**Assignment-1**

**FreeBSD INSTALLATION:**

**Text

Description automatically generatedGraphical user interface, text

Description automatically generatedGraphical user interface, text, application, email

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Description automatically generatedGraphical user interface, text, application, email

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Description automatically generated**

**UBUNTU INSTALLATION:**

**Graphical user interface, application

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**Graphical user interface, application

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**Graphical user interface, application

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**Graphical user interface, application

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**Graphical user interface, text, application

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**Graphical user interface

Description automatically generated**

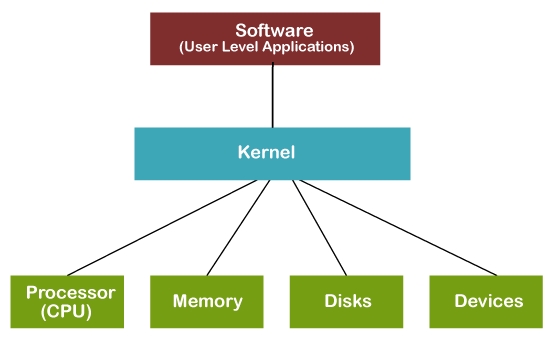
**Graphical user interface, PowerPoint

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**Q1: -what is kernel and shell?**

**Ans: -**

**Kernel: -**The kernel is the essential center of a computer operating system ([OS](https://whatis.techtarget.com/definition/operating-system-OS)). It is the core that provides basic services for all other parts of the OS. It is the main layer between the OS and hardware, and it helps with process and memory management, file systems, device control and networking.



* Kernel is the core part of an OS (Operating system); hence it has full control over everything in the system. Each operation of hardware and software is managed and administrated by the kernel.
* It acts as a bridge between applications and data processing done at the hardware level. It is the central component of an OS.
* It is the part of the OS that always resides in computer memory and enables the communication between software and hardware components.
* It is the computer program that first loaded on start-up the system (After the bootloader). Once it is loaded, it manages the remaining start-ups. It also manages memory, peripheral, and I/O requests from software. Moreover, it translates all I/O requests into data processing instructions for the CPU. It manages other tasks also such as memory management, task management, and disk management.
* A kernel is kept and usually loaded into separate memory space, known as protected Kernel space. It is protected from being accessed by application programs or less important parts of OS.
* Other application programs such as browser, word processor, audio & video player use separate memory space known as user-space.
* Due to these two separate spaces, user data and kernel data don't interfere with each other and do not cause any instability and slowness.

**Functions of a Kernel**

**Device Management**

To perform various actions, processes require access to peripheral devices such as a mouse keyboard, etc. that are connected to the computer. A kernel is responsible for controlling these devices using device drivers. Here, a device driver is a computer program that helps or enables the OS to communicate with any hardware device. A kernel maintains a list of all the available devices and this list may be already known configured by the user, or detected by OS at runtime

**Memory Management**

The kernel has full control for accessing the computer's memory Each process requires some memory to work, and the kernel enables the processes to safely access the memory. To allocate the memory, the first step is known as virtual addressing, which is done by paging or segmentation Virtual addressing is a process of providing virtual address spaces to the processes This prevents the application from crashing into each other

**Resource Management**

One of the important functionalities of Kernel is to share the resources between various processes it must share the resources in a way that each process undermix accesses the resource The kernel also provides a way for synchronization and inter-process communication (IPC). is responsible for context switching between processes

**Shell: -** A Shell provides you with an interface to the Unix system. It gathers input from you and executes programs based on that input. When a program finish executing, it displays that program's output.

Shell is an environment in which we can run our commands, programs, and shell scripts. There are different flavors of a shell, just as there are different flavors of operating systems. Each flavor of shell has its own set of recognized commands and functions.

**Shell Types:**

In Unix, there are two major types of shells −

* Bourneshell − If you are using a Bourne-type shell, the $ character is the default prompt.
* Cshell − If you are using a C-type shell, the % character is the default prompt.

The Bourne Shell has the following subcategories −

* Bourne shell (sh)
* Korn shell (ksh)
* Bourne Again shell (bash)
* POSIX shell (sh)

The different C-type shells follow −

* C shell (csh)
* TENEX/TOPS C shell (tcsh)

The original Unix shell was written in the mid-1970s by Stephen R. Bourne while he was at the AT&T Bell Labs in New Jersey.

Bourne shell was the first shell to appear on Unix systems, thus it is referred to as "the shell".

Bourne shell is usually installed as **/bin/sh** on most versions of Unix. For this reason, it is the shell of choice for writing scripts that can be used on different versions of Unix.

In this chapter, we are going to cover most of the Shell concepts that are based on the Borne Shell.

**Q2: -What OS means?**

**Ans:** -An operating system is the most important software that runs on a computer. It manages the computer's memory and processes, as well as all its software and hardware. It also allows you to communicate with the computer without knowing how to speak the computer's language. Without an operating system, a computer is useless**.**

**operating system** (**OS**) manages all of the**software**and**hardware**on the computer. Most of the time, there are several different computer programs running at the same time, and they all need to access your computer's **central processing unit (CPU)**, **memory**, and **storage**. The operating system coordinates all of this to make sure each program gets what it needs.

