Competency Based Learning Materials

(CBLM)

IT Support Service

Level-3

Module: Installing and Using Operating System and Optimize Utilities

Code: CBLM-OU-ICT-ITSS-03-L3-V1

National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh

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This Competency Based Learning Materials (CBLM) on "Installing and Using Operating System and Optimize Utilities" under the IT Support Service, Level-3 qualification is developed based on the national competency standard approved by National Skills Development Authority (NSDA)

This document is to be used as a key reference point by the competency-based learning materials developers, teachers/trainers/assessors as a base on which to build instructional activities.

This Competency Based Learning Materials is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this CBLM for activities benefitting Bangladesh.

List of Abbreviations

CS	- Competency Standard
ISC	- Industry Skills Council
NSDA	- National Skills Development Authority
NSQF	- National Skills Qualifications Framework
BNQF	- Bangladesh National Qualifications Framework
OSH	- Occupational Safety and Health
PPE	- Personal Protective Equipment
SCVC	- Standards and Curriculum Validation Committee
STP	- Skills Training Provider
SOP	- Standard Operating Procedure
UoC	- Unit of Competency
EC	- Executive Committee
CBT&A	- Competency based Training & Assessment
CBC	- Competency based Curriculum
CAD	- Course Accreditation Document
CBLM	- Competency Based Learning Materials
OS	- Operating System
GUID	- Globally Unique Identifier
GPT	- GUID Partition Table
MBR	- Master Boot Record
NTFS	- New Technology File System
FAT32	- File Allocation Table 32
UEFI	- Unified Extensible Firmware Interface
BIOS	- Basic Input/Output System

How to use this Competency Based Learning Materials (CBLMs)

The module, Installing and Using Operating System and Optimize Utilities contains training materials and activities for you to complete. These activities may be completed as part of structured classroom activities or you may be required you to work at your own pace. These activities will ask you to complete associated learning and practice activities in order to gain knowledge and skills you need to achieve the learning outcomes.

1. Review the **Learning Activity** page to understand the sequence of learning activities you will undergo. This page will serve as your road map towards the achievement of competence.

2. Read the **Information Sheets.** This will give you an understanding of the jobs or tasks you are going to learn how to do. Once you have finished reading the **Information Sheets** complete the questions in the **Self-Check.**

3. **Self-**Checks are found after each **Information Sheet**. **Self-Checks** are designed to help you know how you are progressing. If you are unable to answer the questions in the **Self-Check** you will need to re-read the relevant **Information Sheet**. Once you have completed all the questions check your answers by reading the relevant **Answer Keys** found at the end of this module.

4. Next move on to the **Job Sheets. Job Sheets** provide detailed information about *how to do the job* you are being trained in. Some **Job Sheets** will also have a series of **Activity Sheets**. These sheets have been designed to introduce you to the job step by step. This is where you will apply the new knowledge you gained by reading the Information Sheets. This is your opportunity to practice the job. You may need to practice the job or activity several times before you become competent.

5. Specification **sheets**, specifying the details of the job to be performed will be provided where appropriate.

6. A review of competency is provided on the last page to help remind if all the required assessment criteria have been met. This record is for your own information and guidance and is not an official record of competency

When working though this Module always be aware of your safety and the safety of others in the training room. Should you require assistance or clarification please consult your trainer or facilitator.

When you have satisfactorily completed all the Jobs and/or Activities outlined in this module, an assessment event will be scheduled to assess if you have achieved competency in the specified learning outcomes. You will then be ready to move onto the next Unit of Competency or Module

Approved by __ th Authority Meeting of NSDA Held on ----------

Table of Content

MODULE CONTENT

Unit of Competency: Install and Use Operating System and Optimize Utilities

Module Title: Installing and Using Operating System and Optimize Utilities

Module Description: This module discusses the aspects that must be given attention when Installing and Using Operating System and Optimize Utilities. It shows the knowledge and skills requirements for preparing for installation of OS, installing operating system, performing user management and installing required driver.

Nominal Duration: 32 Hours

Learning Outcomes:

Upon completion of this module the trainees must be able to:

1. Prepare for installation of Operating System (OS)
2. Install operating system
3. Install required driver
4. Perform user management

Assessment Criteria:

1.1 Operating system is selected as per requirement
1.2 Unified Extensible Firmware Interface (UEFI) and legacy mode is identified
1.3 Partition type is selected as per partition requirement
1.4 Boot Media is selected and prepared for installation
1.5 Boot sequence is modified as per requirement
2.1 OS installation is started
2.2 OS version is selected as per requirement
2.3 Disk is partitioned and formatted as per user requirement.
2.4 Operating system installation steps are followed according to the OS setup instruction.
2.5 Operating system is configured and optimized according to the workplace requirement.
3.1. Required driver is identified
3.2. Source is selected for driver as requirement
3.3. Driver is installed as per component requirement
4.1 Users are created as per requirement
4.2 Password is set as required
4.3 Access privilege is set for user accounts

Learning Outcome 1: Prepare for installation of Operating System (OS)

Assessment Criteria:

1. Operating system is selected as per requirement
2. Unified Extensible Firmware Interface (UEFI) and legacy mode is identified
3. Partition type is selected as per partition requirement
4. Boot Media is selected and prepared for installation
5. Boot sequence is modified as per requirement

Content:

1. Operating system
2. Unified Extensible Firmware Interface (UEFI) and legacy mode
3. Partition type
4. Boot Media selection procedure
5. Boot sequence modification

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 1: Prepare for installation of Operating System (OS)

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Trainee will ask the instructor about Prepare for installation of Operating System (OS)	1. Instructor will provide the learning materials "Installing and Using Operating System and Optimize Utilities"
2. Read the Information sheet/s	2. Information Sheet No: 1 Prepare for installation of Operating System (OS)
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 1 Prepare for installation of Operating System (OS) Answer key No. 1 Prepare for installation of Operating System (OS)
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 1- Prepare for installation of Operating System (OS) Specification Sheet 1 – Prepare for installation of Operating System (OS)

Information Sheet 1: Prepare for installation of Operating System (OS)

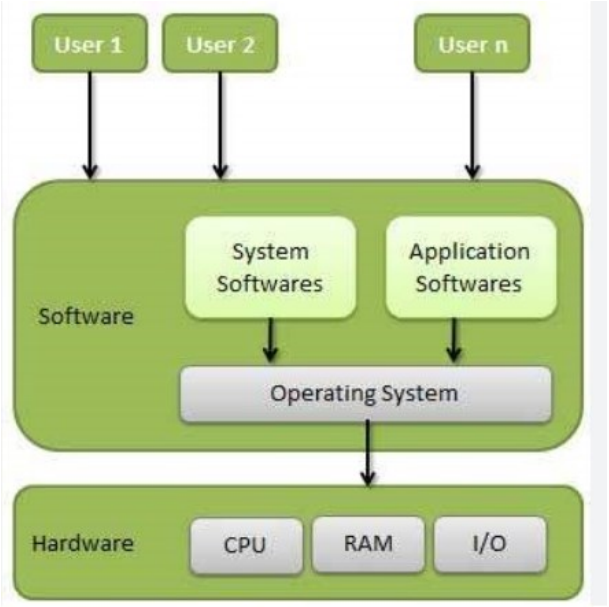
Learning Objectives:

After completion of this information sheet, the learners will be able to:

1.1 Select Operating system as per requirement
2.1 Identify Unified Extensible Firmware Interface (UEFI) and legacy mode
3.1 Select Partition type as per partition requirement
4.1 Select and prepare Boot Media for installation
5.1 Modify Boot sequence as per requirement

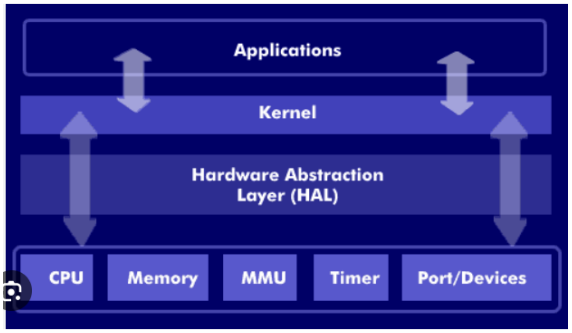
1.1 Operating system

An operating system (OS) is a software program that serves as the intermediary between the hardware components of a computer system and the software applications running on it. It provides a platform for managing and controlling the computer's hardware resources, such as the CPU, memory, storage devices, and peripherals, and enables users to interact with the computer through a user-friendly interface.



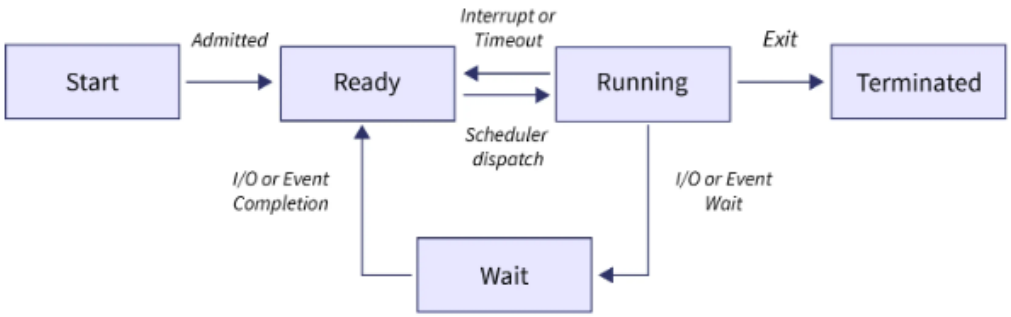
Functions of an operating system:

Hardware abstraction:
The operating system abstracts the underlying hardware complexities, providing a uniform interface for software applications to interact with the hardware components. This abstraction allows programmers to develop software without needing to know the specific details of the hardware.



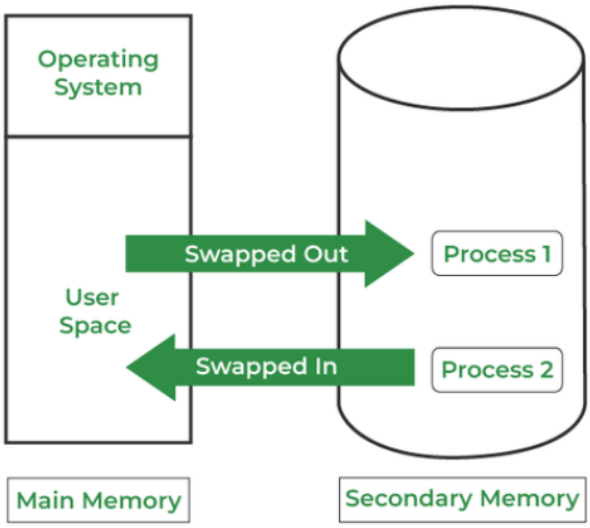
Process management:

The OS manages processes, which are instances of executing programs. It allocates system resources such as CPU time, memory, and input/output (i/o) devices to processes, ensuring efficient execution and multitasking.



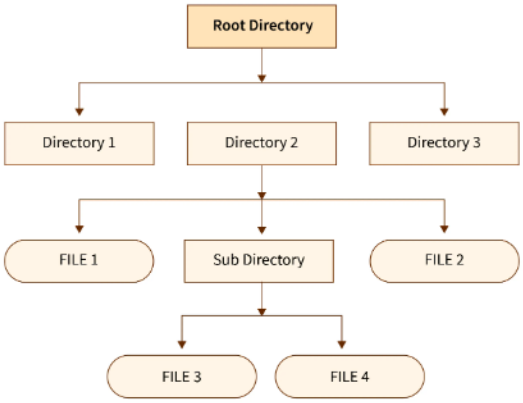
Memory management:

Memory management involves allocating and deallocating memory resources to processes as needed. The OS tracks available memory, manages virtual memory space, and handles memory swapping between ram and storage devices to optimize system performance.



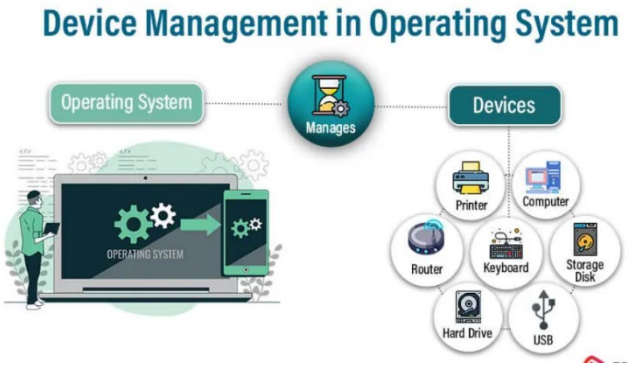
File system management:

The OS provides a file system that organizes and stores data on storage devices such as hard drives and solid-state drives. It manages file creation, deletion, and manipulation, and provides access controls to ensure data security and integrity.



Device management:

Device management involves controlling and coordinating communication between the computer's hardware devices and software applications. The os interacts with device drivers to manage input/output operations, including reading from and writing to storage devices, networking devices, and peripheral devices such as printers and scanners.

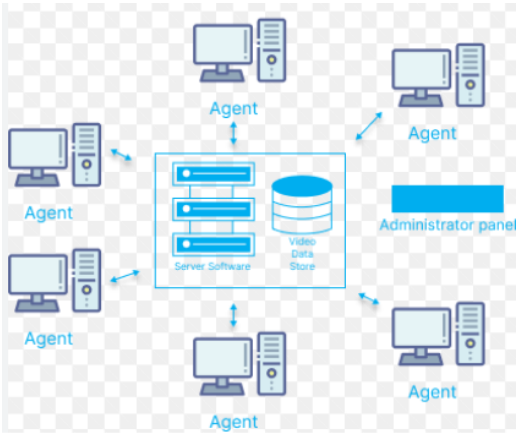


User interface:

The OS provides a user interface (UI) through which users interact with the computer. This interface can take various forms, including a graphical user interface (GUI) with icons, windows, and menus, or a command-line interface (CLI) where users enter text commands.

