SKILL DEVELOPMENT AND TRAINING PROGRAMS ON

SOFTWARE INSTALLATION & TROUBLESHOOTING

INNOVATIVE AND PERSONALIZED SOFTWARE SOLUTIONS

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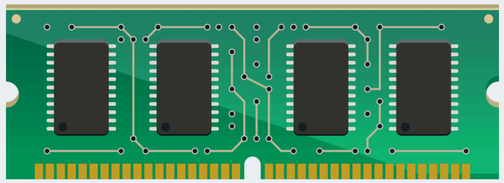
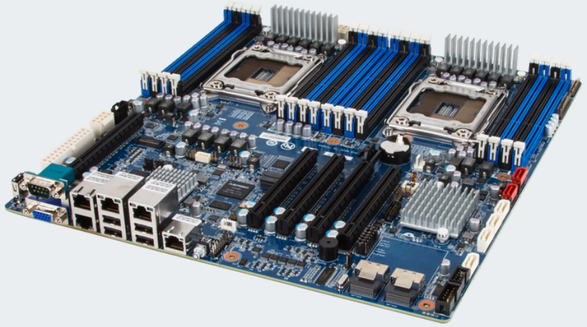
TABLE OF CONTENT

"INTRODUCTION TO BASIC COMPUTER HARDWARE: RAM, MOTHERBOARD, SSD, AND USB KEYBOARD"





INTRODUCTION TO OS INSTALLATION

1.1 What is an Operating System (OS)?

An operating system (OS) is software that manages computer hardware and provides services for applications. Examples include **Windows**, **Linux**, and **macOS**.

1.2 Importance of Choosing the Right OS?

Choosing the right OS is crucial based on your needs:

- **For Gaming:** Windows 10/11 is ideal due to software support.
- **For Development:** Linux provides flexibility and open-source tools.
- **For Business:** Windows Pro or macOS offers security and productivity.

TYPES OF OPERATING SYSTEMS

WINDOWS OS

1.Windows 10, 11 for home and office use.
2.Windows Server for business and IT infrastructure.

LINUX OS

1.Popular distributions: Ubuntu, Fedora, Debian.
2.Mostly free and open-source, great for security and programming.

MACOS

1.Exclusive to Apple devices, known for stability and professional use.

Difference Between OS Types:

Feature	Windows	Linux	macOS
Open-Source	No	Yes	No
Customization	Limited	High	Limited
Compatibility	High	Medium	Low
Cost	Paid	Free (mostly)	Paid

SYSTEM REQUIREMENTS CHECK

3.1 HARDWARE REQUIREMENTS

OS	Minimum RAM	Storage Required	Processor Requirement
Windows 10	2GB	20GB	1GHz, 2-core
Ubuntu	4GB	25GB	2GHz, dual-core
Windows 11	4GB	64GB	1GHz, TPM 2.0
OS	Minimum RAM	Storage Required	Processor Required

3.2 COMPATIBILITY WITH 32-BIT VS. 64-BIT

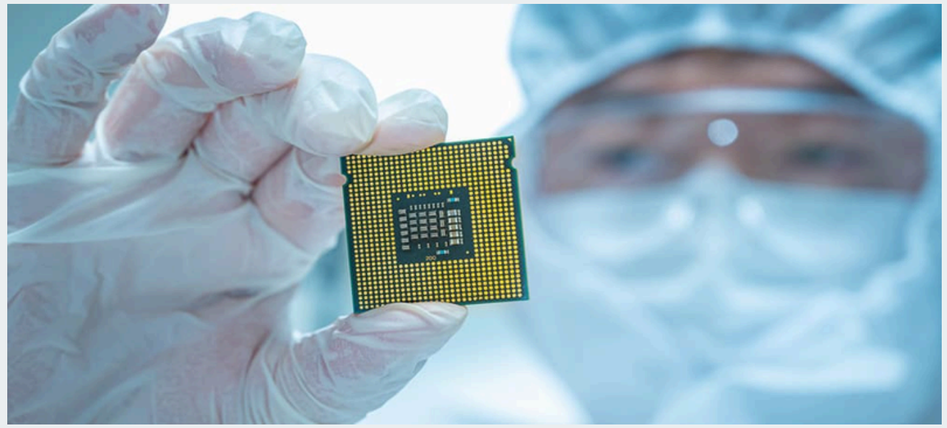
- 32-bit OS supports up to 4GB RAM.
- 64-bit OS supports more than 4GB RAM and runs modern applications better.

3.3 CHECKING TPM AND SECURE BOOT FOR WINDOWS 11

- Open Run (Win + R) > Type ‘tpm.msc’ > Press Enter to check if TPM 2.0 is available.
- Secure Boot can be enabled/disabled in BIOS settings.

SYSTEM REQUIREMENTS CHECK

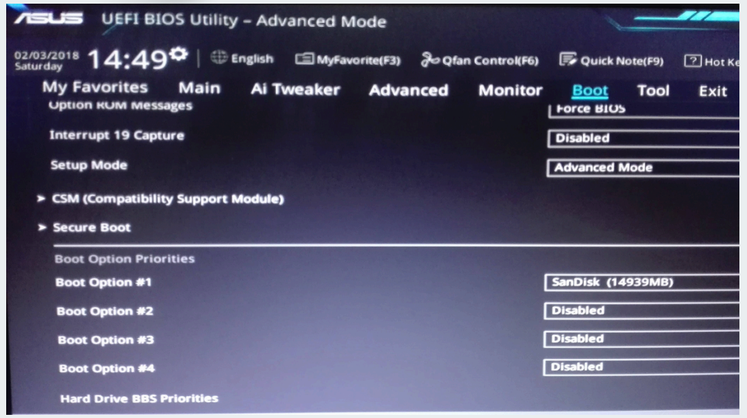
Processor Type	Clock Speed (GHz)	Performance Level	Processor Type
Intel i3 (10th Gen)	2.4 - 3.6 GHz	Basic (Office Work, Browsing)	Intel i3 (10th Gen)
Intel i5 (11th Gen)	2.5 - 4.2 GHz	Moderate (Gaming, Editing)	Intel i5 (11th Gen)
Intel i7 (12th Gen)	2.8 - 4.8 GHz	High (Video Editing, Programming)	Intel i7 (12th Gen)
Intel i9 (13th Gen)	3.0 - 5.5 GHz	Extreme (Heavy Gaming, AI, 3D Rendering)	Intel i9 (13th Gen)



