



University of Diyala  
College of Engineering



Department of Computer Engineering

# Computer Science

## 1<sup>st</sup> stage

### Lecture #5

- Course Number: U 102
- Course Name: Computer Science
- Credit Hours: (2-1-0-2)
- Prerequisites: None
- Course Contents: Computer Architecture, Computer Assembly and parts Characteristics, History of Computer, Generations of computer, Types of computer, Personal computer, major parts of the Computer (Hard Ware); Input Devices, Processor, Output Devices, Storage Devices, Internal Components, Software; Types of software, System software, Application software, Computer Languages and Scripting, Booting, Computer maintenance and troubleshooting, BIOS Setting, Open Source Software and Linux OS, Navigating Linux GUI, The Internet.

# Graphical User Interface

- With a graphical user interface (GUI), you interact with menus and visual images



# Popular types of OS

- Desktop Class
  - ❖ Windows
  - ❖ OS X
  - ❖ Unix/Linux
  - ❖ Chrome OS
- Server Class
  - ❖ Windows Server
  - ❖ Mac OS X Server
  - ❖ Unix/Linux
- Mobile Class
  - ❖ Android
  - ❖ iOS
  - ❖ Windows Phone

# Desktop Class Operating Systems:-

- **Platform:** the hardware required to run a particular operating system
  - Intel platform (IBM-compatible)
    - Windows
    - DOS
    - UNIX
    - Linux
  - Macintosh platform
    - Mac OS
  - iPad and iPhone platform
    - iOS

# Ms-DOS

- Single User Single Tasking OS.
- It had no built-in support for networking, and users had to manually install drivers any time they added a new hardware component to their PC.
- DOS supports only 16-bit programs.
- Command line user interface.
- So, why is DOS still in use? Two reasons are its size and simplicity. It does not require much memory or storage space for the system, and it does not require a powerful computer.

# Microsoft Windows

- The graphical Microsoft operating system designed for Intel-platform desktop and notebook computers.
- Best known, greatest selection of applications available.
- Current editions include Windows 7, 8, 8.1 and 10.

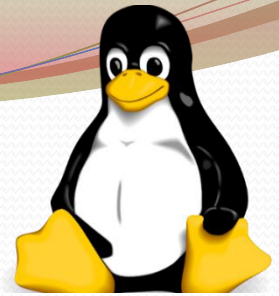


# Mac OS

- User-friendly, runs on Mac hardware. Many applications available.
- Current editions include: Sierra, High Sierra, Mojave, Catalina & Big Sur—Version XI(Released in Nov 2020)







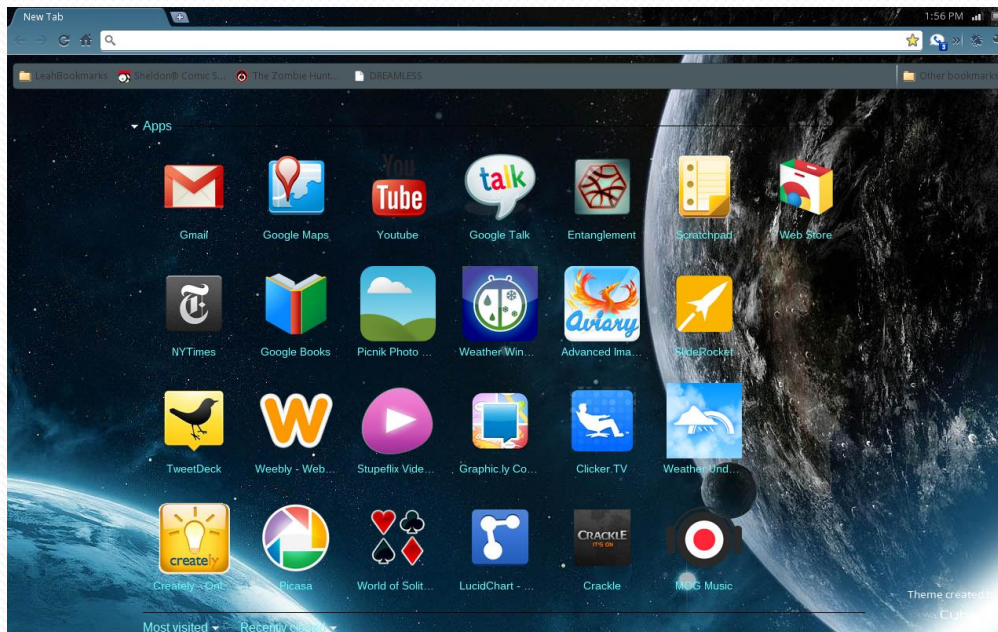
# Linux

- **Linux:** An open-source, cross-platform operating system that runs on desktops, notebooks, tablets, and smartphones.
  - The name *Linux* is a combination *Linus* (the first name of the first developer) and *UNIX* (*another operating system*).
- Users are free to modify the code, improve it, and redistribute it,
- Developers are not allowed to charge money for the Linux kernel itself (the main part of the operating system), but they can charge money for **distributions** (**distros** for short).