Security:
The OS implements security mechanisms to protect the computer system from unauthorized access, malware, and other security threats. This includes user authentication, access control, encryption, and firewall functionality.

Networking:
Many modern operating systems include networking capabilities to support communication between computers and devices over local area networks (LANs) or the internet. This includes protocols for data transmission, network configuration, and network resource sharing.



Error handling and recovery:
The OS monitors system operations for errors and provides mechanisms for error detection, reporting, and recovery. This includes error logging, system diagnostics, and recovery procedures to minimize the impact of system failures on user productivity.
System configuration and administration:
The OS enables system configuration and administration tasks such as installing and updating software, managing user accounts and permissions, configuring system settings, and monitoring system performance.

2.1 Unified extensible firmware interface (UEFI) and legacy mode

Unified extensible firmware interface (UEFI) and legacy mode are two different firmware interfaces used in modern computer systems, particularly in the context of initializing the hardware and booting the operating system.

Unified extensible firmware interface (UEFI):
UEFI is a modern firmware interface that serves as the successor to the traditional bios (basic input/output system). It provides a more advanced and versatile platform for initializing hardware components, managing system startup, and launching the operating system.

Key features of UEFI:
Graphical user interface (GUI): UEFI often includes a graphical user interface (GUI) that provides a more user-friendly and visually appealing environment for configuring system settings and performing firmware-level tasks.

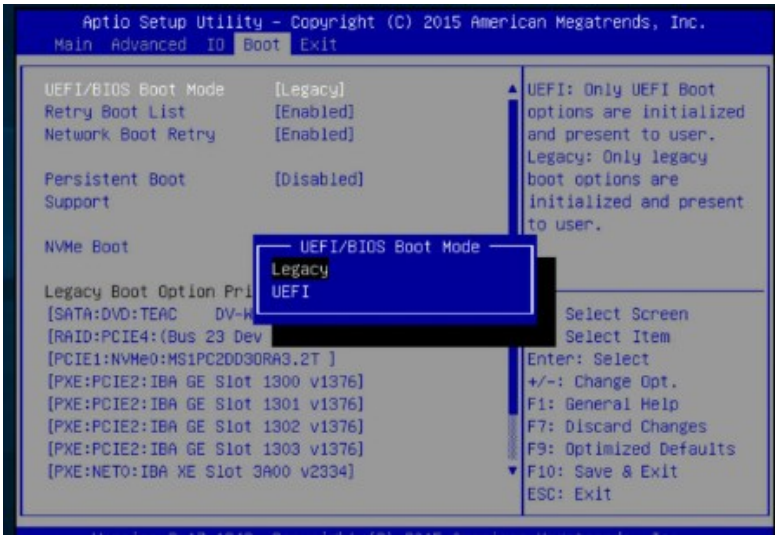
Secure boot: UEFI supports secure boot, a security feature that verifies the digital signatures of bootloader and operating system components during the boot process to prevent malware and unauthorized software from executing.

UEFI applications: UEFI allows for the execution of UEFI applications, which are software programs that run directly from the firmware environment. These applications can perform various tasks, such as diagnostics, system utilities, and firmware updates.

Advanced hardware support: UEFI offers enhanced support for modern hardware technologies, including **larger** storage devices (over 2TB), faster boot times, and more efficient system initialization.

Extensibility: UEFI is extensible, allowing hardware manufacturers to develop custom firmware modules (**known** as UEFI drivers) to support specific hardware features and functionalities.

Legacy mode:
Legacy mode, also **known** as bios compatibility mode, refers to a configuration option in UEFI firmware that allows the system to boot using the traditional bios firmware interface. In legacy mode, the UEFI firmware emulates the behavior of a traditional bios, enabling compatibility with older operating systems and legacy hardware that rely on bios-based boot processes.



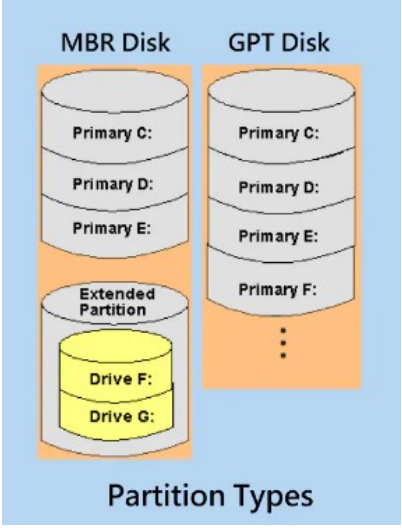
Key points about legacy mode:
BIOS compatibility: legacy mode **provides** backward compatibility with legacy operating systems (such as older versions of windows, dos, and certain LINUX distributions) and legacy hardware that do not support UEFI.

Limited features: when operating in **legacy** mode, the system may not fully utilize the advanced features and capabilities offered by UEFI, such as secure boot, UEFI applications, and advanced hardware support.

Potential limitations: legacy mode may impose certain limitations, such as restrictions on disk partitioning schemes (e.g., MBR vs. GPT) and limitations on the size of storage devices that can be recognized by the firmware.

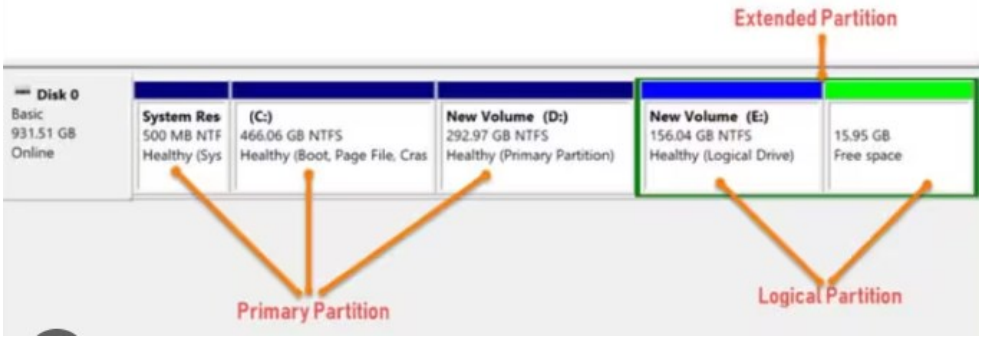
Transition period: legacy mode is often used during the transition from bios-based systems to UEFI-based systems, allowing users **to** maintain compatibility with existing software and hardware while gradually adopting UEFI-based technologies.

Partition type
In the context of computer storage, a partition type refers to the specific format or structure applied to a portion of a storage device, typically a hard drive or SSD, to organize and manage data. Partitions divide the storage device into separate sections, each with its own file system and data storage capabilities.



Primary partition:

A primary partition is a standalone section of a storage device that functions as an independent storage unit. It can contain a file system and store data, including an operating system. On a master boot record (MBR) partitioning scheme, a disk can have up to four primary partitions.



Extended partition:

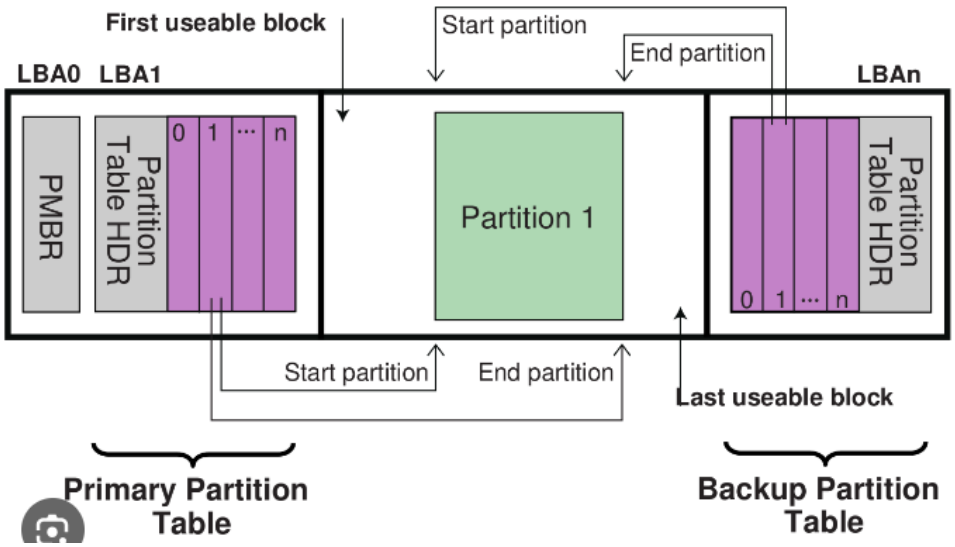
An extended partition is a special type of partition used in MBR partitioning schemes to overcome the limitation of four primary partitions per disk. It serves as a container for logical partitions and cannot hold data directly. Instead, it subdivides into logical partitions.

Logical partition:

A logical partition is a subdivision of an extended partition. It functions similarly to a primary partition, allowing data storage and file system organization. Logical partitions are created within an extended partition and enable the creation of more than four partitions on an mbr disk.

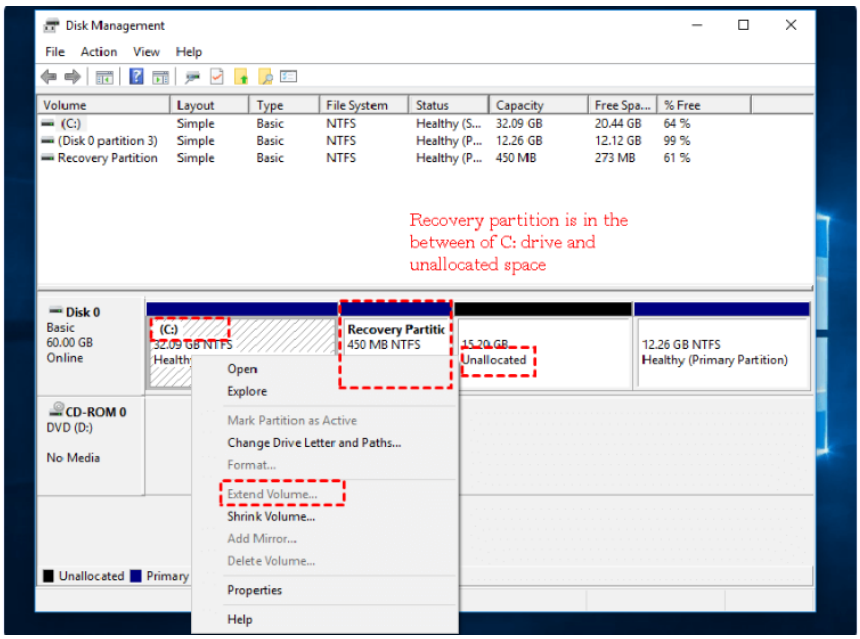
GUID partition table (GPT) partition:

GUID partition table (GPT) is a newer partitioning scheme designed to overcome the limitations of MBR, including the maximum partition size and the number of partitions per disk. GPT partitions support larger disk sizes and can have up to 128 primary partitions by default.



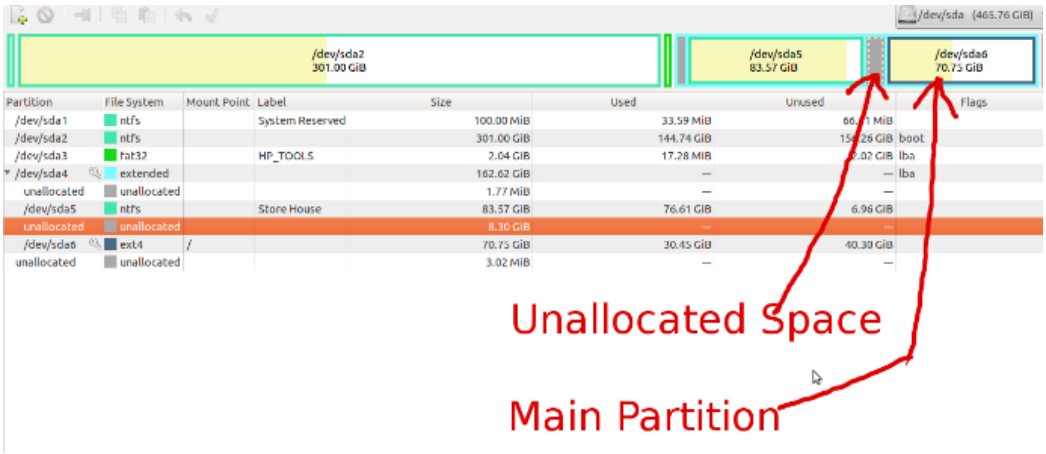
Recovery partition:

A recovery partition is a dedicated section of a storage device used to store system recovery tools and files necessary for restoring the operating system to its original state in case of system failure or corruption. Recovery partitions are often created by manufacturers and may include system backup images and recovery utilities.