PREPARING FOR OS INSTALLATION

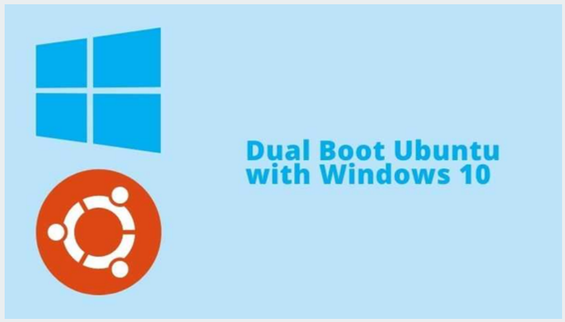
4.1 BACKING UP IMPORTANT DATA

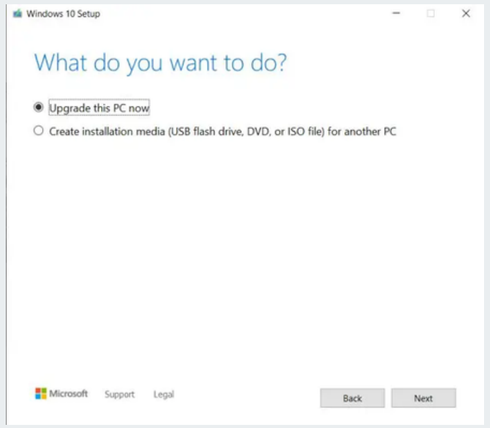
Use external storage, cloud backup (Google Drive, OneDrive).

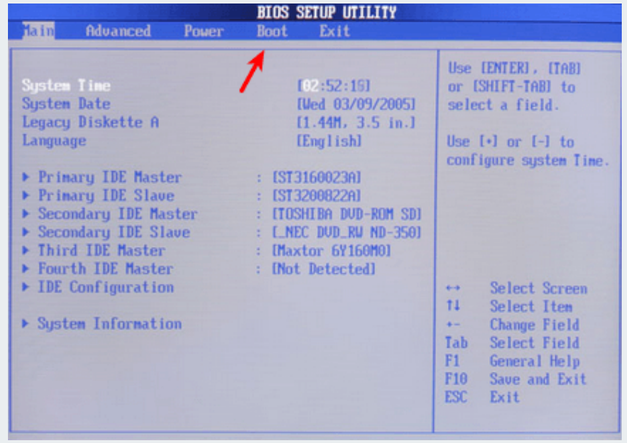


4.2 CHOOSING INSTALLATION TYPE

- Fresh Install: Deletes everything.
- Upgrade Install: Keeps files and settings.
- Dual Boot: Runs two operating systems.







PREPARING FOR OS INSTALLATION

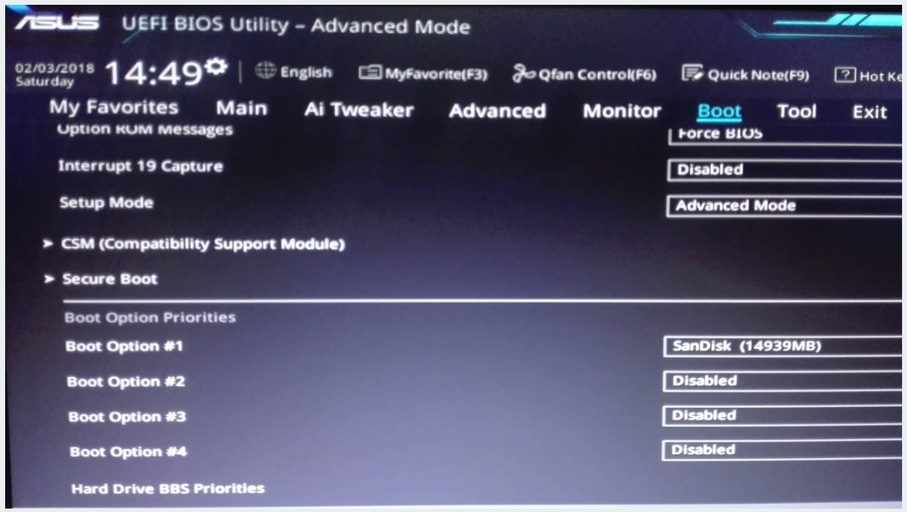
4.3 CREATING BOOTABLE USB/DVD

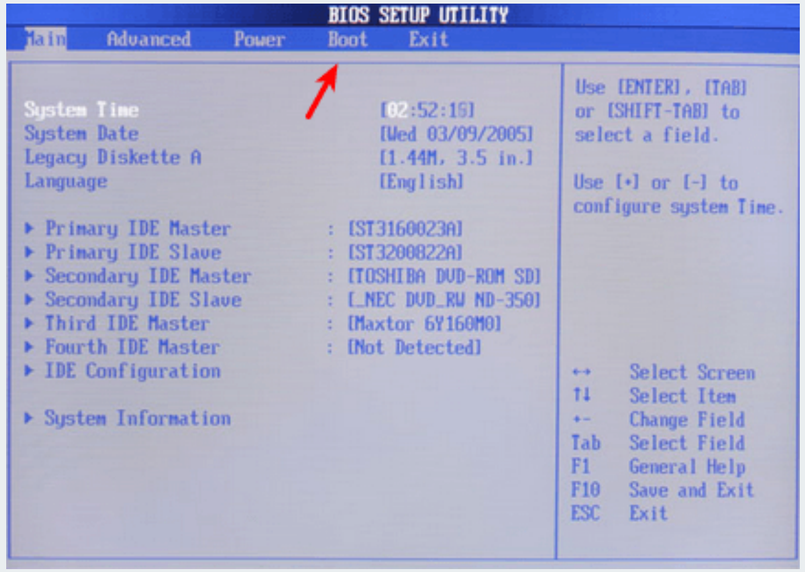
Use Rufus, BalenaEtcher, or Windows Media Creation Tool.