**Types of operating system**:

Operating systems usually come **pre-loaded** on any computer you buy. Most people use the operating system that comes with their computer, but it's possible to upgrade or even change operating systems. The three most common operating systems for personal computers are **Microsoft Windows**,**macOS**, and **Linux**.

Modern operating systems use a **graphical user interface**, or **GUI** (pronounced **gooey**). A GUI lets you use your mouse to click **icons**, **buttons**, and **menus**, and everything is clearly displayed on the screen using a combination of **graphics** and **text**.

Each operating system's GUI has a different look and feel, so if you switch to a different operating system, it may seem unfamiliar at first. However, modern operating systems are designed to be **easy to use**, and most of the basic principles are the same.

**Microsoft Windows**

Microsoft created the **Windows** operating system in the mid-1980s. There have been many different versions of Windows, but the most recent ones are **Windows 10** (released in 2015), **Windows 8** (2012), **Windows 7**(2009), and **Windows Vista** (2007). Windows comes **pre-loaded** on most new PCs, which helps to make it the **most popular operating system** in the world.

**MacOS**

**macOS** (previously called **OS X**) is a line of operating systems created by Apple. It comes preloaded on all Macintosh computers, or Macs. Some of the specific versions include **Mojave** (released in 2018), **High Sierra** (2017), and **Sierra** (2016).

**linux**

**Linux** (pronounced **LINN-ux**) is a family of **open-source** operating systems, which means they can be modified and distributed by anyone around the world. This is different from **proprietary software** like Windows, which can only be modified by the company that owns it. The advantages of Linux are that it is **free**, and there are many different **distributions**—or versions—you can choose from.

**Operating System Definition:** It is a software that works as an interface between a user and the computer hardware. The primary objective of an operating system is to make computer system convenient to use and to utilize computer hardware in an efficient manner. The operating system performs the basic tasks such as receiving input from the keyboard, processing instructions and sending output to the screen.

What is the operating system?

The Software is the Non-Touchable Parts of the Computer , and Software’s are those which are used for Performing an Operation So that Software’s are just used for Making an Application but hardware’s are those which are used for Performing an Operation .

Operating system is software that is required in order to run application programs and utilities. It works as a bridge to perform better interaction between application programs and hardware of the computer. **Examples of operating system are UNIX, MS-DOS, MS-Windows – 98/XP/Vista, Windows-NT/2000, OS/2 and Mac OS.**

**Functions of operating system:**

Operating System Means that Resource Manager, that manage all the Resources those are Attached to the System, like Memory,Processor,Input/output Devices.

**Storage Management**: It manage all the Storing and Accessing Files and Directories  Reading/Writing Operations.

Operating system manages overall activities of a computer and the input/output devices attached to the computer. It is the first software you see when you turn on the computer, and the last software you see when the computer is turned off. It is the software that enables all the programs you use. At the simplest level, an operating system does two things:

The first, it manages the hardware and software resources of the computer system. These resources include the processor, Memory, disk space, etc. The second, it provides a stable, consistent way for applications to deal with the hardware without having-to know all the details of the hardware.

The first task is very important i.e., managing the hardware and software resources, as various processes compete to each other for getting the CPU time and memory space to complete the task. In this regard; the operating system acts as a manager to allocate the available resources to ‘satisfy the requirements forechoices.

The second task i.e., providing a consistent application interface is especially important. A consistent application program interface (API) allows a user (or *S/W*developer) to write an application program on any computer and to run this program on another computer, even if the hardware configuration is different like as amount of memory, type of or storage disk. It shields the user of the machine from the low-level details of the machine’s operation and provides frequently needed facilities.

**Process Management:** It manage all the User and system Process.  
**Memory Management**: Operating System also Manages the Computer Memory that is provided to the process.  
**Extended Machine**: It is behaves like an Extended Machine that Provides us Sharing of Files between Multiple Users.  
**Mastermind**: It performs Many Functions that’s why we can say that Operating System is a Mastermind.

Different types of operating system:

There are different types of operating system those are organized by their Working.

**Serial Processing**: In Serial Processing operating system that use FIFO (First in First Out) technique for processing the process.  
**Batch Processing:** In batch processing a similar type of jobs prepared and processed.  
**Multi-Programming:** In Multi programming Operating System Multiple Programs are Executed on the System at a Time.  
**Real Time System:** Real Time System are used there Requires higher and Timely Response.  
**Distributed Operating System**: In this Operating system Data is Stored and Processed on Multiple Locations.  
**Multiprocessing:** In This type of operating system there are two or More CPU in a Single OS.  
**Parallel operating systems**: It manage parallelly all running resources of the computer system.

**Q3: -What are the functions of kernel and shell?**

Bash’s function feature is an expanded version of a similar facility in the System V Bourne shell and a few other shells. A function is sort of a script-within-a-script; you use it to define some shell code by name and store it in the shell’s memory, to be invoked and run later.

Functions improve the shell’s programmability significantly, for two main reasons. First, when you invoke a function, it is already in the shell’s memory; therefore a function runs faster. Modern computers have plenty of memory, so there is no need to worry about the amount of space a typical function takes up. For this reason, most people define as many commonly used functions as possible rather than keep lots of scripts around.

The other advantage of functions is that they are ideal for organizing long shell scripts into modular “chunks” of code that are easier to develop and maintain. If you aren’t a programmer, ask one what life would be like without functions (also called procedures or subroutines in other languages) and you’ll probably get an earful.