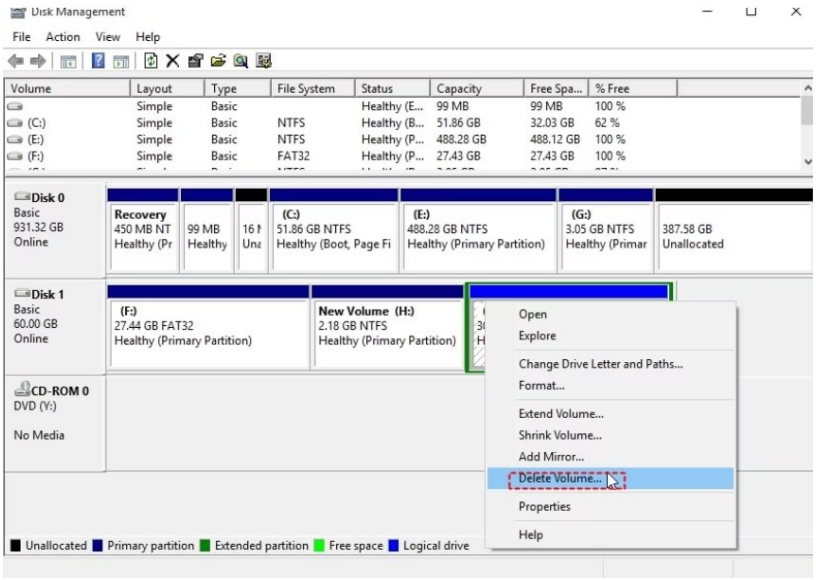
Swap partition:

A swap partition, commonly used in UNIX-like operating systems such as LINUX, serves as virtual memory storage used when physical ram is exhausted. It provides additional memory space for storing temporary data and facilitates efficient memory management.



Data partition:

A data partition is a partition dedicated to storing user data, such as documents, multimedia files, and application data. Unlike system partitions containing operating systems and system files, data partitions are primarily used for user-generated content and can be formatted with various file systems.



The boot media selection procedure

The boot media selection procedure refers to the process of choosing the device from which a computer system will boot or start up. This selection is typically made during the system startup process, often referred to as the boot process. Here's an explanation of the boot media selection procedure:

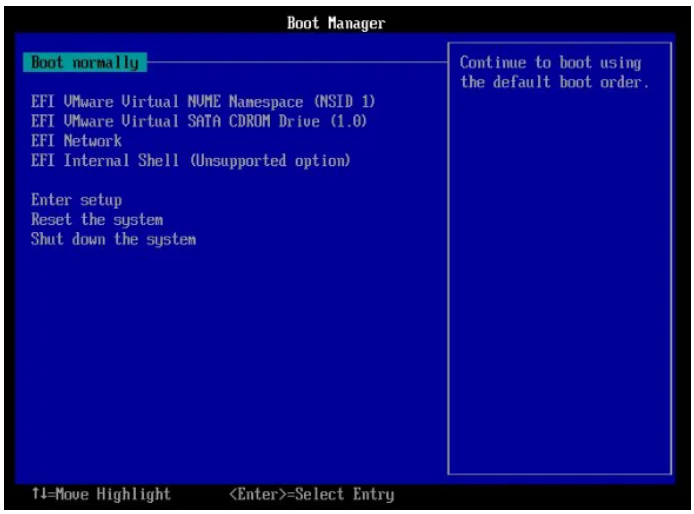
Power on and post (power-on self test):

When you turn on the computer, the system undergoes a sequence of hardware tests known as the power-on self test (POST). During post, the computer's firmware, such as

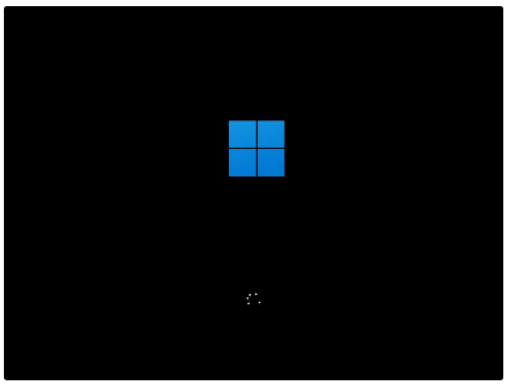
bios or UEFI, initializes hardware components and performs basic checks to ensure they are functioning correctly.

Accessing the boot menu:
After the post process, the computer's firmware checks for bootable devices connected to the system, such as internal hard drives, SSDs, optical drives (CD/DVD), USB drives, and network devices. You can typically access the boot menu by pressing a specific key during the startup process, such as F12, esc, or del. This key varies depending on the computer's manufacturer and firmware.

Selecting the boot device:
Once the boot menu is accessed, a list of available bootable devices is displayed. These devices may include the internal hard drive or SSD, optical drive, USB drives (flash drives), and network boot options (if supported). Use the arrow keys on the keyboard to navigate the menu and highlight the desired boot device.



Choosing the boot media:
Select the boot device you want to use by highlighting it in the boot menu and pressing enter. The computer will attempt to boot from the selected device by loading the bootloader or initial boot code stored on that device. If the selected device contains a bootable operating system, the system will proceed to load the operating system from that device.



Booting the operating system:

Once the boot process begins, the computer loads the bootloader or initial boot code from the selected boot device into memory (RAM). The bootloader then locates and loads the operating system's kernel or primary boot files from the specified boot partition. The operating system continues to load and initialize, eventually presenting the user with the login screen or desktop environment.

Default boot device:
In many cases, the computer is configured to boot from a default device automatically if no user input is provided during startup. This default boot device is typically set in the computer's bios or UEFI firmware settings. You can change the default boot device by accessing the firmware settings and modifying the boot order or boot priority settings.

Boot sequence modification
Boot sequence modification refers to the process of changing the order in which a computer's firmware (BIOS or UEFI) attempts to boot from various storage devices during the startup process. By modifying the boot sequence, users can prioritize different bootable devices, such as hard drives, SSDs, optical drives, USB drives, and network devices, to control the booting behavior of the system. Here's an explanation of the boot sequence modification process:

Accessing firmware settings:
To modify the boot sequence, you need to access the firmware settings of the computer. This is typically done by pressing a specific key during the system startup process, before the operating system loads. The key to access firmware settings varies depending on the computer's manufacturer and firmware type. Common keys include del, F2, F10, esc, or F12.

Entering the firmware setup utility:
After pressing the appropriate key, the computer will enter the firmware setup utility, also known as bios setup or UEFI setup. This utility provides access to various settings and configuration options for the computer's hardware components, including the boot sequence.

Navigating to boot options:
Within the firmware setup utility, navigate to the boot options or boot sequence settings. These settings may be located in different sections of the setup utility menu, depending on the firmware interface used (BIOS or UEFI).

Viewing current boot sequence:
Before modifying the boot sequence, review the current boot order to understand the existing configuration. The boot sequence typically lists the available bootable devices in order of priority, with the device at the top of the list being the first one the system attempts to boot from.

Modifying boot sequence:
To modify the boot sequence, use the appropriate keys or options provided in the firmware setup utility to rearrange the order of bootable devices. You can usually move devices up or down in the list to change their priority. For example, you may want to prioritize booting from a USB drive over the internal hard drive.

Saving changes:
After making the desired modifications to the boot sequence, save the changes and exit the firmware setup utility. This typically involves selecting an option such as "save changes and exit" or pressing a key combination (e.g., f10) to save the changes to the firmware's configuration.

Restarting the computer:
Once the changes are saved, the computer will restart. During the startup process, the firmware will use the updated boot sequence to determine which device to boot from first. If the selected device contains a bootable operating system, the system will proceed to load the operating system from that device.

Self-Check Sheet 1: Prepare for installation of Operating System (OS)

1. What determines the selection of an operating system on a computer?

2. How do you identify Unified Extensible Firmware Interface (UEFI) and legacy mode during system startup?

3. When would you choose UEFI over legacy mode for system booting?

4. What factors influence the selection of partition types during disk partitioning?

2. How can you prepare boot media for installation purposes?

3. Why would you modify the boot sequence on a computer?

4. What steps are involved in modifying the boot sequence of a computer?

5. Can modifying the boot sequence affect the computer's startup behavior?

6. How does selecting the appropriate partition type impact disk management and data organization?

7. What considerations should be taken into account when selecting an operating system for installation?

Answer Key 1: Prepare for installation of Operating System (OS)

1. What determines the selection of an operating system on a computer?
   Answer: The selection of an operating system depends on the user's requirements, including compatibility with hardware, software needs, and personal preferences.
2. How do you identify Unified Extensible Firmware Interface (UEFI) and legacy mode during system startup?
   Answer: UEFI and legacy mode can be identified by accessing the firmware setup utility during system startup and checking the firmware settings or boot options.
3. When would you choose UEFI over legacy mode for system booting?
   Answer: UEFI is preferred for modern systems and offers advantages such as faster boot times, support for larger storage devices, and advanced security features like Secure Boot.
4. What factors influence the selection of partition types during disk partitioning?
   Answer: The selection of partition types is influenced by factors such as the disk size, the number of partitions needed, the desired file system compatibility, and the specific requirements of the operating system or applications.
5. How can you prepare boot media for installation purposes?
   Answer: Boot media can be prepared by creating a bootable USB flash drive or DVD/CD containing the installation files of the desired operating system or software.
6. Why would you modify the boot sequence on a computer?
   Answer: The boot sequence may be modified to prioritize different bootable devices based on specific requirements, such as installing a new operating system, troubleshooting hardware issues, or accessing diagnostic tools.
7. What steps are involved in modifying the boot sequence of a computer?
   Answer: The steps include accessing the firmware setup utility, navigating to the boot options or boot sequence settings, rearranging the order of bootable devices, saving the changes, and restarting the computer.
8. Can modifying the boot sequence affect the computer's startup behavior?
   Answer: Yes, modifying the boot sequence determines the order in which the computer attempts to boot from different storage devices, impacting the startup behavior and the loading of the operating system.
9. How does selecting the appropriate partition type impact disk management and data organization?
   Answer: Selecting the appropriate partition type ensures compatibility with the operating system and file system requirements, facilitates efficient disk management, and organizes data in a structured manner.
10. What considerations should be taken into account when selecting an operating system for installation?
    Answer: Considerations include hardware compatibility, software requirements, system resources, security features, support options, and user preferences or familiarity with the operating system.

Activity Sheet 1.1:

Activity Sheet 1.0: Prepare for installation of Operating System (OS)
Performance Objective: At the end of this task, the trainee should be able to select an operating system, identify firmware modes (UEFI and legacy), select appropriate partition types, prepare boot media, and modify boot sequences as needed.
1. Identify the operating system that best suits your requirements (e.g., Windows, Linux, macOS).
2. Consider factors such as compatibility with hardware, software needs, and personal preferences.
3. Power on the computer and access the firmware setup utility during startup (typically by pressing a specific key like Del, F2, F10, or Esc).
4. Navigate to the firmware settings or boot options section.
5. Identify whether the firmware mode is set to UEFI or legacy mode.
6. Take note of the firmware mode for future reference
7. Determine the partition requirements for your system (e.g., primary partitions, extended partitions, EFI system partition).
8. Select the appropriate partition type (e.g., MBR, GPT) based on your partitioning requirements and system compatibility.
9. Determine the type of boot media needed for the installation of the selected operating system (e.g., USB flash drive, DVD/CD)
10. Obtain a blank USB flash drive or DVD/CD.
11. Download the installation files for the chosen operating system from the official source or create an installation disk image.
12. Use appropriate software tools (e.g., Rufus, Etcher) to create a bootable USB flash drive or burn the installation files onto a DVD/CD.

Specification Sheet 1.1

A. Tools and Materials required

- Notebook
- Handbook
- OS
- USB flash drive or DVD/CD
- Rufus/ Etcher

B. Equipment

- Laptop/Computer with Internet connection

Learning Outcome 2: Install operating system

Assessment Criteria:

2.1 OS installation is started
2.2 OS version is selected as per requirement
2.3 Disk is partitioned and formatted as per user requirement.
2.4 Operating system installation steps are followed according to the OS setup instruction.
2.5 Operating system is configured and optimized according to the workplace requirement.

Content:

1. OS installation
2. OS version
3. Disk partitioning and formatting.
4. Operating system installation steps.
5. Operating system configuration and optimization.

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 2: Install operating system

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about install operating system	1. Instructor will provide the learning materials "Installing and Using Operating System and Optimize Utilities"
2. Read the Information sheet/s	2. Information Sheet No: 2 Install operating system
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 2 - Install operating system Answer key No. 2 - Install operating system
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 2 - Install operating system Specification Sheet: 2- Install operating system

Information Sheet 2: Install operating system

Learning Objectives:

After completion of this information sheet, the learners will be able to:

2.1 Start OS installation
2.2 Select OS version as per requirement
2.3 Partition and format Disk as per user requirement.
2.4 Follow Operating system installation steps according to the OS setup instruction.
2.5 Configure and optimize Operating system according to the workplace requirement.

2.1 Operating System (OS) installation

Operating System (OS) installation refers to the process of installing an operating system onto a computer's storage device (e.g., hard drive, solid-state drive) to enable the computer to boot up and function with the selected OS. OS installation involves several steps, typically initiated using bootable installation media (e.g., USB flash drive, DVD/CD), which contains the necessary installation files and setup program.

2.2 Operating system (OS) version

An operating system (OS) version refers to a specific release or iteration of an operating system software. OS versions are typically distinguished by unique identifiers, such as version numbers or names, and are often accompanied by updates, patches, and new features introduced by the operating system vendor.

2.3 Disk partitioning and formatting

Disk partitioning and formatting are essential steps in preparing a storage device (such as a hard drive or SSD) for data storage and organization. These processes involve dividing the storage space into logical sections called partitions and preparing these partitions for use by formatting them with a compatible file system.

Disk Partitioning:
Disk partitioning involves dividing a storage device into one or more separate sections or partitions. Each partition acts as an independent unit with its own file system, allowing for better organization and management of data on the disk. Here's how disk partitioning works:
Types of Partitions: There are different types of partitions, including primary partitions, extended partitions, and logical partitions (on MBR disks), as well as GUID Partition Table (GPT) partitions.

Partitioning Tools: Various tools can be used to partition a disk, including built-in utilities provided by operating systems (such as Disk Management in Windows or Disk Utility in macOS) and third-party partitioning software (like GParted for Linux).

