

Windows Fundamentals

Agenda:

- module 1: Operating System Basic
 - module 2: Windows to windows
 - module 3: user & groups in windows
 - module 4: Device Management
 - module 5: Disk Management
 - Module 6: File Systems → NTFS
 - Module 7: Process Management
- } handles on
labor
* Testprep: upload lab
* Recordings
* Quizz
* Knowledge check
* Digitizing notes
* "windows fundamentals"

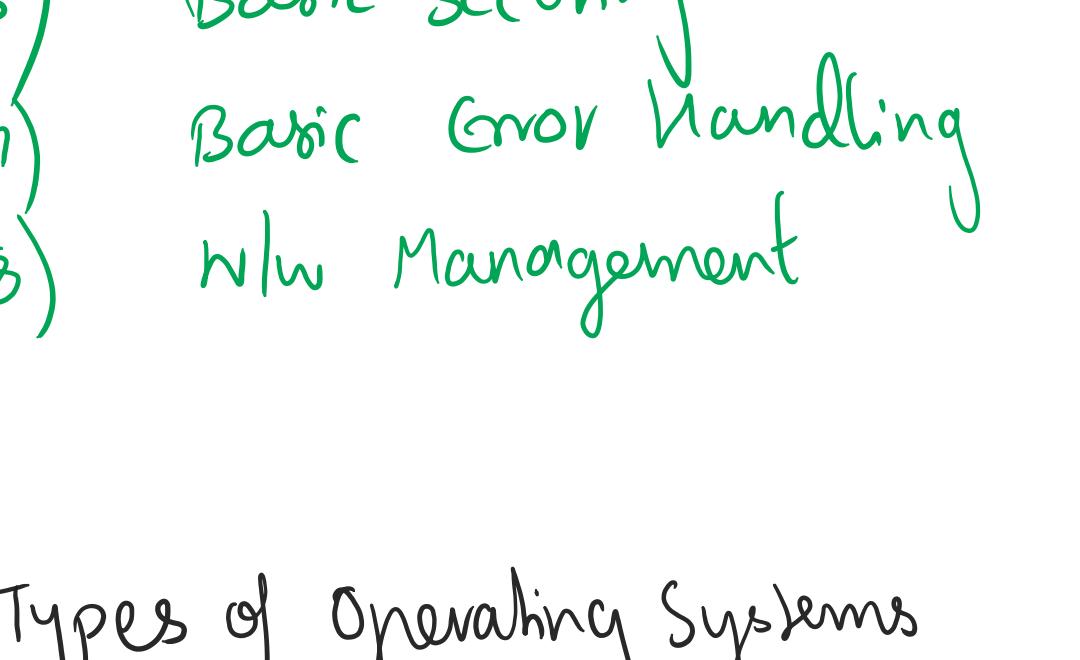
Module 1 → OS Basics

* what is an OS?

- manager of the computer

- intermediary component b/w H/W & S/W

* OS components / layers



physical components
- HD
- RAM
- processor

set of instructions → task
Types
1) System s/w
↳ control & manage H/W components
e.g.: OS, Device Drivers
2) Application s/w
↳ perform a specific task
e.g.: paint, ms word,

* Kernel → main / imp component of the OS

- engine in a car
→ manages all the operations

* UI (User Interface) → used by the users to interact with the system

user { L GUI → graphical user intf → windows desktop, mac, phones, websites

L CLI → command line intf → command prompt, Linux Server

API { L system call → Apps use this to req. resources from the kernel.

Functions of the operating system

- 1) Process Management → Task Manager
 - creating, scheduling, terminating
 - allocating resources
 - time slice
- 2) Memory Management → Memory Manager
 - RAM
 - memory allocation
 - memory protection
 - virtual memory
 - A1 A2
MSP1 MSP2
↳ memory management technique
 - ↳ space/storage → HDD/SSD
 - ↳ Temp. sol.
convert that to a temp. RAM
- 3) Device Management → Device Manager
 - device drivers (Translator b/w OS & Device)
 - I/O Management
 - Resource allocation
- 4) File System Management → File Explorer/Manager
 - Hierarchical structure
 - org. data = files & folders
 - file org
 - file access & permissions
 - Disk management
- 5) Storage / Disk Management → Disk Manager
 - secondary storage devices → HDD, SSD
- 6) Basic Security
- 7) Basic Error Handling
- 8) H/w Management

* Types of Operating Systems

1) Single Tasking OS (e.g.: MS DOS)

2) Multi Tasking OS (e.g.: Windows 10, 11, Mac OS, Linux)

3) Real Time OS → timecritical task completion

→ no delay

- Shock mounted

- Aviation → VRworks

- Medical devices

- IoT → freeRTOS

4) Embedded OS

- lightweight

- built-in behavior → cars, ATMs, washing machine

5) Mobile OS ↳ specifically for smartphones

e.g.: Android, iOS, windows,

6) Batch OS ↳ payroll system

→ processes jobs (tasks) in batches

→ no user interaction

Multi Tasking

→ multiple features

→ ability to run multiple tasks at the same time.

→ rapidly switching

```
graph LR; CPU[CPU] --> T1[T1]; CPU --> T2[T2]
```

→ use 2 or more CPUs (cores)

→ Run the tasks parallelly

Multiprocessing

→ processing unit

↳ Indep. II

↳ executing individual tasks

↳ single core

↳ multi core

```
graph LR; CPU_Socket[CPU socket] --> T1[T1]; CPU_Socket --> T2[T2]; CPU_Socket --> T3[T3]; CPU_Socket --> T4[T4]
```

1 core = 2 tasks

1 core = 1 task

AMD: symmetric Multithreading

Operating System Examples

1) Windows

↳ Desktop OS → windows 11

↳ Server OS → windows server 2022

- Linux

↳ Ubuntu

↳ fedora

↳ RHEL

↳ Debian

- Mac OS

↳ chrome OS

- Android

- iOS

Boot process

Booking / Bootstrapping procedure → loading the OS

1) hit the power button

2) load BIOS (Basic Input Output System)

3) runs a test; POST (power on self test)

↳ examine its components

4) load the OS

↳ secondary memory (Disk)

↳ primary memory (RAM)

MBR (Master Boot Record)

OS loader / Boot loader → load it to the RAM

(winload.exe)

5) Drivers, settings, initialization, start services

6) login screen → "Authentication"

↳ verify the identity

↳ Authorization

↳ verify the permissions / access level

Types of Booting

1) Cold

→ starting the system from first

→ all 6 steps are executed

→ longer

2) Warm

→ system running → update → Restart

→ not all 6 steps are executed

→ quick

1) Dual boot → 1 H/W → 1 OS → windows

2) Single boot → 1 H/W → 1 OS → common

3) Multi boot → 1 H/W → more than 2 OS

↳ development / testing

↳ test Apps on diff. OS