free	Cost 150-320
Free Software	Cost Software
Live CD Distribution	NO
Secure	Insecure
NO	Virus, Malware
Low Hardware Cost	High Hardware Cost
Customizable add features	Not Customizable

Hardware Virtualization

WHAT IS VIRTUALIZATION?

- Virtualization allows you to run multiple operating systems as a virtual machine on a single computer.
- Each copy of an operating system is installed into a virtual machine.

WHAT IS VIRTUALIZATION?



WHY ARE VIRTUAL MACHINES USEFUL

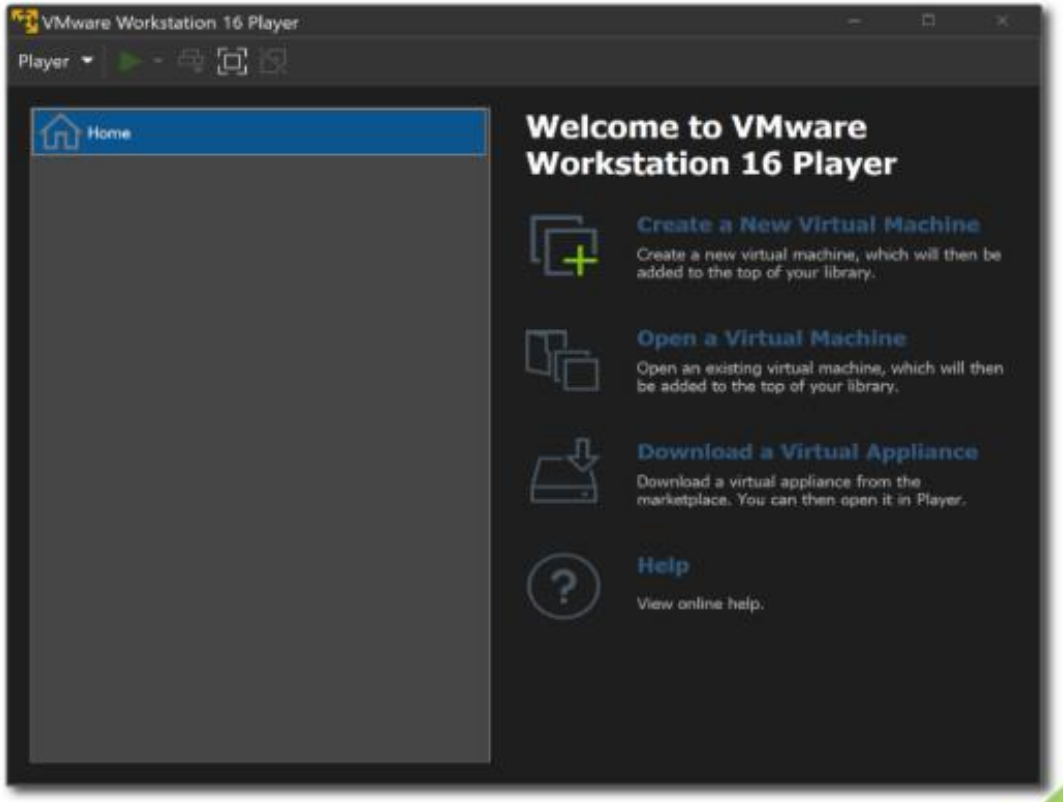
- Run Windows on Linux (or Mac OS)

- Consolidate many different guest OSes on one big machine

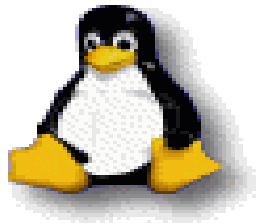
WHY ARE VIRTUAL MACHINES USEFUL

- We can migrate running virtual machines (VMs) run one host to another, so we can do automatic workload balancing across a cluster of machines
- VMs also simplify high availability, disaster recovery, etc.

VMWARE

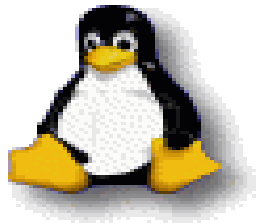

VMware Workstation 16 Player
Player
Home
Welcome to VMware Workstation 16 Player
Create a New Virtual Machine
Create a new virtual machine, which will then be added to the top of your library.
Open a Virtual Machine
Open an existing virtual machine, which will then be added to the top of your library.
Download a Virtual Appliance
Download a virtual appliance from the marketplace. You can then open it in Player.
Help
View online help.


vmware
WORKSTATION
PLAYER™
16



WHAT IS VMWARE?

- VMware Workstation Player is an ideal utility for running a single virtual machine on a Windows or Linux PC.
- The free version is available for non-commercial, personal and home use.



WHAT IS VMWARE?

- VMware provides hardware virtualization that presents a complete x86 platform to the virtual machine
- Allows multiple applications to run in isolation within virtual machines on the same physical machine

DOWNLOAD VMWARE

https://www.vmware.com/products/workstation-player/workstation-player-evaluation.html

LINUX DISTRIBUTORS

A Linux distribution (often abbreviated as distro) is an operating system made from a software collection that is based upon the Linux kernel

LINUX DISTRIBUTORS

- Corel Linux
- Ubuntu
- OpenLinux (Caldera)
- Red Hat
- Slackware
- SuSE
- TurboLinux

WHAT IS UBUNTU?