Partition Schemes: The choice of partitioning scheme (e.g., MBR or GPT) depends on factors such as disk size, compatibility requirements, and the intended use of the disk. GPT is the newer and more advanced partitioning scheme, offering support for larger disk sizes and more partitions compared to MBR.

Partitioning Process: During the partitioning process, the user specifies the size and type of each partition, allocates space for the partitions, and creates the necessary data structures on the disk to manage the partitions.

Formatting:

Formatting a partition involves preparing it for use by creating a file system, which determines how data is stored and accessed on the partition. Formatting is necessary before storing data on a partition or installing an operating system. Here's how formatting works:

File Systems: There are various file systems to choose from, including NTFS and FAT32 (for Windows), HFS+ and APFS (for macOS), and ext4 and XFS (for Linux). The choice of file system depends on factors such as compatibility, performance, and the operating system being used.

Formatting Tools: Operating systems provide built-in tools for formatting partitions with compatible file systems. For example, in Windows, you can use Disk Management or the Format command in Command Prompt. In macOS, Disk Utility is commonly used for formatting partitions.

Formatting Process: When formatting a partition, the user selects the desired file system and initiates the formatting process. This process creates the necessary data structures (such as the file allocation table or inode table) on the partition and prepares it for storing data.

Quick Format vs. Full Format: Many formatting utilities offer the option of quick format or full format. A quick format only initializes the file system structures, while a full format also performs a surface scan to check for bad sectors on the disk.

2.4 Operating system installation steps.

Installing Windows 11 involves several steps, from preparing the installation media to configuring the operating system settings after installation. Below are the general steps for installing Windows 11:

Check System Requirements:

Before proceeding with the installation, ensure that your computer meets the minimum system requirements for Windows 11. These requirements include compatible hardware components such as CPU, RAM, storage, and TPM (Trusted Platform Module) version 2.0.

Backup Important Data:

It's recommended to back up any important data on your computer before installing Windows 11. This ensures that your data is safe in case of any issues during the installation process.

Create Installation Media:
Obtain a bootable installation media for Windows 11. This can be a USB flash drive or a DVD/CD containing the Windows 11 installation files. You can create installation media using the official Media Creation Tool provided by Microsoft.

Boot from Installation Media:
Insert the bootable installation media into your computer and restart it. Access the BIOS or UEFI settings to set the boot priority to boot from the installation media. Save the changes and exit the BIOS/UEFI settings.

Start Windows 11 Setup:
Once the computer boots from the installation media, the Windows 11 setup process will begin. Follow the on-screen instructions to proceed with the installation.

Select Language, Time, and Keyboard Input:
Choose your preferred language, time format, and keyboard input method when prompted by the setup wizard.

Enter Product Key (if required):
If prompted, enter your Windows 11 product key. You may skip this step if your computer came with Windows 11 pre-installed or if you're upgrading from a previous version of Windows with a digital license.

Accept License Terms:
Read and accept the Microsoft Software License Terms to proceed with the installation.

Choose Installation Type:
Select the installation type. You can choose to perform a clean installation (which formats the existing drive and installs Windows 11) or an upgrade installation (which preserves your files, settings, and applications).

Select Drive and Partition:
Choose the drive and partition where you want to install Windows 11. If you're performing a clean installation, you may need to format the drive before proceeding.

Install Windows 11:
Wait for the installation process to complete. The computer may restart multiple times during the installation. Ensure that you don't interrupt the process until it's finished.

Set Up Windows 11:
After the installation is complete, follow the on-screen prompts to set up Windows 11. This includes configuring user accounts, privacy settings, network settings, and other preferences.

Install Drivers and Updates:
After Windows 11 is installed, it's recommended to install device drivers for your hardware components and install any available Windows updates to ensure system stability and security.

Enjoy Windows 11:
Once setup is complete and your computer is running Windows 11, you can start exploring the new features and functionalities of the operating system.

2.5 Operating system configuration and optimization

Operating system configuration and optimization involve adjusting various settings and parameters within the operating system to enhance performance, improve security, and customize the user experience. Here's an overview of the process:

Performance Optimization:
Adjust power settings: Customize power plans to balance performance and energy consumption, particularly on laptops and portable devices.
Manage startup programs: Disable unnecessary startup programs to reduce boot time and system resource usage.

Optimize disk performance: Defragment hard drives (if applicable) or enable features like TRIM for SSDs to improve disk performance.

Adjust visual effects: Disable or adjust visual effects to allocate system resources more efficiently and improve responsiveness.

Upgrade hardware: Install additional RAM, upgrade to SSD storage, or upgrade other hardware components to improve overall system performance.

Security Configuration:
Install security updates: Keep the operating system up-to-date by installing the latest security patches and updates released by the vendor.

Enable firewall: Activate the built-in firewall or install third-party firewall software to monitor and control network traffic.

Use antivirus software: Install reputable antivirus software and keep it updated to protect against malware, viruses, and other security threats.
Enable BitLocker (Windows) or FileVault (macOS): Encrypt the system drive to protect sensitive data from unauthorized access in case of theft or loss.

Configure user accounts: Set up user accounts with appropriate permissions and passwords to prevent unauthorized access to system resources.

Customization and Personalization:
Customize desktop settings: Adjust desktop background, themes, and screen savers to personalize the user interface.

Configure taskbar and Start menu: Customize the taskbar and Start menu layout, pin frequently used apps, and organize shortcuts for easy access.

Set default programs: Choose default applications for file types and protocols to streamline workflow and improve productivity.

Customize system settings: Adjust system settings such as display resolution, sound settings, and keyboard shortcuts to suit individual preferences.

System Maintenance:
Perform regular updates: Schedule automatic updates to ensure the operating system and installed software remain up-to-date with the latest patches and security fixes.

Run disk cleanup: Use built-in disk cleanup tools to remove temporary files, system cache, and other unnecessary files to free up disk space.

Monitor system health: Use built-in system monitoring tools or third-party utilities to monitor system performance, temperature, and hardware health.

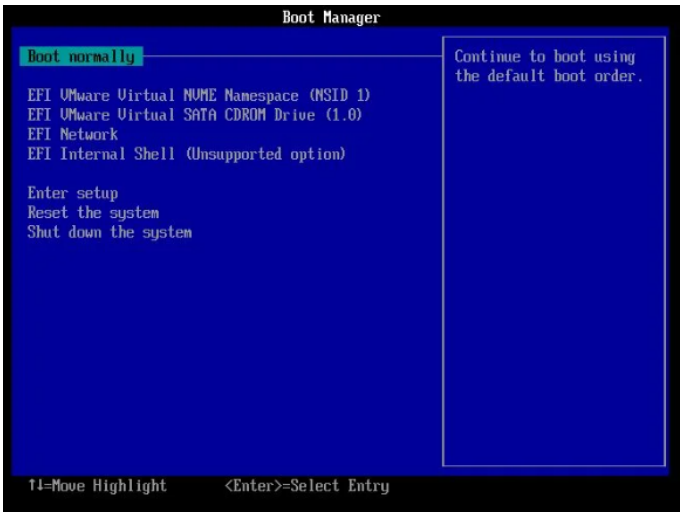
Create system backups: Regularly back up important files, system settings, and configurations to protect against data loss and system failures.

Troubleshooting and Optimization Tools:
Use built-in troubleshooting tools: Windows includes various troubleshooting tools and utilities to diagnose and fix common system issues.

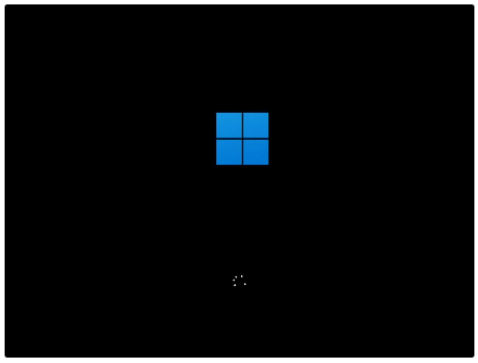
Utilize third-party optimization software: Consider using third-party optimization software to automate system maintenance tasks, optimize system performance, and troubleshoot issues.

Windows 11 Installation Step by Step:

1. Insert the installation DVD into the optical drive or bootable USB disk into your computer.
2. Press the F8 key multiple times while the computer starts to call the boot manager menu.



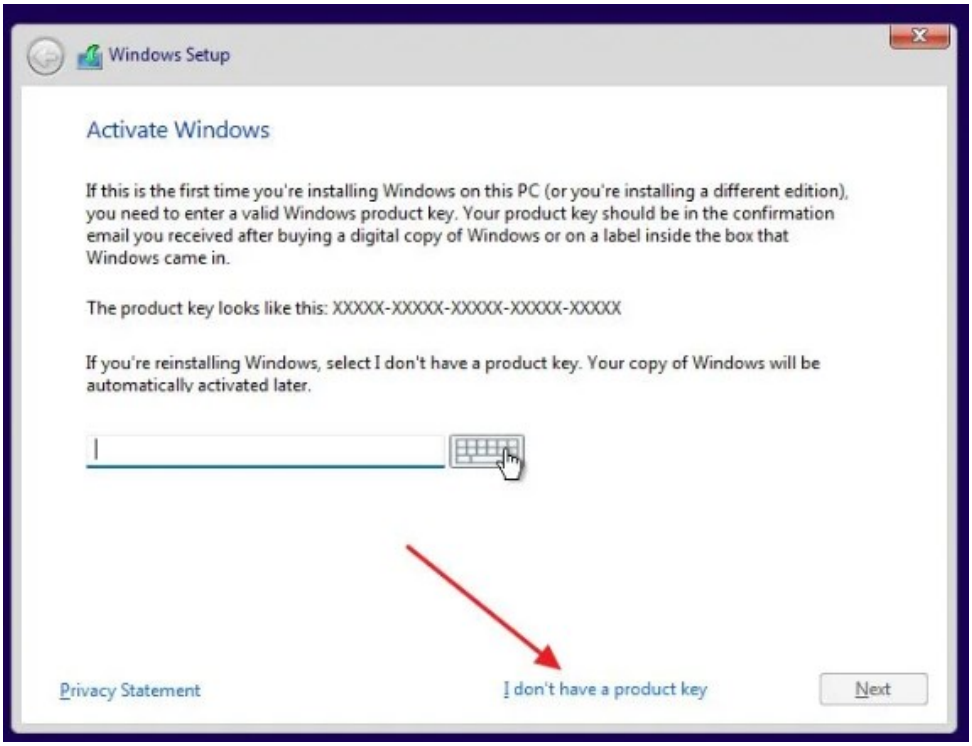
3. Use the arrow key to select the drive unit that the windows 11 installer.
   Some device may show up twice. If so I recommend you chose the version that's named EFI or UEFI/ This is the best way to install windows 11 and it's a hassle to switch to UEFI after installing the OS in legacy BIOS mode.
4. Next, a message to press any key to boot from the CD or DVD… appears. Doing so will start the actual windows 11 installation process and the new windows 11 flat logo will show up.



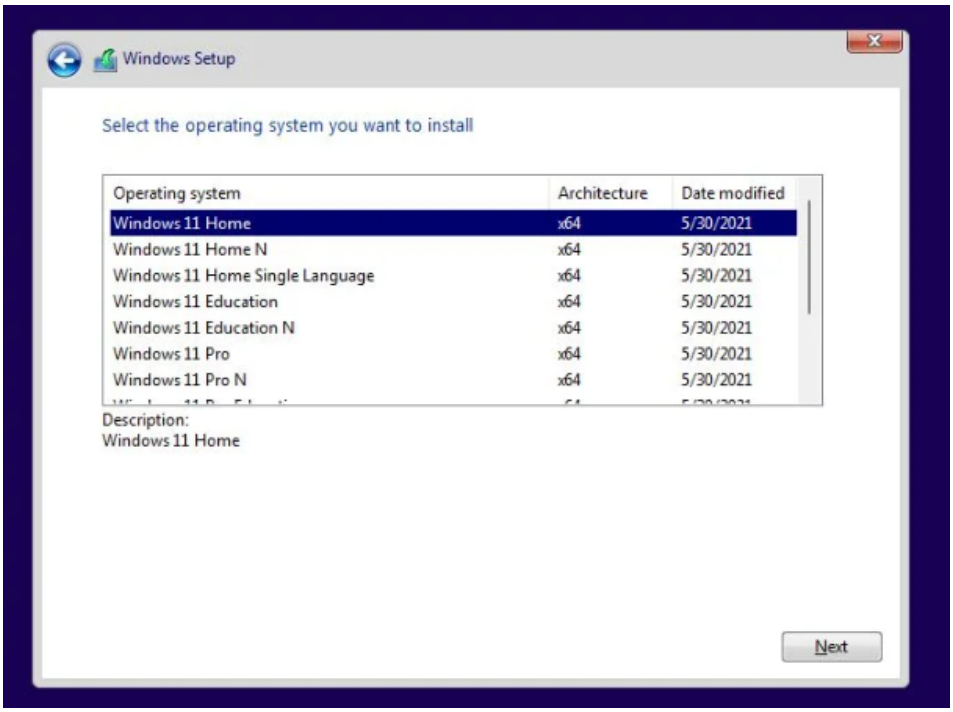
5. First step is to choose to install now. On this screen, you will also see an option to repair your computer. You will ignore it for this guide.

6. The installer will ask now to chose the language of the interface, the time and currency, and keyboard layout. These can be mixed and matched to your preference, and don't need to reflect reality. Changing them at a later date is possible without reinstalling windows 11.

7. At the next step you will be asked to enter windows 11 product key. This step can be skipped for now, but you will have to eventually activate windows 11 to get all the features. Be careful and enter the correct code provided with your license.



8. Now its time to select windows edition you want to install. Your selection must match the product key entered earlier or else windows wont activate.