4.4 CHANGING BOOT ORDER IN BIOS/UEFI

Restart PC, press F2 / DEL / ESC to enter BIOS.

Set USB as the first boot device.





PARTITIONING THE HARD DRIVE

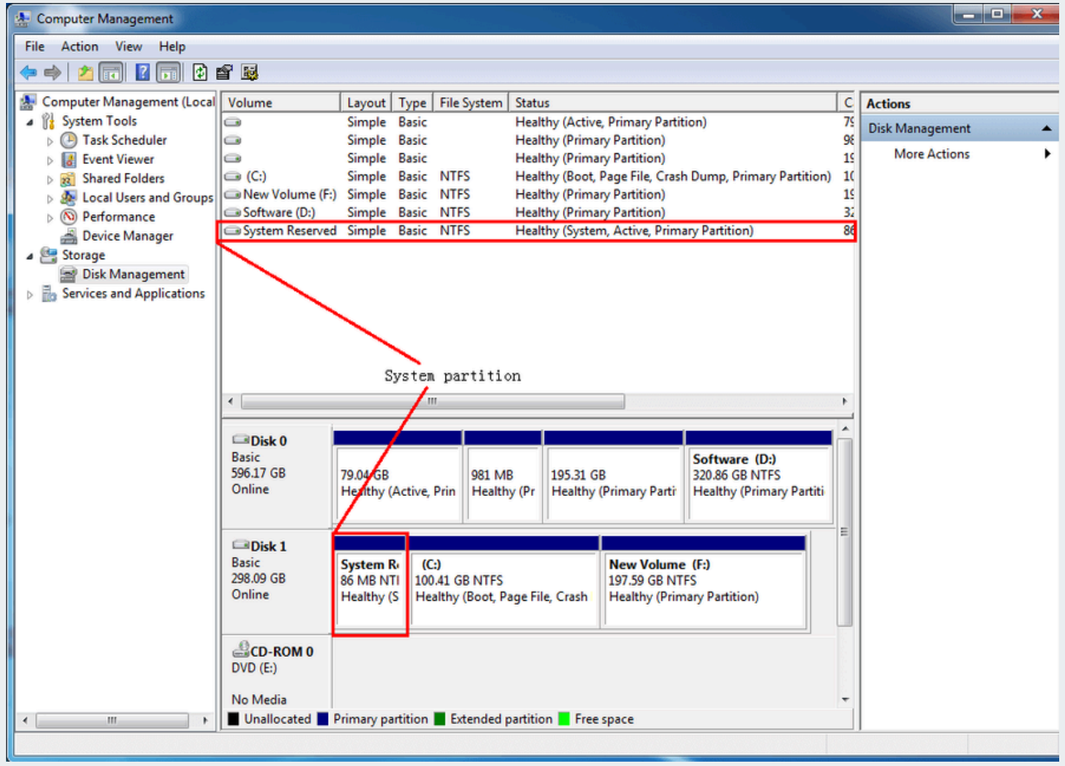
When installing an operating system (OS), you need to partition the hard drive, which means dividing it into separate sections (partitions) to store different types of data.
Partitioning can be Automatic (done by the OS) or Manual (you decide how to set up the partitions).

- Automatic Partitioning

✅ The OS creates and manages all partitions automatically.

✅ Good for beginners who don't need custom setups.

✅ Example: If you install Windows without changing anything, it creates a C: drive and a small recovery partition.



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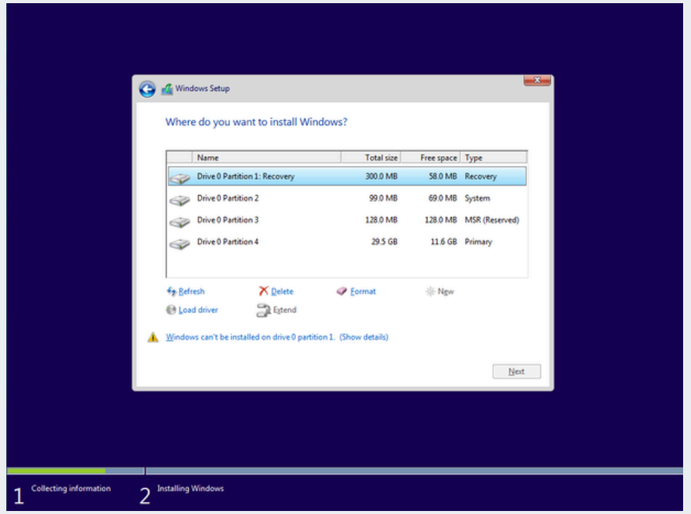
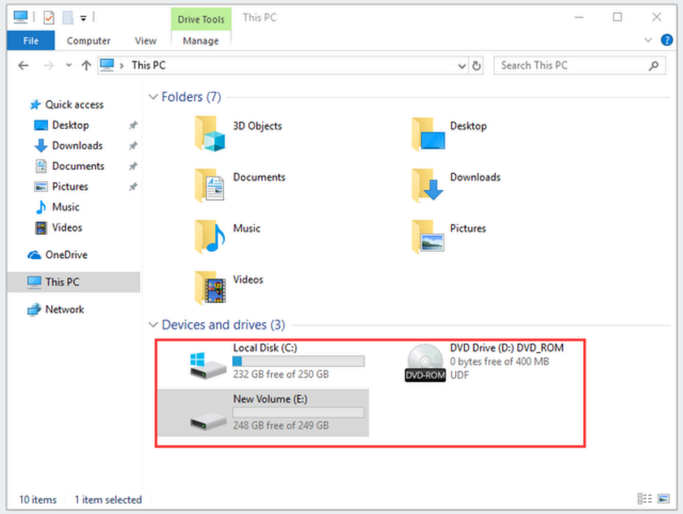
Partitioning can be Automatic (done by the OS) or Manual (you decide how to set up the partitions).