# Google Chrome OS

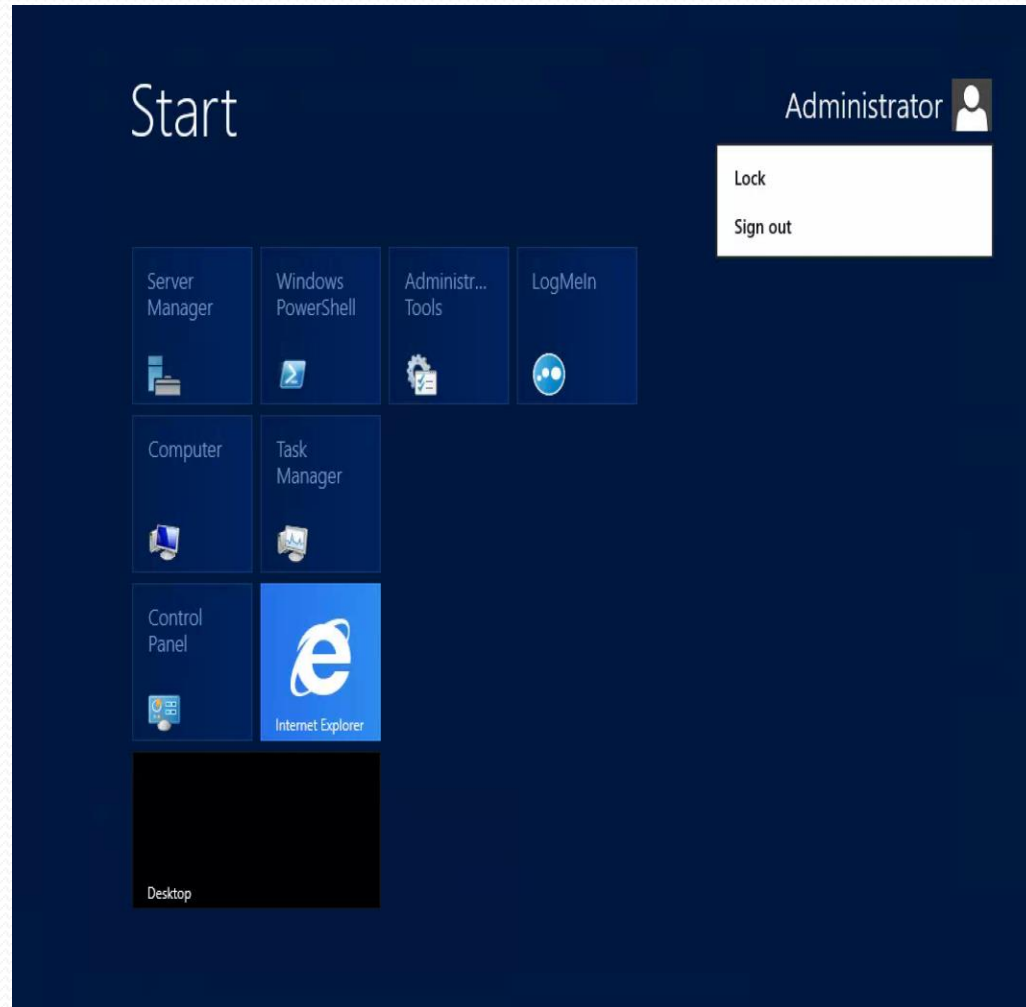
- **Chrome OS.** Is a popular thin client operating system.
- **Thin client** A computer with minimal hardware, designed for a specific task. For example, a thin web client is designed for using the Internet.



# Server Operating Systems

- Windows Server
  - Familiar GUI interface for those experienced with Windows
- UNIX
  - Very mature server capabilities, time-tested, large user community, stable
- Linux
  - Free, customizable, many free services and utilities available

# Windows Server



# UNIX

```
mars@marsmain /usr/portage/app-shells/bash $ sudo /etc/init.d/bluetooth status
Password:
* status: started
mars@marsmain /usr/portage/app-shells/bash $ ping -q -c1 en.wikipedia.org
PING rr.esams.wikimedia.org (91.198.174.2) 56(84) bytes of data.

--- rr.esams.wikimedia.org ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 2ms
rtt min/avg/max/mdev = 49.820/49.820/49.820/0.000 ms
mars@marsmain /usr/portage/app-shells/bash $ grep -i /dev/sda /etc/fstab | cut --fields=-3
/dev/sda1          /boot
/dev/sda2          none
/dev/sda3          /
mars@marsmain /usr/portage/app-shells/bash $ date
Sat Aug  8 02:42:24 MSD 2009
mars@marsmain /usr/portage/app-shells/bash $ lsmod
Module              Size  Used by
rndis_wlan          23424  0
rndis_host           8696  1 rndis_wlan
cdc_ether            5672  1 rndis_host
usbnet               18688  3 rndis_wlan,rndis_host,cdc_ether
parport_pc          38424  0
fglrx               2388128  20
parport              39648  1 parport_pc
iTCO_wdt             12272  0
i2c_i801             9380  0
mars@marsmain /usr/portage/app-shells/bash $ █
```

# Tablet and Phone Operating Systems

- **System-on-chip (SoC):** An operating system that comes preinstalled on a chip on a portable device such as a smartphone.
- Popular SoC operating systems:
  - iOS: for iPad, iPhone
  - Android: for a variety of tablets and phones
- Downloadable applications (apps) from an App store, for example:
  - Apple App Store
  - Google Play Store



# iOS on the iPhone and iPad

- The Apple-created operating system for Apple tablets and phones.
- The current stable version, iOS 16, was released to the public on 2023.