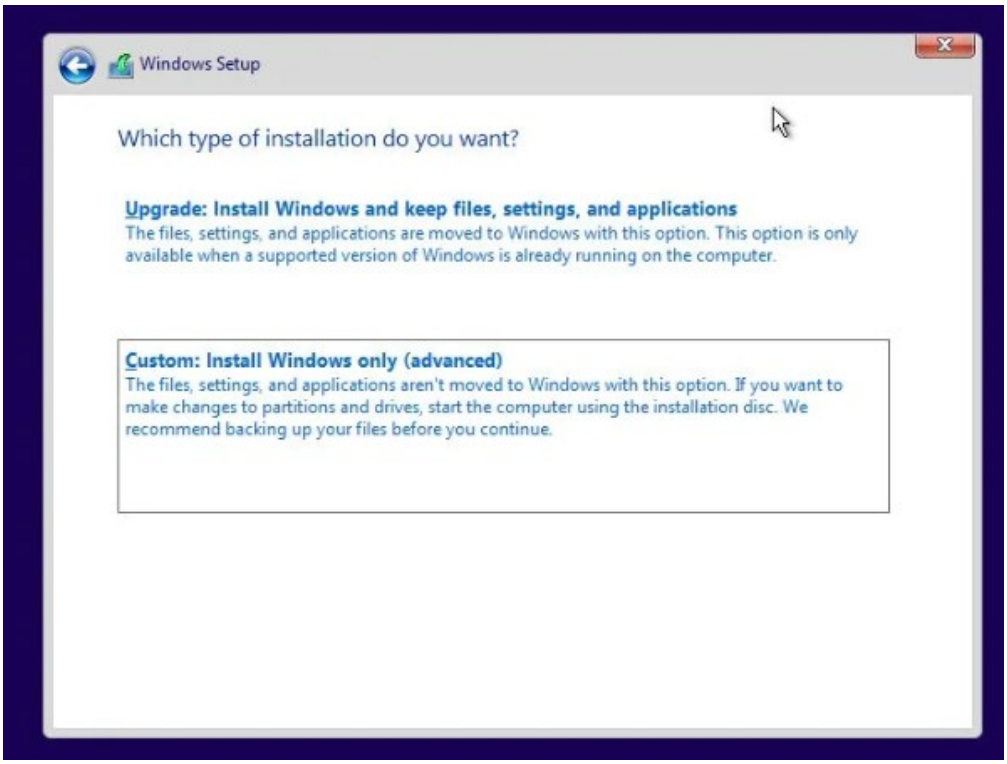


9. To proceed you next need to agree to licensing terms

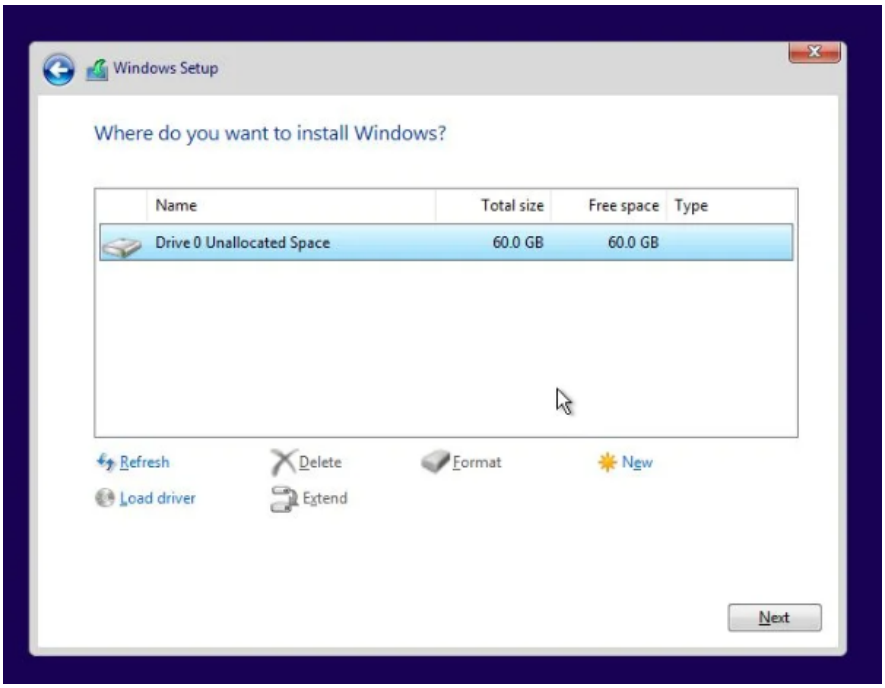
10. Next select the installation type. There are two options: **Upgrade** an existing installation of Windows (version 7, 8, or 10) or **Custom**.

Upgrade doesn't work anyway from this installer. You need to boot into Windows, plug the installer kit CD or USB disk, then start Setup.exe from File Manager. I don't know why Microsoft still shows the Upgrade option here.

If you don't have a previous Windows version installed just select the latter option.

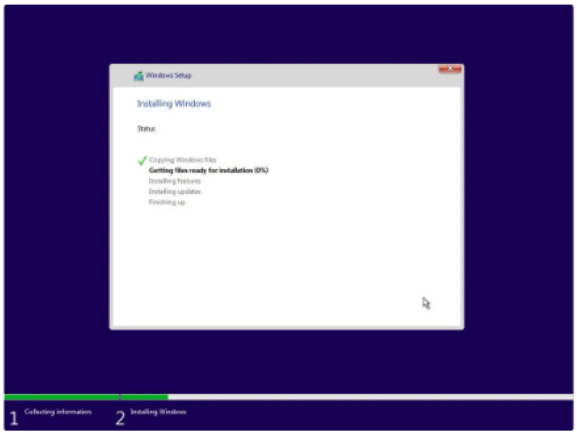


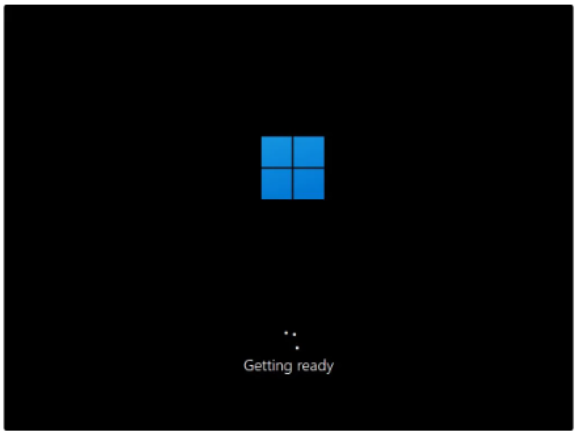
11. At this step you'll see all available disks detected in your computer. Let the installer know the **disk where Windows 11 files will be copied**. You can choose to partition the existing disk into smaller virtual disks (recommended for bigger disks). If you only have one unformatted disk just select it and hit Next. The installer will create all the needed partitions for you.



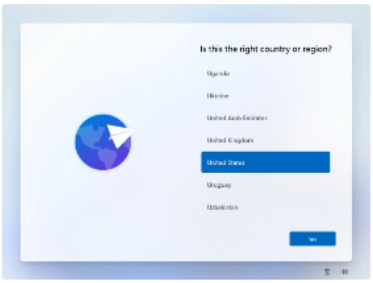
Expect an advanced setup guide for this install step so check back to BinaryFork. I'll make sure to link the guide back here. I think it is a must-know if you're reinstalling Windows, installing it on a multi-disk computer, and especially if you want to dual-boot other operating systems next to Windows 11.

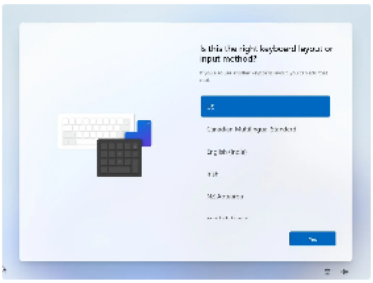
12. The installer will now start to **copy the required files** from the install medium to their final destination. A reboot will definitely happen at this point.

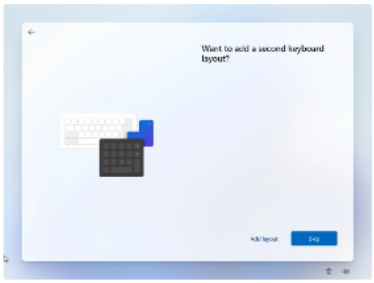




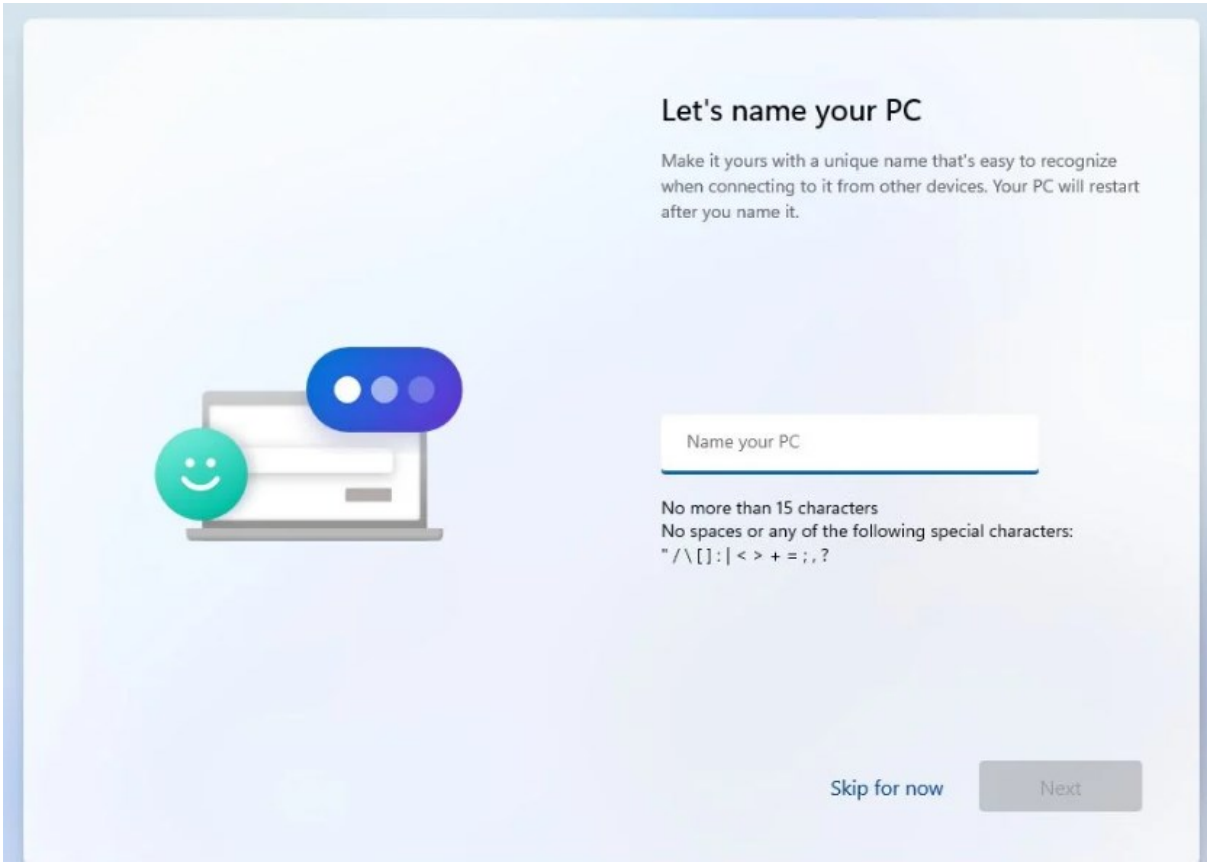
13. If this is a deja-vu, don't worry, because you're asked again to **select the geographical region and keyboard layout**. They can differ from the original choice and will override the settings from step 6. You can optionally **add more keyboard layouts** (hint: use WIN + Shift to switch between them while using Windows).