- Ubuntu is a complete Linux operating system, freely available
- Ubuntu (pronounced oo-BOON-too) is an open source Linux distribution.
- Ubuntu is considered a good distribution for beginners.

DOWNLOAD UBUNTU

https://ubuntu.com/download/desktop

TASK – LAB 1

- Download and install VMware
- Download Ubuntu
- Install Ubuntu in your virtual machine

HOW IS LINUX USED?

- Personal Workstation
- File and Print Server
- Internet Service Provider
- Client/Server systems

USING LINUX ON PERSONAL COMPUTERS

- Linux kernel for free
- Kernel is central component
- Kernel can be customized to user's needs

UBUNTU HARDWARE REQUIREMENTS

- CPU
- Main memory
- Optical Drive
- Graphic card
- Hard Drive
- Sound Card

CPU

- IBM
- INTEL
  - Pentium I – III
  - No 286, 386, 486, and Celeron
- AMD
  - K6/II/III
  - Duran
  - Athlon, Athlon XP/MP

MAIN MEMORY

SDRAM or DDRRAM

- Doesn't matter

Capacity:

- Minimum requirement 64MB
- Recommended 128MB and up

OPTICAL DRIVE

CD-ROM / DVD-ROM

- Sony, Philips, and Acer
- SuSE website has compatibility listing

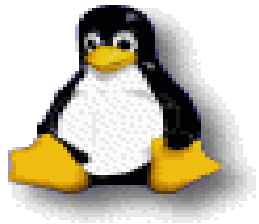
CD-R

- Sony, Philips, and Acer

GRAPHICS CARDS

Supports new cards on the market

- ATI: Radeon 7500/8500, FireGl 8700/8800, FireGL 2/4
- Matrox: G450/G550
- nVidia: GeForce 2/3/4, nForce



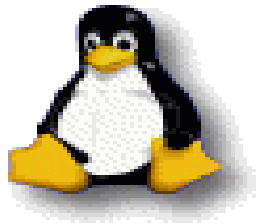
HARD DRIVES

Supports EIDE and SCSI drives

- IBM, Maxtor, and Seagate

Capacity

- Min: 400MB
- Full Install: 3GB
- Anything above 3GB



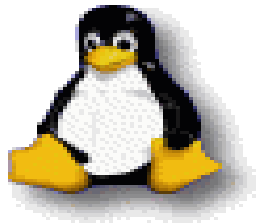
SOUND CARD

All common sound cards

- Dell & Yamaha OPL3-SA

Professional audio:

- Soundblaster: Audigy
- Terratec: EWX 24/96 (Sereo I/O analog and digital), EWS 88 MT (8 analog channels), EWS 88D (10 digital channels in ADAT format)



CONFIGURING LINUX SYSTEM

1. Selecting a language
2. Choosing automatic or manual partitioning
3. Type of software to install
4. Choosing which drive to boot from

CONFIGURING LINUX (CONTINUED)

5. Adjusting the time settings
6. Configuring the hardware aspect of the system
7. Creating the root password (for the Administrator), and user accounts
8. Hardware configuration

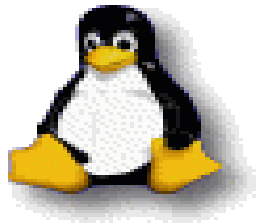
WORKING WITH LINUX

- Graphical User Interface
- Terminal

SOFTWARE APPLICATIONS

A default installation of Ubuntu contains a wide range of software that includes

- LiberOffice: word processing, spreadsheets, slideshow, drawing
- several lightweight games such as Sudoku and chess.
- Firefox: The web Browser
- Many additional software packages are accessible from the built in Ubuntu Software (previously Ubuntu Software Center)
- Sound Applications



WORKING WITH THE "TERMINAL"

- Executes user commands
- Command element
  - Command name
  - parameters

LINUX DIRECTORY STRUCTURE

- Accessing data using folders
- Root directory:
  - beginning of file system

Linux	Windows
Terminal	Commond Prompt
/home/user	C:\Windows
ls	Dir
cd (case sensitive)	cd (case insensitive)
clear	Cls
cd ..	cd.. cd ..
Sudo	Run as administrator

SUBDIRECTORIES

Examples of Subdirectories

/root	directory, starting point of the directory tree
/home	(private) directories of users
/devDevice	files that represent hardware components
/etc	Important files for system configuration
/etc/init.d	Boot scripts/usr/binGenerally accessible programs