- **Manual Partitioning**

- ✅ You control how much space each partition gets.
- ✅ Useful for dual-booting (e.g., Windows & Linux) or custom setups.
- ✅ Example: When installing Linux, you can manually set up /, /home, /swap, and other partitions.





RECOMMENDED PARTITIONING FOR LINUX:

In Linux, manual partitioning allows better organization of files. The common partitions are:

Partition	Purpose	Recommended Size
/ (Root)	Stores the main OS files and system settings	20GB+
/home	Stores user data (documents, downloads, desktop)	50GB+
/swap	Acts as virtual memory when RAM is full	Equal to RAM size
/boot	Stores bootloader and kernel files	1GB

WHY IS MANUAL PARTITIONING USEFUL?

✅ Prevents Data Loss – If your OS crashes, your files in /home are safe.

✅ Better Performance – Swap helps when RAM is full.

✅ Easier Upgrades – You can reinstall Linux without deleting your files.

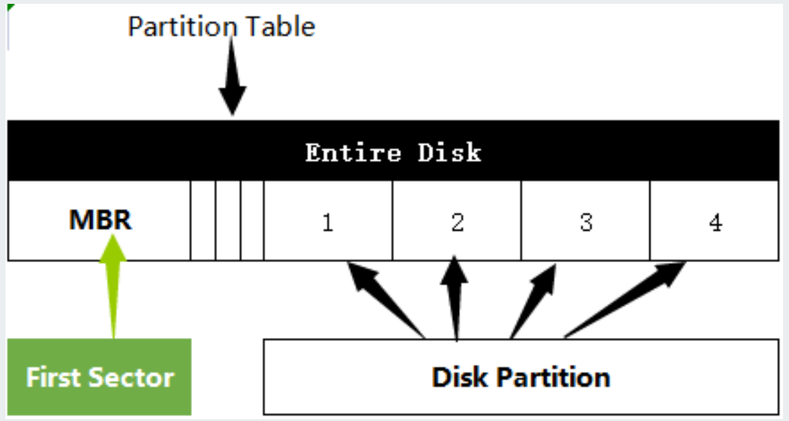
✅ Dual Boot Support – You can keep Windows and Linux on the same PC.

UNDERSTANDING PARTITIONS IN MBR AND GPT

Before understanding Primary and Logical partitions, you need to know that hard drives use partitioning schemes like:

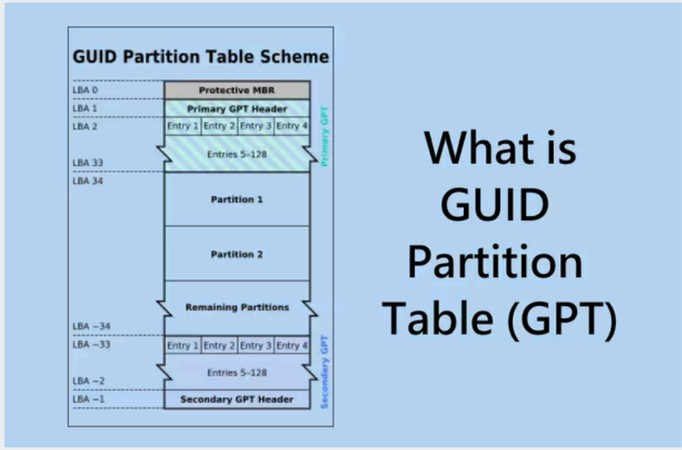
MBR (MASTER BOOT RECORD)

- ✅ Supports only 4 primary partitions.
- ✅ If you need more than 4 partitions, one must be converted into an Extended Partition, inside which Logical Partitions can be created.
- ✅ Maximum disk size: 2TB
- ✅ Used in older systems.



GPT (GUID PARTITION TABLE)

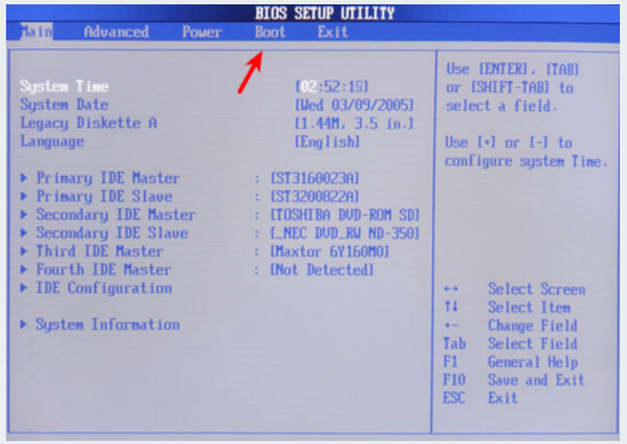
- ✅ Supports unlimited primary partitions.
- ✅ Recommended for modern systems (Windows 10/11, Linux, macOS).
- ✅ Supports disks larger than 2TB.
- ✅ Uses UEFI instead of the traditional BIOS.