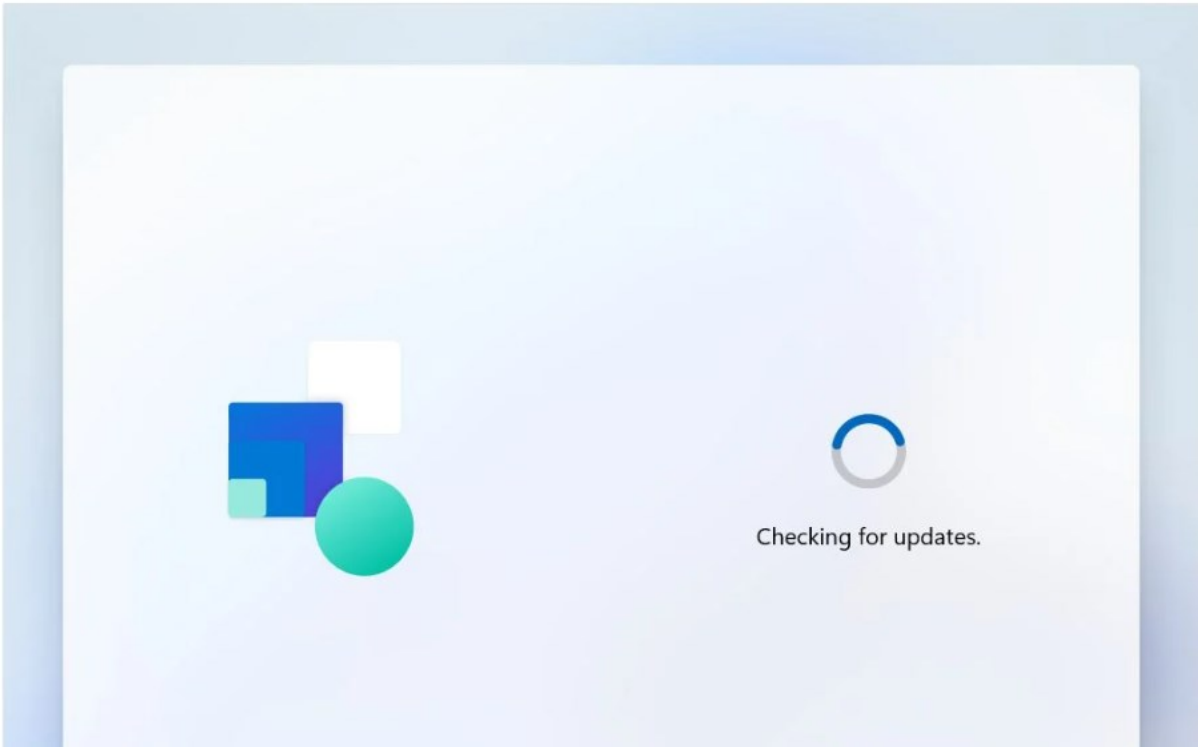




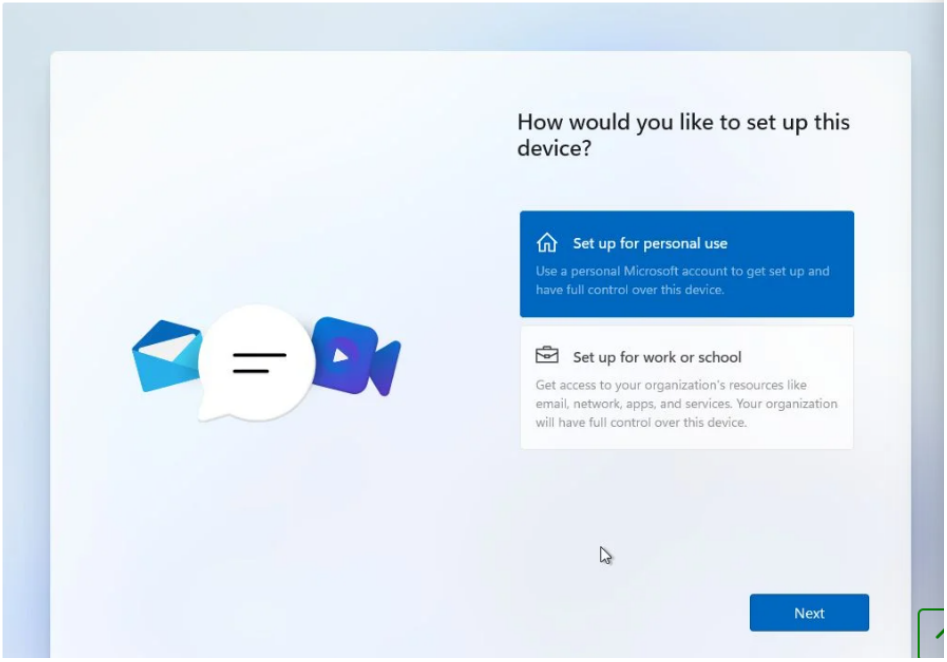
14. All previous screens are almost identical to the Windows 10 installer. Now we're getting the first newly designed screen: **name your PC**. I suggest you enter a computer name that's recognizable and easy to remember.



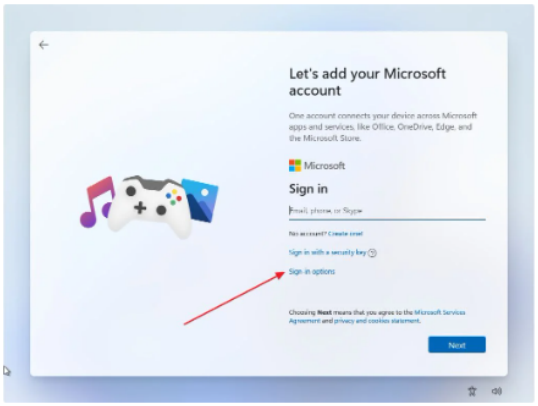
15. The installer will now **check for any updates** and download them before proceeding. Let it do its thing.

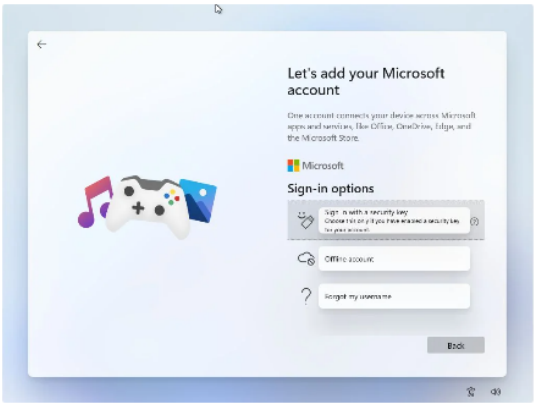


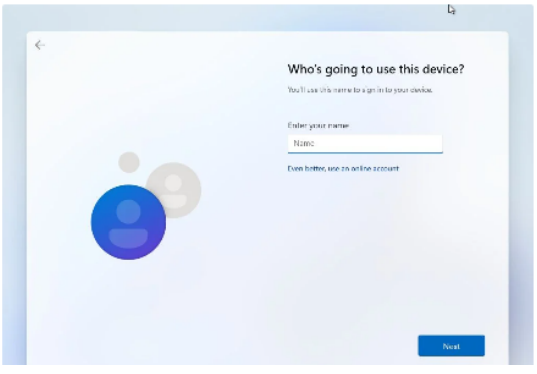
16. At this next step you'll select the predefined device usage scenario: for **Personal use** or **Organization**, in which case your system administrator will enforce some settings for you after you login into your company network. We'll be using the Personal option for this guide.

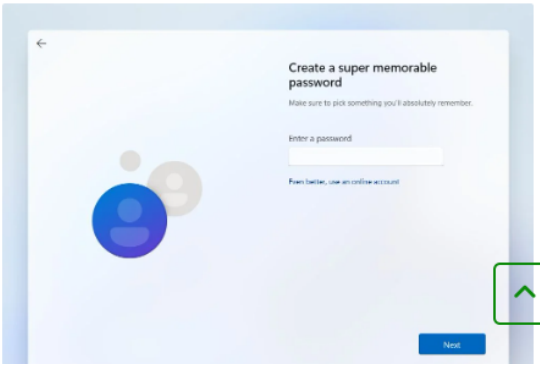


17. Now it's time to **create the administrator account** for this PC. Microsoft still tries to make you sign in with your outlook.com account, but I suggest you stick to an offline account for privacy reasons. We also have an article detailing the differences between the two account types.

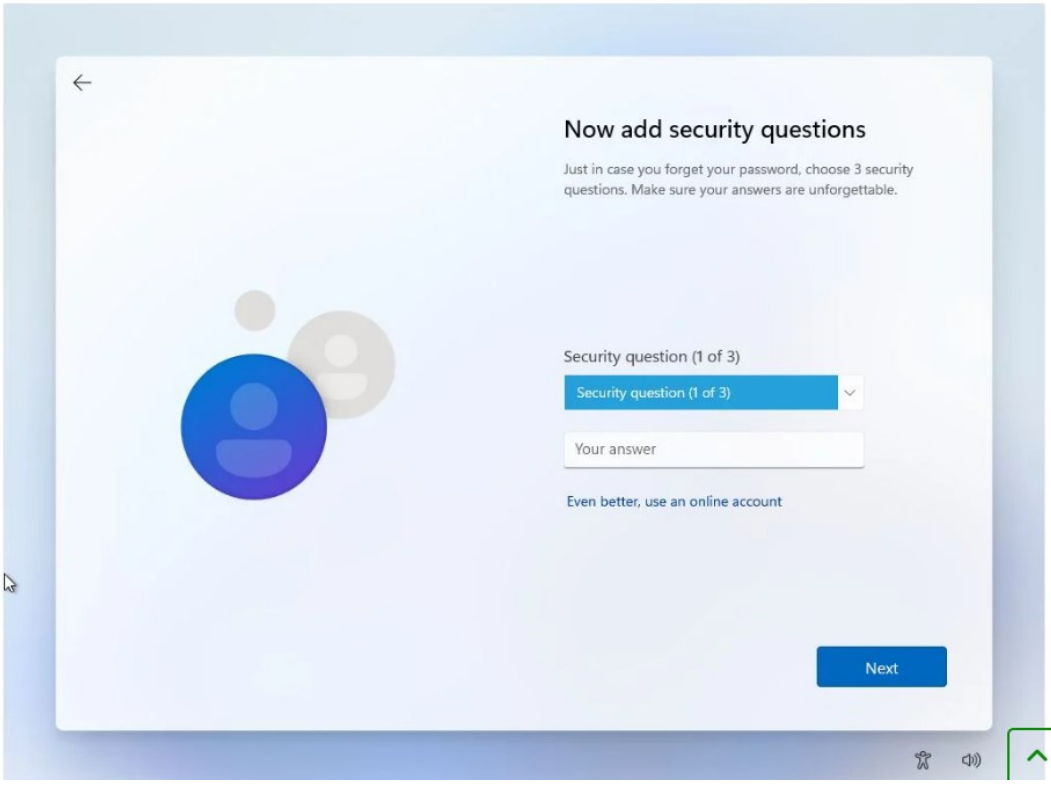






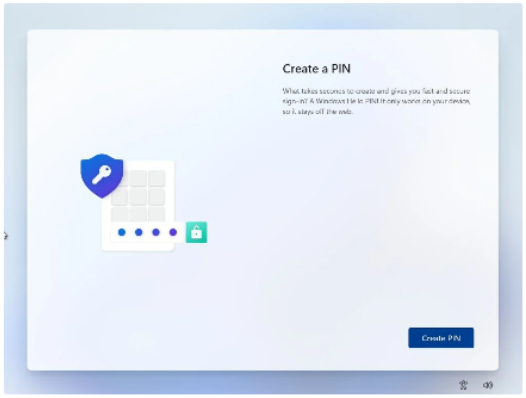


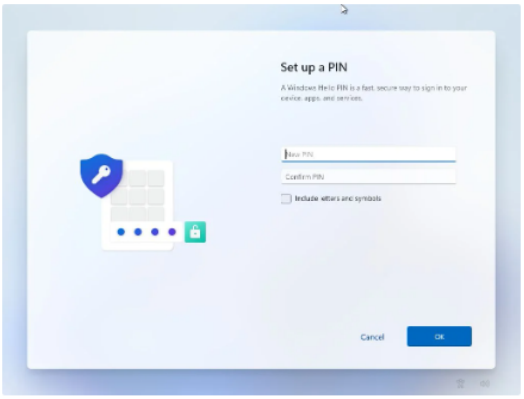
18. To ensure you can recover your files if you don't remember your password you'll need to provide answers to one of the **3 security questions** set up at this step.



18a. If you sign in with a Microsoft account, you will be asked to **Create a PIN** to log in quicker to your computer, instead of using the complex Microsoft password.

You can complete a more secure PIN if you wish, but by default, you're only required to add numbers, not letters and symbols.





19. If this is not your first Windows device and you had set up settings sync in the past you can choose to restore settings from another machine (it can also be the same machine if you're reinstalling Windows).

Self-Check Sheet 2: Install operating system

1. What is the first step in the process of installing an operating system (OS)?

2. Why is it important to select the appropriate OS version during installation?

3. What is the purpose of partitioning and formatting a disk during OS installation?

4. What steps should be followed to partition and format a disk according to user requirements?

5. Why is it essential to follow the OS installation steps according to setup instructions?

6. What are some common optimization tasks performed after OS installation?

7. How can the operating system be optimized to meet workplace requirements?

8. What tools or utilities can assist in optimizing the operating system?

9. Why is it important to configure and optimize the operating system according to workplace requirements?

10. What role does user preference play in configuring and optimizing the operating system?

Answer Key 2: Install operating system

1. What is the first step in the process of installing an operating system (OS)?
   Answer: Starting the OS installation process.
2. Why is it important to select the appropriate OS version during installation?
   Answer: To ensure compatibility with hardware, software, and user requirements.
3. What is the purpose of partitioning and formatting a disk during OS installation?
   Answer: To organize storage space and prepare it for use by the operating system.
4. What steps should be followed to partition and format a disk according to user requirements?
   Answer: Identify partition needs, select partition type, allocate space, and format partitions with a suitable file system.
5. Why is it essential to follow the OS installation steps according to setup instructions?
   Answer: To ensure a successful installation and avoid errors or complications.
6. What are some common optimization tasks performed after OS installation?
   Answer: Configuring power settings, managing startup programs, and adjusting visual effects.
7. How can the operating system be optimized to meet workplace requirements?
   Answer: By configuring security settings, customizing user interfaces, and installing necessary applications.
8. What tools or utilities can assist in optimizing the operating system?
   Answer: Built-in system tools (e.g., Task Manager, Disk Cleanup) and third-party optimization software.
9. Why is it important to configure and optimize the operating system according to workplace requirements?
   Answer: To enhance productivity, security, and efficiency in the workplace environment.
10. What role does user preference play in configuring and optimizing the operating system?
    Answer: User preferences influence customization options such as desktop settings, default programs, and system configurations.