COLORS

Blue: Directory

Green: Executable or recognized data file

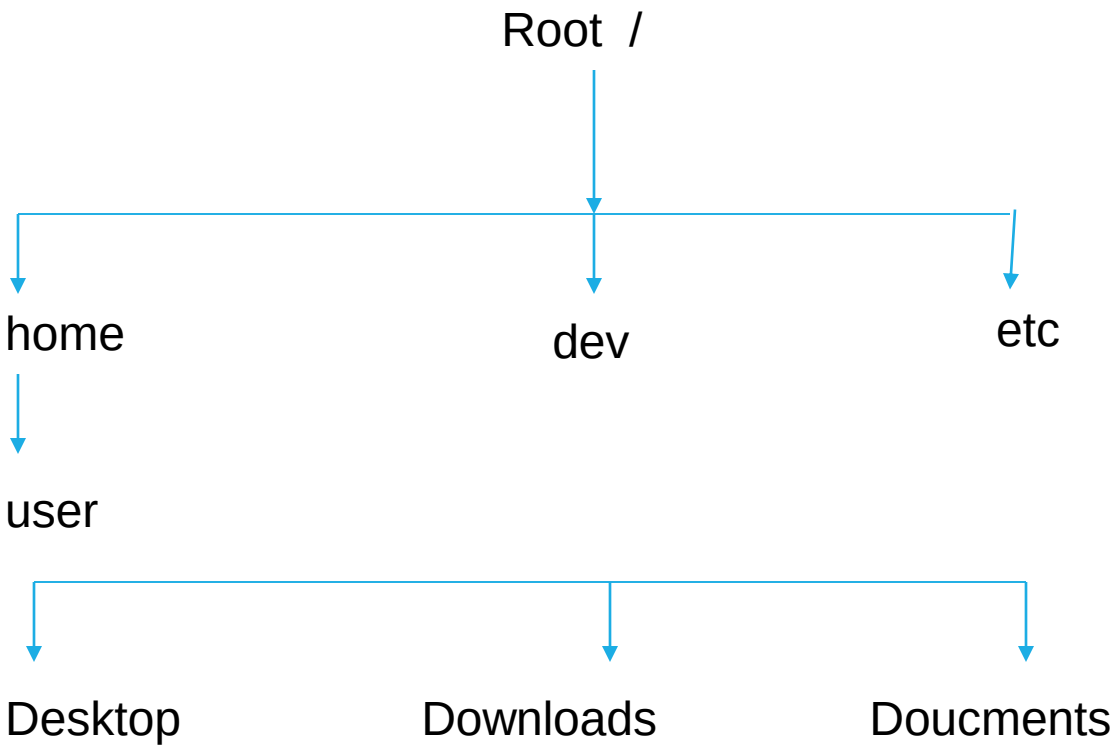
Cyan (Sky Blue): Symbolic link file

Yellow with black background: Device

Magenta (Pink): Graphic image file

Red: Archive file

Red with black background: Broken link


Root /
home
dev
etc
user
Desktop
Downloads
Doucments

BASIC COMMANDS

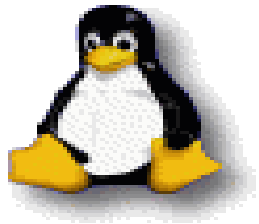
pwd	print working directory,
ls	list of contents (shows the content of a directory)
cd	change directory
cd ..	Back to parent directory
mkdir	make new directory in current working directory
Clear	clear the content of terminal

BASIC COMMANDS IN LINUX:

- pwd (print working directory)
- clear (clear screen)
- ls (list of contents)
- cd Desktop (change directory)
- mkdir oslab (create directory/folder)
- rmdir oslab (delete empty directory/folder)
- rm –r dirctoryName (delete directory)

HELLO WORLD PROGRAM IN TERMINAL

1. sudo apt-get install build-essential // this will install the necessary c/c+ + development libraries for Ubuntu
2. gedit helloWorld.cpp //to create C++ file
3. g++ helloWorld.cpp –o output //to compile C++ file
4. ./output //executes the compiled file
5. If you don't use the -o option the name of the executable will be a.out (by default).



BASIC COMMANDS IN LINUX:

- touch hello.txt (create any file in gedit)
- rm hello.txt (remove file)
- cp hello.txt hello1.txt (paste here this file)
- cp hello.txt /home/user/Downloads (copy to a specific folder from current directory)
- cp /home/user/Desktop/hello.txt /home/user/Downloads
- mv hello.txt (move file from one location to another)
- less hello.txt (The command less writes the contents of a file onto the screen a page at a time.)

BASIC COMMANDS IN LINUX:

- more hello.txt (display file contents)
- cat hello.txt (The command cat can be used to display the contents of a file on the screen)
- man ls (manuals of commands)
- whatis ls (detailed description about commands)
- clear (This will clear all text and leave you with the % prompt at the top of the window.)
- head hello.txt (The head command writes the first ten lines of a file to the screen.)
- tail hello.txt (The tail command writes the last ten lines of a file to the screen.)

ASSIGNMENT

Brief introduction to each directory in unbuntu root folder

```
user@ubuntu:/$ ls
bin    dev   lib    libx32      mnt   root  snap        sys  var
boot   etc   lib32  lost+found  opt   run   srv         tmp
cdrom  home  lib64  media       proc  sbin  swapfile    usr
```

ASSIGNMENT

1. Try and run all the commands written in the slides.
2. Make a c++ program to take input of 2 integers, calculate their addition, subtraction, multiplication, division, modulus, factorial, power. (Using Ubuntu terminal)