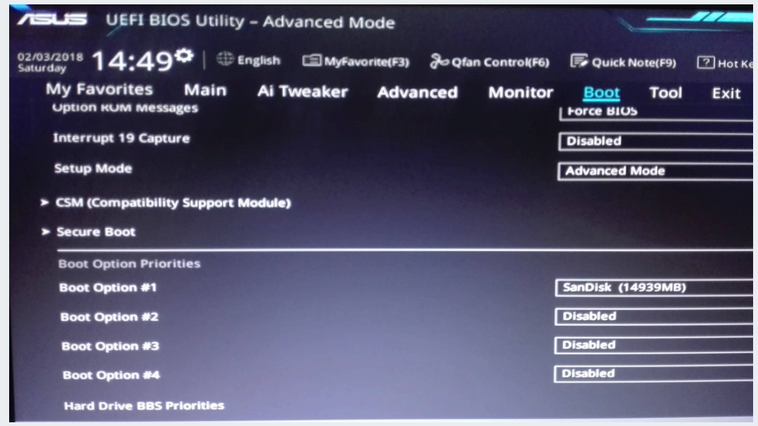


💡 MBR = 4 partitions max (with Logical Partitions workaround), GPT = No limit on partitions

ENTERING BIOS/UEFI AND SELECTING BOOT DEVICE

Before installing an operating system (OS), you must enter the BIOS/UEFI settings and select the correct boot device (USB, DVD, or external drive). This ensures that the system loads the OS installation files from the correct source.





What is BIOS/UEFI? BIOS (Basic Input/Output System):

- ✅ Older firmware used in older computers.
- ✅ Uses Legacy Boot Mode.
- ✅ Limited features and slower than UEFI.

UEFI (Unified Extensible Firmware Interface):

- ✅ Modern replacement for BIOS.
- ✅ Supports Secure Boot, GPT partitions, and faster booting.
- ✅ Found in most computers manufactured after 2012.

ENTERING BIOS/UEFI AND SELECTING BOOT DEVICE

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Steps to Enter BIOS/UEFI

1. Turn On or Restart the Computer
   If the system is already on, restart it.

2. Press the BIOS/UEFI Key During Startup
   As soon as the screen lights up, repeatedly press the BIOS key.

Common keys:

F2 → Dell, Acer, ASUS, Lenovo

F10 → HP

F12 → Boot Menu (some brands)

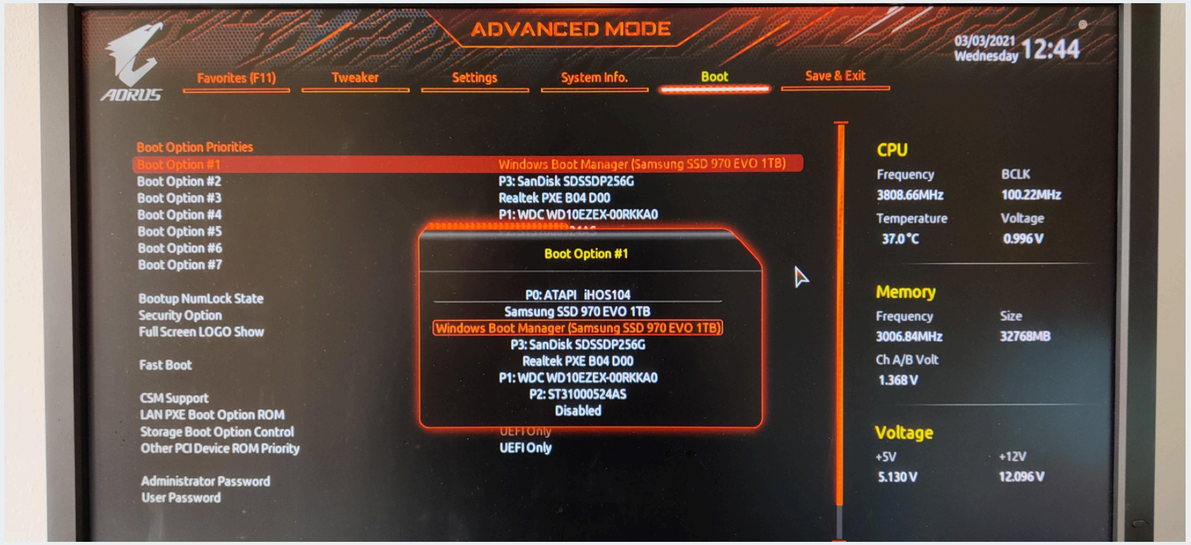
DEL (Delete) → MSI, Gigabyte, ASRock

ESC → Some models

Lenovo Laptop	F12, Fn + F11	F1, F2
Lenovo Desktop	F12, F8	F1, F2
Intel	F10	
HP Desktop	Esc, F9	F10, Esc
HP Laptop	Esc	F10
Dell Desktop	F12	F2
Dell Laptop	F12	F2
Asus Desktop	F8	F9
Asus Laptop	Esc	F2 or Delete
Acer Desktop	Esc, F12, F9	Del, F2
Acer Laptop	F12	F2
Samsung	Esc, F2	F2, F10
Sony Laptop	Esc, F11	F1, F2
Toshiba Laptop	F12	F2
Compaq Laptop	Esc, F9	F10
Fujitsu Laptop	F12	F2
Appl Model		

💡 If you miss the timing, restart and try again.

CHANGING BOOT ORDER TO SELECT BOOT DEVICE



1 Navigate to the Boot Menu

- ✅ Use arrow keys to go to Boot, Boot Order, or Boot Configuration.
- ✅ In UEFI, use a mouse if available.

2 Change Boot Priority

- ✅ Set the USB drive or DVD as the first boot device.
- ✅ If installing from a network, select PXE Boot.

3 Disable Secure Boot (If Necessary)

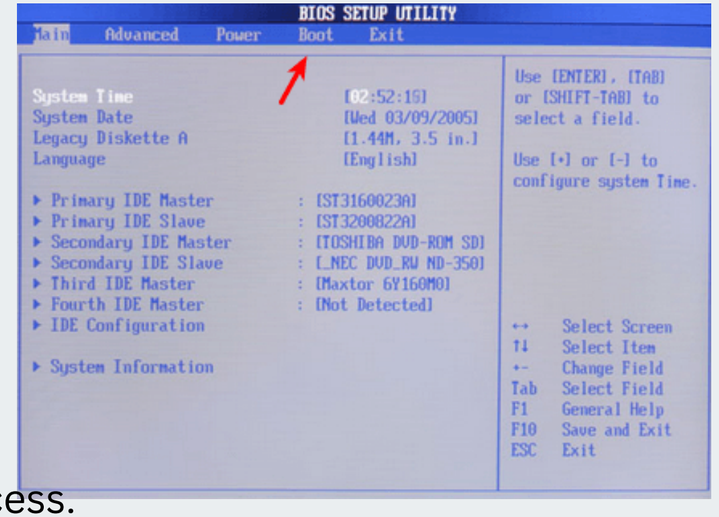
- ✅ If installing Linux or an older OS, go to Security and disable Secure Boot.
- ✅ In UEFI, enable Legacy Boot Mode if required.