Task Sheet 2.1: Perform Operating System Installation and Optimization

TASK SHEET 2.1
Title: Perform Operating System Installation and Optimization
Performance Objective: At the end of this task, the trainee should be able to install an operating system (OS), select the appropriate OS version, perform partitioning and formatting the disk, following OS installation steps, and configuring and optimizing the OS according to workplace requirements.
1. Boot the computer from the bootable installation media (e.g., USB flash drive, DVD/CD) containing the OS installation files.
2. Access the BIOS/UEFI settings to set the boot priority to boot from the installation media.
3. Start the OS installation process by following the on-screen instructions.
4. Determine the specific requirements and compatibility needs for the OS.
5. Choose the appropriate OS version based on factors such as hardware compatibility, software requirements, and user preferences.
6. Identify disk partitioning needs based on storage requirements and usage.
7. Use disk partitioning tools to create partitions and allocate disk space accordingly.
8. Format the partitions with the desired file system (e.g., NTFS, FAT32, exFAT) based on user requirements and OS compatibility.
9. Proceed with the OS installation process according to the setup instructions provided by the OS installer.
10. Select language, time zone, keyboard layout, and other settings as prompted by the setup wizard.
11. Choose the destination drive/partition for OS installation and follow the on-screen prompts to complete the installation.
12. Customize system settings, desktop preferences, and user accounts to meet workplace requirements.
13. Configure security settings, such as firewall, antivirus software, and user permissions, to enhance system security.
14. Optimize system performance by adjusting power settings, managing startup programs, and optimizing disk usage.
15. Install necessary applications and software tools required for workplace productivity and functionality.

Specification sheet 2.1: Perform Operating System Installation and Optimization

A. Tools and Material required:

- Notebook
- USB flash drive or DVD/CD)
- Operating System (OS)

B. Equipment:

- Laptop/Computer

Learning Outcome 3: Install required driver

Assessment Criteria:

1. Required driver is identified
2. Source is selected for driver as requirement
3. Driver is installed as per component requirement

Content:

1. Required driver
2. Source of driver
3. Driver installation procedure

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 3: Install required driver

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about install required driver	1. Instructor will provide the learning materials "Installing and Using Operating System and Optimize Utilities"
2. Read the Information sheet/s	2. Information Sheet No 3: install required driver
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No 3: install required driver Answer key No. 3: install required driver
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No 3-1: install required driver Specification Sheet 3-1: install required driver

Information Sheet 3: install required driver

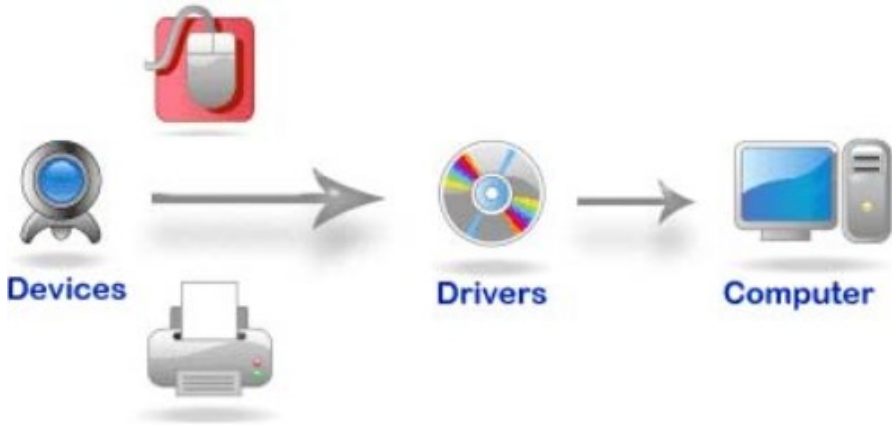
Learning Objectives:

After completion of this information sheet, the learners will be able to:

3.1 Identify Required driver
3.2 Select source for driver as requirement
3.3 Install driver as per component requirement

3.1 Driver

A driver, in computing, refers to a software component that enables communication between the operating system (OS) and a specific hardware device. It acts as an intermediary, allowing the OS to interact with and control the hardware, facilitating the exchange of data and commands.



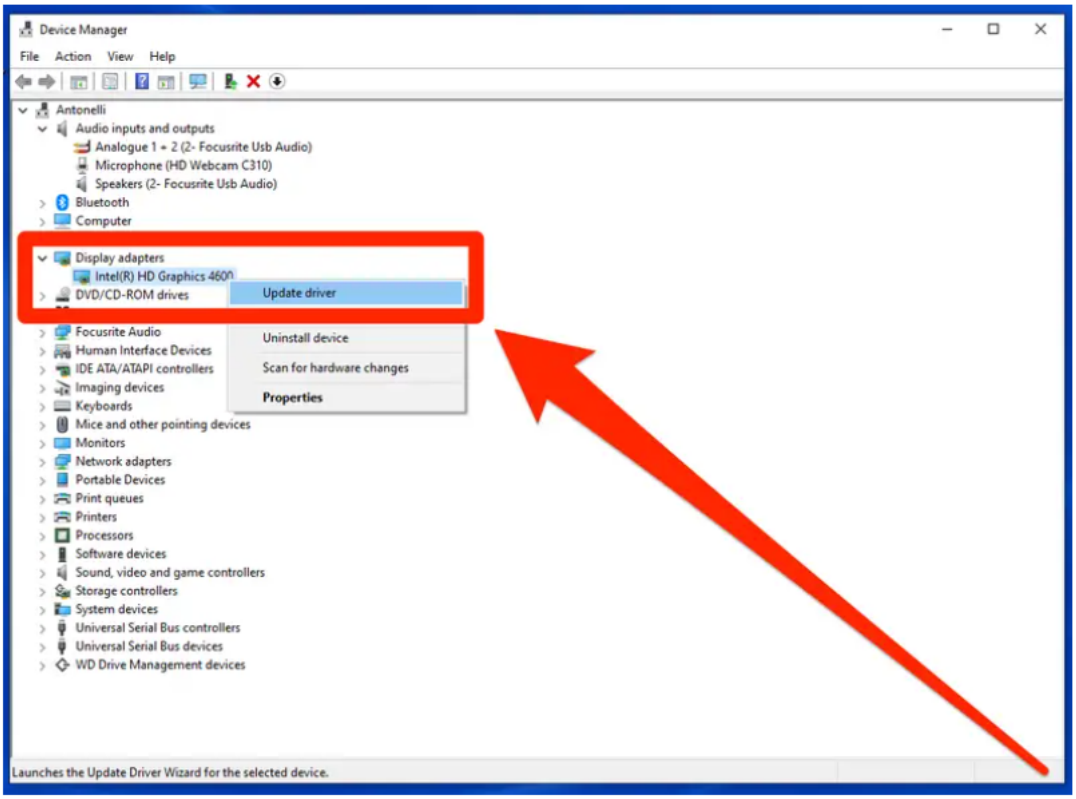
Every hardware device in a computer system, such as a graphics card, network adapter, sound card, or printer, requires a driver to function properly. Drivers provide a standardized interface that allows the OS to send commands and receive data from the hardware device.

Drivers are typically installed during the initial setup of the operating system. During this process, the OS identifies connected hardware devices and installs the appropriate drivers from its database or from external sources.

Users may also manually install drivers when adding new hardware devices or updating existing ones. This is often done by running installation packages provided by the hardware manufacturer.

Driver-related issues are common causes of hardware problems. Symptoms may include device malfunctions, error messages, system crashes, or poor performance.

Troubleshooting hardware problems often involves diagnosing driver-related issues and updating or reinstalling the appropriate drivers.



3.2 Source of driver

Drivers can originate from various sources, including:

Operating System Installation Media:

Many operating systems come bundled with a variety of basic drivers for common hardware components. During the OS installation process, these drivers are automatically installed to ensure basic functionality of hardware devices.

Manufacturer's Website:

Hardware manufacturers often provide drivers for their devices on their official websites. Users can visit the support section of the manufacturer's website, locate the specific hardware model, and download the latest drivers compatible with their operating system.

Windows Update (for Windows-based Systems):

Microsoft regularly releases driver updates through Windows Update. When users connect their Windows-based systems to the internet, Windows Update automatically checks for and installs available driver updates for detected hardware devices.

Automatic Driver Update Utilities:

Some hardware manufacturers offer automatic driver update utilities that can scan the user's system, detect installed hardware devices, and download and install the latest drivers directly from the manufacturer's servers.

Device Manager (for Windows-based Systems):

Windows Device Manager allows users to manually update drivers for installed hardware devices. Users can right-click on a device in Device Manager, select "Update driver," and choose to search for drivers automatically or browse for driver files locally.

Third-party Driver Download Websites:

There are numerous third-party websites that host collections of drivers for various hardware devices. While these sites may offer convenience, users should exercise caution and ensure they download drivers from reputable sources to avoid downloading malicious or outdated drivers.

Hardware Installation Disk/CD:

Some hardware devices come with installation disks or CDs that contain drivers and software utilities. Users can use these disks to install drivers during the initial setup of the hardware device.

Open Source and Community-developed Drivers:

In some cases, open-source drivers or community-developed drivers may be available for certain hardware devices. These drivers are often developed and maintained by volunteers or communities of users and may be distributed through open-source repositories or forums.

3.3 Driver installation procedure

The driver installation procedure typically involves several steps to ensure that the correct drivers are installed and properly configured for hardware devices in a computer system. Here's a general overview of the driver installation process:

1. Determine the Required Drivers:

Identify which hardware devices on the system require drivers. This may include components such as the graphics card, network adapter, sound card, and other peripherals.

2. Obtain the Latest Drivers:

Visit the official website of the hardware manufacturer to download the latest drivers for the identified hardware devices. Ensure that the drivers are compatible with the operating system version installed on the computer.

3. Prepare for Installation:

Before installing the drivers, ensure that the system meets the minimum requirements specified by the hardware manufacturer. Close any unnecessary applications or processes running in the background to prevent conflicts during installation.

4. Run the Driver Installation Program:

Double-click on the downloaded driver installation file to launch the installation wizard. Follow the on-screen instructions provided by the wizard to proceed with the installation process.

5. Accept License Agreement (if applicable):

Read through the license agreement presented by the installation wizard. If you agree to the terms and conditions, select the option to accept the agreement and continue with the installation.

6. Choose Installation Options (if applicable):

Some driver installation wizards may provide options to customize the installation process. This may include selecting specific components or features to install, choosing the installation directory, or configuring additional settings.

7. Install the Drivers:

Click on the "Install" or "Next" button to begin the installation process. The wizard will copy the necessary driver files to the appropriate location on the system and configure the drivers for the hardware devices.

8. Follow On-screen Instructions:

During the installation process, the wizard may prompt you to restart the computer or connect the hardware device to complete the installation. Follow any on-screen instructions provided by the wizard.

9. Complete the Installation:

Once the installation process is complete, the wizard will typically display a message indicating that the drivers have been successfully installed. Click on the "Finish" or "Close" button to exit the installation wizard.

10. Verify Driver Installation:

After installing the drivers, it's important to verify that the hardware devices are functioning properly. Check Device Manager (on Windows-based systems) or equivalent system utilities to ensure that the drivers are installed correctly and that there are no errors or conflicts with the hardware devices.

Self-Check Sheet 3: Install required driver

1. How do you identify the required driver for a hardware component?

2. What is the significance of selecting the correct source for drivers?

3. What are common sources for obtaining drivers?

4. Why is it important to install drivers according to component requirements?

5. What steps are involved in identifying a required driver?

6. How do you select the appropriate source for drivers?

7. What factors should be considered when installing drivers as per component requirement?

8. What are the consequences of installing incorrect drivers?

9. How can users verify that the installed driver meets the component requirement?

10. What steps can users take to ensure successful driver installation?

Answer Key 3: Install required driver

1. How do you identify the required driver for a hardware component?
   Answer: By determining the hardware component that needs a driver and identifying the specific model or version of the component.

2. What is the significance of selecting the correct source for drivers?
   Answer: Selecting the correct source ensures that the driver obtained is compatible with the hardware component and the operating system.

3. What are common sources for obtaining drivers?
   Answer: Common sources include the official website of the hardware manufacturer, Windows Update, and third-party driver download websites.

4. Why is it important to install drivers according to component requirements?
   Answer: Installing drivers according to component requirements ensures that the hardware devices function properly and are compatible with the operating system.

5. What steps are involved in identifying a required driver?
   Answer: Steps may include identifying the hardware component, checking its model or version, and determining the operating system compatibility.

6. How do you select the appropriate source for drivers?
   Answer: By visiting the official website of the hardware manufacturer and ensuring compatibility with the hardware component and operating system.

7. What factors should be considered when installing drivers as per component requirement?
   Answer: Compatibility with the hardware device, compatibility with the operating system, and adherence to installation instructions provided by the manufacturer.

8. What are the consequences of installing incorrect drivers?
   Answer: Incorrect drivers may lead to hardware malfunctions, system instability, and compatibility issues with the operating system.

9. How can users verify that the installed driver meets the component requirement?
   Answer: Users can verify driver installation by checking Device Manager (on Windows-based systems) or using system utilities to ensure that the hardware device is recognized and functioning properly.

10. What steps can users take to ensure successful driver installation?
    Answer: Users should follow installation instructions provided by the manufacturer, download drivers from trusted sources, and verify compatibility with the hardware component and operating system.

Task Sheet 3.1: Install required driver

Task Sheet 3.1: Install required driver
Performance Objective: By the end of this task, the trainee should be able to identify required drivers for hardware components, select appropriate sources for obtaining drivers, and install drivers according to component requirements.
1. Determine which hardware components require drivers for proper functioning.
2. Check device manager or system specifications to identify hardware components that may need drivers.
3. Gather information about the hardware components requiring drivers, including the manufacturer, model number, and version.
4. Note down the operating system version to ensure compatibility.
5. Visit the official website of the hardware manufacturer to search for drivers.
6. Verify that the selected source provides drivers compatible with the identified hardware component and operating system
7. Use the manufacturer's website search functionality to locate drivers for the identified hardware component.
8. Download the latest version of the drivers compatible with the operating system
9. Double-check the downloaded drivers to ensure they match the hardware component and operating system version.
10. Confirm compatibility by reviewing driver specifications and compatibility notes provided by the manufacturer.
11. Close any unnecessary applications or processes running in the background to prevent conflicts during installation.
12. Ensure that the system meets the minimum requirements specified by the hardware manufacturer.
13. Double-click on the downloaded driver file to start the installation process.
14. Follow the on-screen instructions provided by the installation wizard to proceed with the driver installation.
15. Choose any customization options or settings as per component requirement during the installation process.