# Android



- Android, a popular OS for smartphones and tablets, is based on Linux Kernel.
  - Developed by Google
- Current versions include:
  - Android 8 Oreo
  - Android 9 Pie
  - Android 10
  - Android 11 (released on Sep, 2020)





# Advantage of Linux Operating System

## 1. Open Source

As it is open-source, its source code is easily available.

Anyone having programming knowledge can customize the operating system.

One can contribute, modify, distribute, and enhance the code for any purpose.

## 2. Security

The Linux security feature is the main reason that it is the most favourable option for developers.

It is not completely safe, but it is less vulnerable than others.

Each application needs to authorize by the admin user.

Linux systems do not require any antivirus program.

## 3. Free

Certainly, the biggest advantage of the Linux system is that it is free to use.

We can easily download it, and there is no need to buy the license for it.

It is distributed under GPL (General Public License).

Comparatively, we have to pay a huge amount for the license of the other OS

# Advantage of Linux Operating System

## **4. Lightweight**

The requirements for running Linux are much less than other operating system In Linux, the memory footprint and disk space are also lower. Generally, most of the Linux distributions required as little as 128MB of RAM around the same amount for disk space.

## **5. Stability**

Linux is more stable than other operating systems.

Linux does not require to reboot the system to maintain performance levels.

# Advantage of Linux Operating System

## **6. Performance**

Linux system provides high performance over different networks.

It is capable of handling a large number of users simultaneously.

## **7. Flexibility**

Linux operating system is very flexible.

It can be used for desktop applications, embedded systems, and server applications too.

It also provides various restriction options for specific computers.

We can install only necessary components for a system.

## **8. Software Updates**

In Linux, the software updates are in user control.

We can select the required updates.

There a large number of system updates are available.

These updates are much faster than other operating systems.

So, the system updates can be installed easily without facing any issue.

# Advantage of Linux Operating System

## 9. Distributions/ Distros

There are many Linux distributions available in the market. It provides various options and flavors of Linux to the users. We can choose any distros according to our needs.

Some popular distros are **Ubuntu, Fedora, Debian, Linux Mint, Arch Linux,**

For the beginners, Ubuntu and Linux Mint would be useful. Debian and Fedora would be good choices for proficient programmers.

## 10. Live CD/USB

Almost all Linux distributions have a **Live CD/USB** option. It allows us to try or run the Linux operating system without installing it.

## 11. Graphical User Interface

Linux is a command-line based OS but it provides an interactive user interface like Windows.

# Advantage of Linux Operating System

## **12. Suitable for programmers**

It supports almost all of the most used programming languages such as C/C++, Java, Python, Ruby, and more.

Further, it offers a vast range of useful applications for development.

The programmers prefer the Linux terminal over the Windows command line.

The package manager on Linux system helps programmers to understand how things are done.

Bash scripting is also a functional feature for the programmers.

It also provides support for SSH, which helps in managing the servers quickly.

## **13. Community Support**

Linux provides large community support.

We can find support from various sources.

There are many forums available on the web to assist users.

Further, developers from the various open source communities are ready to help us.

# Advantage of Linux Operating System

## **14. Privacy**

Linux always takes care of user privacy as it never takes much private data from the user. Comparatively, other operating systems ask for the user's private data.

## **15. Networking**

Linux facilitates with powerful support for networking. The client-server systems can be easily set to a Linux system. It provides various command-line tools such as ssh, ip, mail, telnet, and more for connectivity with the other systems and servers. Tasks such as network backup are much faster than others.

## **16. Compatibility**

Linux is compatible with a large number of file formats as it supports almost all file formats.

## **17. Installation**

Linux installation process takes less time than other operating systems such as Windows. Further, its installation process is much easy as it requires less user input. It does not require much more system configuration even it can be easily installed on old machines having less configuration.

# Advantage of Linux Operating System

## 18. Multiple Desktop Support

Linux system provides multiple desktop environment support for its enhanced use. The desktop environment option can be selected during installation. We can select any desktop environment such as **GNOME (GNU Network Object Model Environment)** or **KDE (K Desktop Environment)** as both have their specific environment.

## 19. Multitasking

It is a multitasking operating system as it can run multiple tasks simultaneously without affecting the system speed.

## 20. Heavily Documented for beginners

There are many command-line options that provide documentation on commands, libraries, standards such as manual pages and info pages. Also, there are plenty of documents available on the internet in different formats, such as Linux tutorials, Linux documentation project, Serverfault, and more. To help the beginners, several communities are available such as **Ask Ubuntu**, **Reddit**, and **StackOverflow**.