4 Save and Exit

- ✅ Press F10 to save changes and exit.
- ✅ Confirm by selecting Yes and pressing Enter.

5 Restart and Begin Installation

- ✅ The system will now boot from the selected device and start the OS installation process.



COMMON ISSUES & FIXES

Issue	Cause	Solution
Cannot Enter BIOS	Wrong key pressed	Try F2, F12, DEL, or ESC immediately after power-on.
USB/DVD Not Showing in Boot Menu	Boot device not detected	Ensure USB/DVD is properly connected and formatted correctly.
Secure Boot Error	UEFI blocks non-certified OS	Disable Secure Boot in BIOS settings.
Changes Not Saved	Incorrect exit method	Use F10 → Save & Exit instead of just exiting.

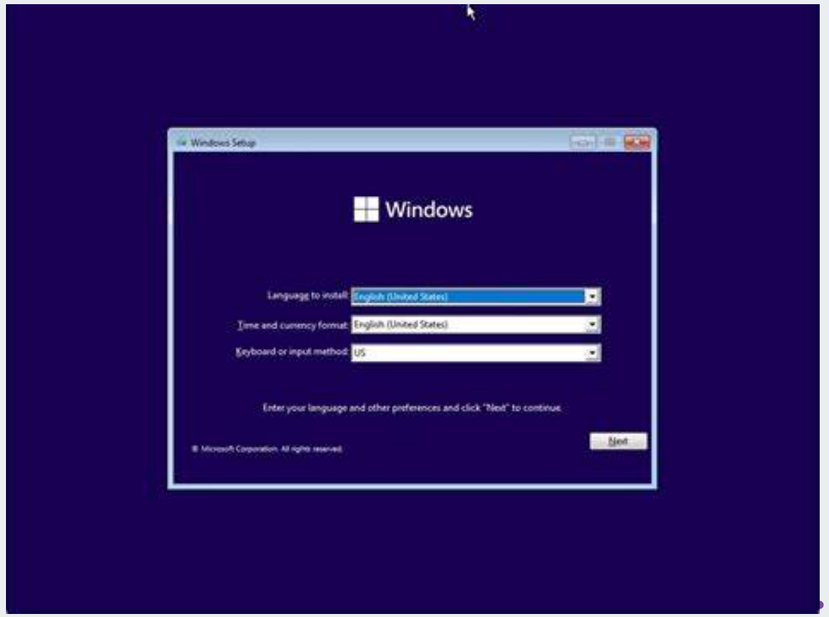
- ✅ BIOS/UEFI helps configure hardware before OS loads.
- ✅ Use the correct key (F2, F12, DEL, ESC) to enter BIOS.
- ✅ Change boot order to boot from USB/DVD.
- ✅ Disable Secure Boot if installing Linux or older OS versions.
- ✅ Save and exit to begin installation.

STEP-BY-STEP OS INSTALLATION GUIDE

Once the boot device is selected in BIOS/UEFI, the OS installation process begins. Below is a detailed step-by-step guide for installing an operating system (Windows/Linux).

🖥️ Step 1: Boot from Installation Media

1. Insert the bootable USB/DVD into the computer.
2. Restart the computer and enter BIOS/UEFI.
3. Select the USB/DVD as the first boot device and exit BIOS (F10 → Save & Exit).
4. The system will boot into the OS installer.



🛠️ Step 2: Selecting Language, Time, and Keyboard Layout

1. When the OS setup screen appears, choose:

   Language (e.g., English, Tamil)

   Time & currency format

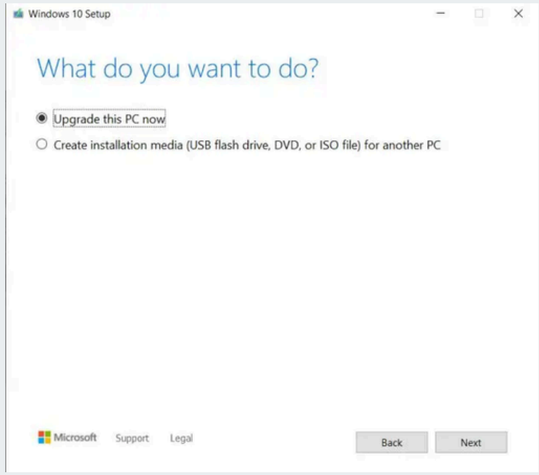
   Keyboard layout (e.g., US, UK, Tamil)

2. Click Next to proceed.

STEP-BY-STEP OS INSTALLATION GUIDE

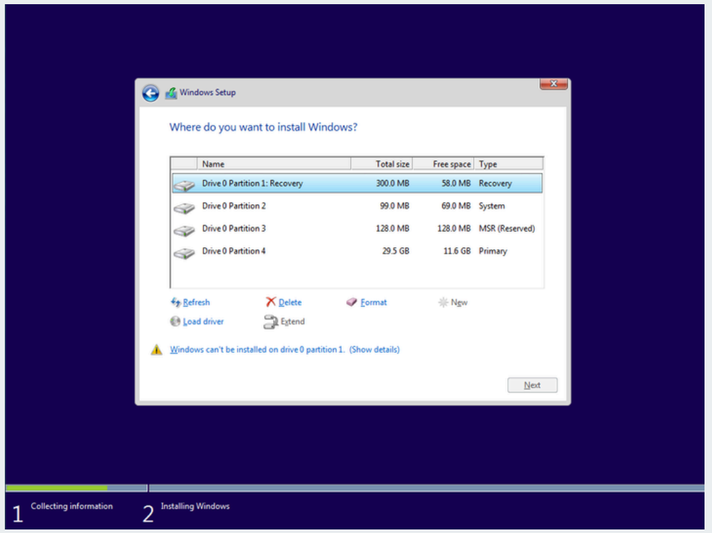
Once the boot device is selected in BIOS/UEFI, the OS installation process begins. Below is a detailed step-by-step guide for installing an operating system (Windows/Linux).