Specification Sheet 3.1

A. Tools and Material required:

- Notebook
- Driver software
- Internet Connection

B. Equipment:

- Laptop/Computer

Learning Outcome 4: Perform user management

Assessment Criteria:

1. Users are created as per requirement
2. Password is set as required
3. Access privilege is set for user accounts

Content:

1. User creation
2. Password setting
3. Access privilege

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 4: Perform user management

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about Perform user management	1. Instructor will provide the learning materials "**Installing and Using Operating System and Optimize Utilities"**
2. Read the Information sheet/s	2. Information Sheet No: 4 Perform user management
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 4 Perform user management Answer key No. 4 Perform user management
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 4 Perform user management Specification Sheet: 4 Perform user management

Information Sheet 4: Perform user management

Learning Objectives:

After completion of this information sheet, the learners will be able to:

4.1 Create users as per requirement
4.2 Set password as required
4.3 Set Access privilege for user accounts

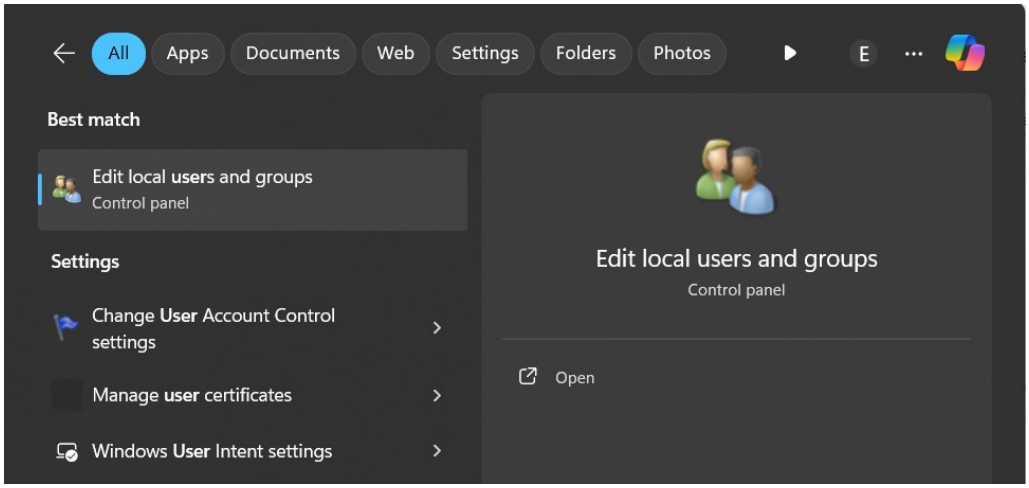
4.1 User creation

User creation refers to the process of creating user accounts on a computer system or network. These user accounts allow individuals to access resources, services, and applications based on their permissions and privileges granted by system administrators.

User creation process:

Access User Management Interface:

User creation typically begins with accessing the user management interface of the operating system or network administration tools. This interface provides options for creating, modifying, and deleting user accounts.



Provide User Information:

When creating a new user account, system administrators are required to provide essential information about the user, such as:

Username: A unique identifier used for logging into the system.

Full Name: The user's full name or display name.

Password: A secure password that the user will use to authenticate their identity.

Email Address: An optional field for providing the user's email address.

Other Contact Information: Additional contact information, such as phone numbers or addresses, may also be required depending on organizational policies.

Assign User Permissions:

System administrators assign permissions and privileges to the user account based on the user's role and responsibilities within the organization. These permissions may include:
Access Rights: Determine which files, folders, and resources the user can access.
Administrative Rights: Grant administrative privileges for managing system settings, installing software, and performing system-level tasks.
Group Memberships: Add the user to specific groups to inherit group permissions and access rights.

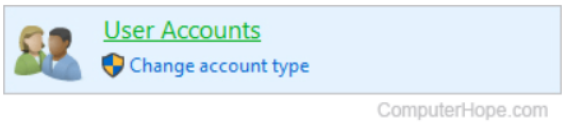
Configure Account Settings:
Administrators can configure additional settings for the user account, such as:
Password Policy: Specify password complexity requirements, expiration periods, and lockout policies.
Account Expiration: Set a date for the account to expire or configure account duration limits.
Account Restrictions: Apply restrictions on login times, workstation logins, or IP address restrictions.

Review and Confirm:

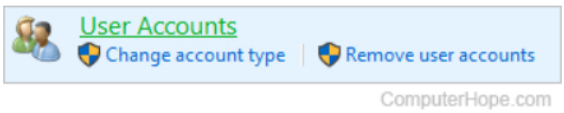
Before finalizing the user creation process, administrators review the information provided and ensure that permissions and settings are configured correctly.
Any errors or inconsistencies are corrected before confirming the creation of the user account.
6. Create User Account:
Once all necessary information and settings are configured, administrators initiate the user creation process. The system generates a unique user account based on the provided information and settings.
7. Document User Account Details:
Administrators maintain documentation of user account details, including usernames, passwords, permissions, and other relevant information, for auditing and management purposes.

Creating a user in Windows 10

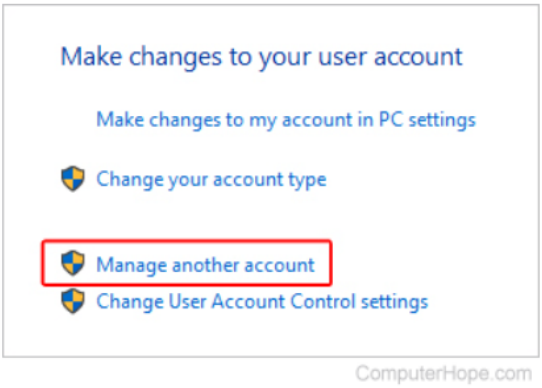
1. Press the Windows key, type **Control Panel**, and press Enter.
2. Select **User Accounts**.



3. Click **User Accounts** again.



4. Near the middle of the window, click **Manage another account**.



5. To the bottom-left of the box containing current user accounts, click the Add a new user in PC settings link.
6. Near the bottom of the window, click **Add a new user in PC settings**.
7. Click the + next to **Add a family member** or **Add someone else to this PC**.
8. Follow the guided instructions to create a new user account.

4.2 Password setting

Password setting refers to the process of establishing rules and configurations for passwords used to authenticate users' identities when accessing computer systems, networks, applications, or online services. Effective password settings help enhance security by ensuring that passwords are sufficiently complex, difficult to guess, and resistant to brute-force attacks.

1. Password Complexity:

Passwords should be complex, containing a combination of uppercase and lowercase letters, numbers, and special characters (e.g., !, @, #, $). This complexity makes passwords more resistant to guessing and dictionary attacks.

2. Minimum Length:

Establish a minimum length requirement for passwords to ensure they are of sufficient complexity. A longer password generally provides better security. The recommended minimum length is often between 8 to 12 characters, but longer passwords are increasingly recommended for higher security.

3. Password Expiration:

Implement password expiration policies that require users to change their passwords regularly. Regular password changes help mitigate the risk of compromised passwords due to potential exposure or breaches.

4. Password History:

Enforce password history requirements to prevent users from reusing previously used passwords. This prevents users from cycling through a small set of passwords and encourages them to create unique passwords for each change.

5. Account Lockout:

Configure account lockout policies to temporarily lock user accounts after a specified number of failed login attempts. This helps prevent brute-force attacks and unauthorized access attempts by locking out attackers after multiple failed login attempts.

4.3 Access privilege

Access privilege, also known as access rights or permissions, refers to the level of access or authority granted to users, groups, or processes to interact with resources, data, or functionalities within a computer system, network, or application. Access privileges define what actions users are allowed or denied to perform on specific resources, and they are essential for maintaining security, controlling access, and protecting sensitive information. Here's an explanation of access privilege:

1. Resource Access:

Access privilege determines who can access specific resources, such as files, folders, databases, network shares, or applications, and what actions they can perform on those resources.

2. Types of Privileges:

Read: Allows users to view or read the contents of a resource.

Write: Permits users to create, modify, or delete data within a resource.

Execute: Grants users permission to run or execute a program or script.

Delete: Authorizes users to remove a resource from the system.

Modify: Enables users to make changes to the settings or configurations of a resource.

Full Control: Provides unrestricted access to perform any action on the resource, including read, write, execute, delete, and modify.

3. User-Based Privileges:

User-based access privileges are assigned to individual user accounts, specifying what resources they can access and what operations they can perform. These privileges are typically based on the user's role, responsibilities, and organizational requirements.

Self-Check Sheet 4: Perform user management

1. How do you create user accounts as per organizational requirements?

2. What is the importance of setting passwords for user accounts?

3. How are passwords set for user accounts?

4. Why is it necessary to set access privileges for user accounts?

5. What factors are considered when setting access privileges for user accounts?

6. How are access privileges assigned to user accounts?

7. What types of actions can be controlled through access privileges?

8. How are access privileges managed for user accounts?

9. What is the role of password policies in access privilege management?

10. How can access privilege assignments be reviewed and updated?

Answer Key 4: Perform user management

1. How do you create user accounts as per organizational requirements?
   Answer: User accounts are created based on the roles and responsibilities of individuals within the organization, ensuring that each user has access to the resources they need to perform their job functions.
2. What is the importance of setting passwords for user accounts?
   Answer: Setting passwords helps authenticate user identities and protect user accounts from unauthorized access, ensuring the security of sensitive information and resources.
3. How are passwords set for user accounts?
   Answer: Passwords are set according to password policies established by the organization, ensuring that they meet minimum complexity requirements and are resistant to unauthorized access attempts.
4. Why is it necessary to set access privileges for user accounts?
   Answer: Setting access privileges ensures that users have appropriate permissions to access resources and perform specific actions based on their roles and responsibilities within the organization.
5. What factors are considered when setting access privileges for user accounts?
   Answer: Factors such as user roles, job responsibilities, organizational policies, and regulatory requirements are considered when determining access privileges for user accounts.
6. How are access privileges assigned to user accounts?
   Answer: Access privileges are assigned based on the principle of least privilege, ensuring that users are granted the minimum level of access necessary to perform their job functions effectively.
7. What types of actions can be controlled through access privileges?
   Answer: Access privileges control actions such as read, write, execute, delete, modify, and full control over resources, ensuring that users can perform authorized tasks while preventing unauthorized access.
8. How are access privileges managed for user accounts?
   Answer: Access privileges are managed through access control mechanisms such as role-based access control (RBAC), access control lists (ACLs), and user/group permissions, ensuring that users have appropriate access to resources.
9. What is the role of password policies in access privilege management?
   Answer: Password policies define the rules and requirements for setting passwords, ensuring that they adhere to security best practices and protect against unauthorized access.
10. How can access privilege assignments be reviewed and updated?
    Answer: Access privilege assignments should be periodically reviewed and updated based on changes in user roles, job responsibilities, and organizational requirements, ensuring that access remains aligned with business needs and security policies.

Task Sheet 4.1: Perform user management

Task Sheet 4.1: Perform user management
Title: Format Media Elements
Performance Objective: By the end of this task, the trainee should be able to:
1. Gather information about the users who need accounts, including their roles, responsibilities, and access requirements.
2. Access the user management interface of the system or network administration tools.
3. Follow the prompts to create new user accounts, providing necessary information such as username, full name, and email address.
4. Assign each user account to the appropriate organizational unit or group.
5. Establish strong passwords for each user account according to password policy requirements.
6. Ensure passwords meet complexity requirements, including minimum length, use of uppercase and lowercase letters, numbers, and special characters.
7. Determine the access privileges required for each user account based on their roles and responsibilities.
8. Assign appropriate permissions and access rights to resources, such as files, folders, applications, and network shares.

Specification Sheet 4.1:

A. Tools and Material required:

- Notebook

B. Equipment:

- Laptop/Computer

Review of Competency

Below is yourself assessment rating for module **"Installing and Using Operating System and Optimize Utilities"**

SL no	**Assessment of performance Criteria**	Yes	No
1.	Operating system is selected as per requirement		
2.	Unified Extensible Firmware Interface (UEFI) and legacy mode is identified		
3.	Partition type is selected as per partition requirement		
4.	Boot Media is selected and prepared for installation		
5.	Boot sequence is modified as per requirement		
6.	OS installation is started		
7.	OS version is selected as per requirement		
8.	Disk is partitioned and formatted as per user requirement.		
9.	Operating system installation steps are followed according to the OS setup instruction.		
10.	Operating system is configured and optimized according to the workplace requirement.		
11.	Required driver is identified		
12.	Source is selected for driver as requirement		
13.	Driver is installed as per component requirement		
14.	Users are created as per requirement		
15.	Password is set as required		
16.	Access privilege is set for user accounts		

I now feel ready to undertake my formal competency assessment.

Signed:

Date:

Development of CBLM

The Competency based Learning Material (CBLM) of '**Installing and Using Operating System and Optimize Utilities' (Occupation: IT Support Service, Level-3)** for National Skills Certificate is developed by NSDA with the assistance of SIMEC System Ltd., ECF Consultancy & SIMEC Institute of Technology JV (Joint Venture Firm) in the month of June, 2024 under the contract number of package SD-9B dated 15th January 2024.

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REFERENCE:

1. https://chat.openai.com/
2. https://gemini.google.com/
3. https://binaryfork.com/how-to-install-windows-11-1114/