💾 Step 3: Choosing Installation Type



- ✅ Fresh Installation (Recommended) → Deletes everything and installs a new OS.
- ✅ Upgrade Installation → Retains files & apps but updates the OS.
- ✅ Dual Boot → Installs OS alongside an existing one.

  Example: If you want both Windows and Ubuntu, choose "Install Ubuntu alongside Windows".



📂 Step 4: Partitioning the Hard Drive

- ✅ Automatic Partitioning: The OS creates partitions automatically.
- ✅ Manual Partitioning: You create custom partitions.

STEP-BY-STEP OS INSTALLATION GUIDE

Once the boot device is selected in BIOS/UEFI, the OS installation process begins. Below is a detailed step-by-step guide for installing an operating system (Windows/Linux).

🔑 Step 5: Entering Product Key (Windows Only)

1. If prompted, enter your Windows activation key.
2. If you don’t have one, click "I don’t have a product key" (you can activate later).

⚙️ Step 7: Post-Installation Setup

1. Create a User Account (set username & password).
2. Check for OS Activation (Windows: Settings > Activation).
3. Install Drivers & Updates (Wi-Fi, graphics, audio).
4. Install Essential Software (browser, office suite, media player).

⏳ Step 6: Installing the OS

1. Click Install Now and wait.
2. The system will copy files and install necessary components.
3. The installation may take 10-45 minutes depending on system speed.

🔄 Step 6: Completing Installation & Restarting

1. Once installation is complete, click Restart Now.
2. Remove the USB/DVD when prompted.
3. The system will reboot into the newly installed OS.

COMMON INSTALLATION ERRORS AND FIXES

🔄 "Windows Setup Stuck at Loading"

Cause:

Insufficient system resources (Low RAM, slow HDD)

Faulty installation media

Fix:

✔ Wait for some time (can take 10-20 minutes on slow PCs)

✔ Restart the PC and try again

✔ Replace the USB/DVD with a freshly created bootable one

📂 8. "GRUB Bootloader Missing (Linux Only)"

Cause:

- GRUB bootloader not installed correctly
- Windows overwrote Linux bootloader

Fix:

✔ Boot into Live Linux USB and run:

```
sudo grub-install /dev/sda
sudo update-grub
```

✅ Final Tips

✔ Always use official OS installation files

✔ Check system requirements before installation

✔ Backup important data before formatting the hard drive

⚙ POST-INSTALLATION SETUP

After installing an operating system, a few essential steps ensure the system runs smoothly, securely, and efficiently. Below is a step-by-step post-installation setup guide.

1. Install System Updates

Why?

Updates include security patches, bug fixes, and performance improvements.

✓ Windows:

Go to Settings → Windows Update → Check for updates

Install drivers, security updates, and feature updates

✓ Linux:

Open a terminal and run:

```
sudo apt update && sudo apt upgrade -y   # (For Debian-based distros like Ubuntu)
sudo dnf update -y                       # (For Fedora)
```

✓ macOS:

Go to System Settings → Software Update

2.Install Essential Drivers

Why? Missing drivers can cause issues like no sound, no Wi-Fi, or poor display resolution.

✓ Windows:

Use Windows Update or download from the manufacturer's website (Intel, AMD, NVIDIA)

Install Wi-Fi, graphics, chipset, and sound drivers

3. Install Essential Software

Why? A fresh OS installation comes with only basic applications.

Test Everything!

Before you start using the system for work, ensure:

- ✅ Internet is working
- ✅ Sound and display settings are configured correctly
- ✅ Software updates are installed
- ✅ Backup & restore points are set

TROUBLESHOOTING COMMON ISSUES

🔧 Common Installation Errors and Fixes

🛑 1. "No Bootable Device Found"

Cause:

- 🔹 Incorrect boot order in BIOS/UEFI
- 🔹 Faulty or improperly created bootable USB/DVD

Fix:

✔ Enter BIOS/UEFI (Press F2, F12, ESC, DEL during startup)

✔ Set USB/DVD as the first boot device

✔ Recreate the bootable USB using Rufus/BalenaEtcher

⚠ 2. "Windows Cannot Be Installed on This Disk"

Cause:

- 🔹 GPT/MBR partition issue (Windows cannot install on the current partition format)
- 🔹 Hard drive is in the wrong partition scheme

Fix:

✔ Convert the partition table:

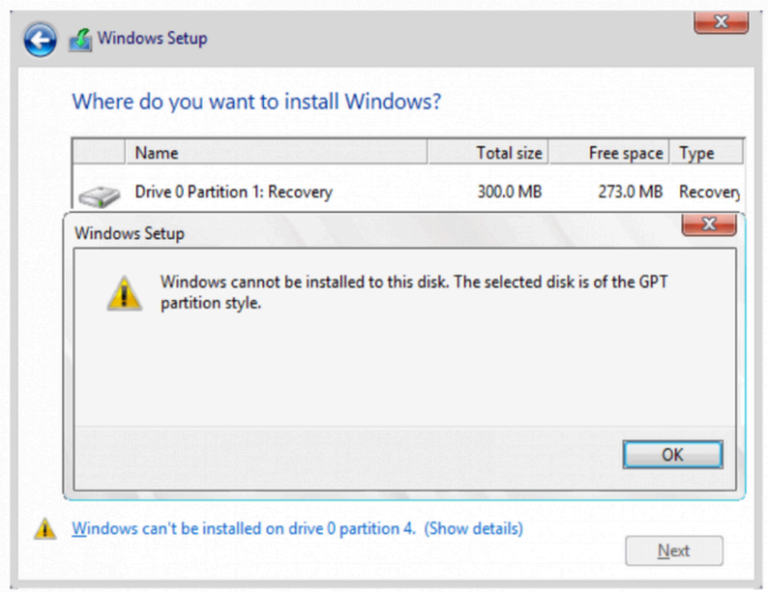
For MBR to GPT: Open Command Prompt in setup (Shift + F10) and type:

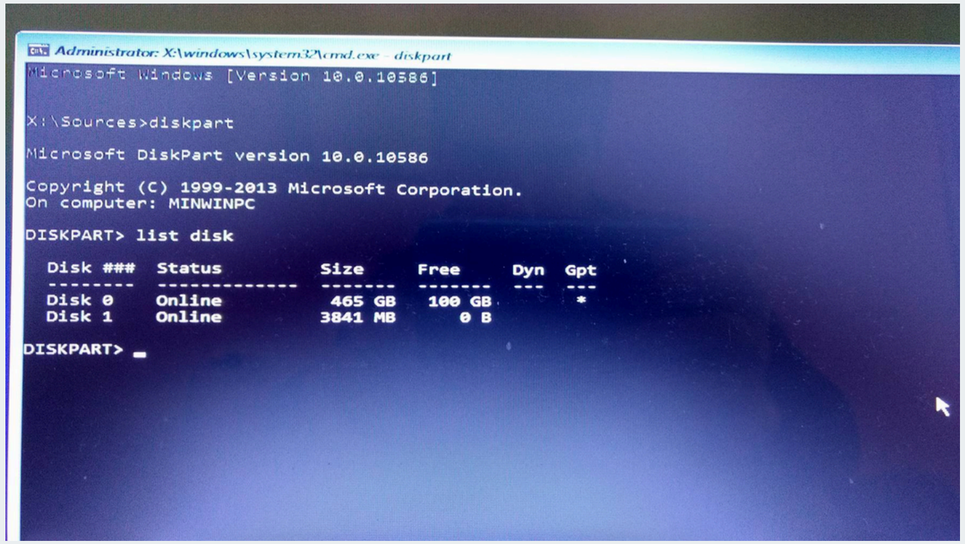
diskpart
list disk
select disk X (replace X with your disk number)
clean
convert gpt
exit

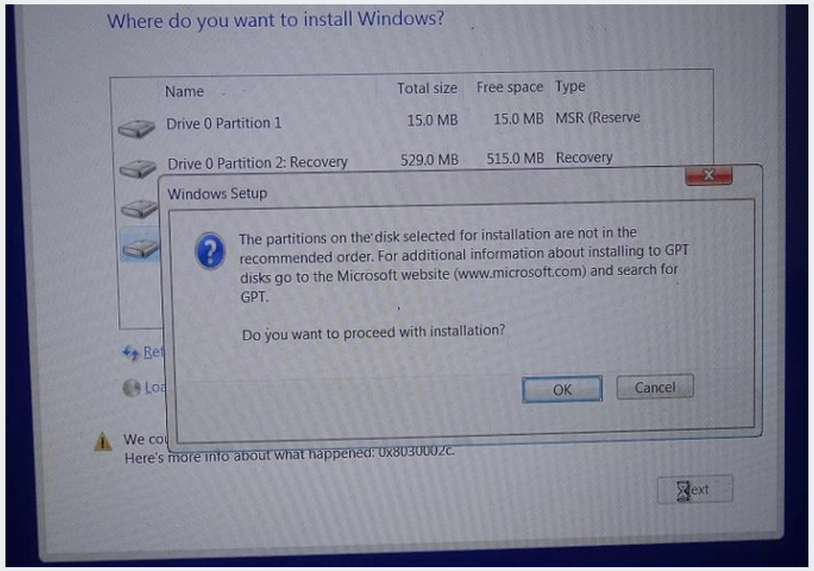
For GPT to MBR: Follow the same steps but use convert mbr instead.

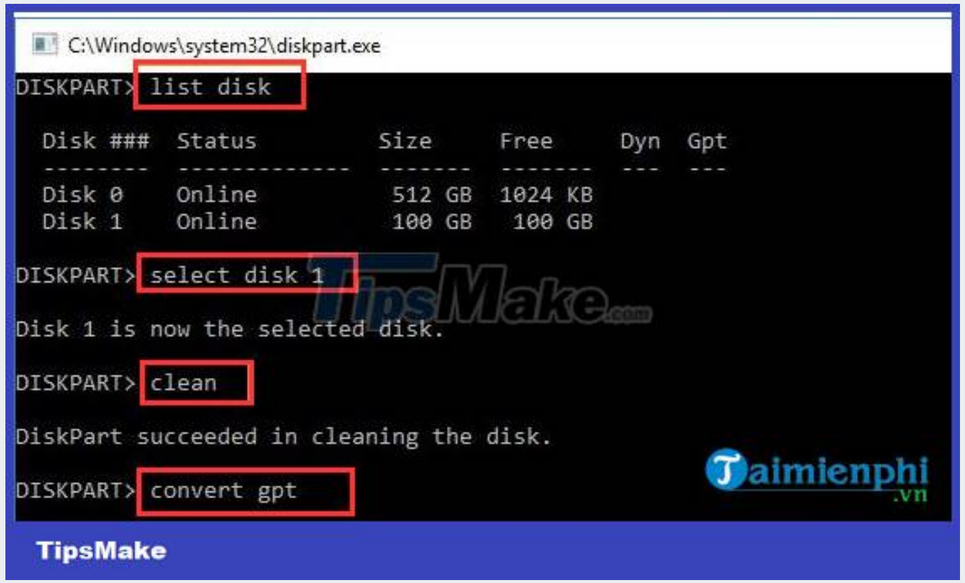
TROUBLESHOOTING COMMON ISSUES

⚠ 2. "Windows Cannot Be Installed on This Disk"









THANK YOU