Fundamentals of Operating System

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ABSTRACT: An Operating System can be defined as an “interface between user and hardware”. It is responsible for the execution of all the processes, Resource Allocation, CPU management and File Management. The purpose of an operating system is to provide an environment in which a user can execute programs in convenient and efficient manner. OS helps to connect and interface computer hardware to program and it help in application software and other common essential services. It is initially loaded on at boot time. The main purpose of Operating System is to handle the activities based on computer hardware. It also provides management for input, output and storage devices. Mostly in computer system different computer programs run at the same time and they need to access CPU, memory, and storage. In an operating system user can communicate with the Command Line Interface by typing command and the user receives the response back form the system according to the command entered. But in Modern Time Operating system use a Graphical user interface (GUI) for easy to use. User can communicate with a system using a mouse to click button, menus, and everything is displayed on the screen using Text, Graphics or image..

KEYWORDS: Introduction, Structure of Computer System, Type of operating system, Process Management.

INTRODUCTION

A System or Computer Machine has the different types of devices and software which are used to do complete various operations. In Computer operating system the most commonly or important is Memory (Ram and Rom), Storage Devices, Central Processing Unit (CPU), Processors and Other peripherals devices. An OS is interfaces that connect the user to various applications (Software to hardware). Operating System can be defined as an interface between user and the hardware. It provides an environment to the user so that user can perform its task in convenient and efficient way [1].

![Operating System Diagram](image)

**Fig. 1:** Operating System

STRUCTURE OF A COMPUTER SYSTEM

Computer system consists of user, application, utilities, OS, machine language, micro-programming, hardware etc.

- Users are people who are using the computer.
- Application programs are Compilers, Databases, Games, Video player, Browsers, etc.
- System programs are Shells, Editors and Compilers etc.
- Operating System is a special program which acts as an interface between user and hardware.

Hardware is CPU, Disks, Memory, etc.
TYPES OF OPERATING SYSTEM

1. **Batch Operating System**

The batch operating system is used to execute the processes in the batches. Mainframe is called as a single computer used by people. In Batch OS, access is given to more than one user at a time. They submit their respective jobs to the system for the execution [2].

- It places the jobs in the queue on the basis of first come first serve (FCFS).
- And execute the entire job one by one. The user waiting for a output get the result [3].
2. **Multiprogramming Operating System**

   ![Multiprogramming OS Diagram]

   **Fig.4: Multiprogramming OS**

   - This operating system is the extension of the batch OS. In this OS CPU is kept always busy.
   - If many jobs run on same time the OS work on a method called as Schelling.
   - Multiprogramming OS increases CPU utilization by organizing jobs. CPU always has one job to execute [4].
   - In this OS it ensures that the CPU is never idle, until there are no jobs to process.

3. **Multiprocessing Operating System**

   ![Multiprocessing OS Diagram]

   **Fig.5: Multiprocessing OS**

   In this, parallel computing is achieved and more than one processor present in the system which can execute more than one process at the same time. It will increase the throughput of the system [5].

4. **Real Time Operating System**

   Data processing system is defined as a real-time system. In this System displays time-consuming information and marked them as response time [6]. In this OS time compared to online processing is very low.

5. **Distributed Operating System**

   In distributed Operating System data processing jobs are distributed among the processors accordingly. Processor communicate with one another through various communication lines. These Communication lines are high speed buses and telephone lines [7]. These are referred as loosely coupled systems or distributed systems.
6. **Network Operating System**

It runs on servers and provides the use to manage such application data, security and other network related application [8]. The main aim of this operating system is sharing file, printing and other device among multiple computer on the network. Various types of network are used such as LAN, WAN, VAN, PAN etc.

**PROCESS MANAGEMENT INTRODUCTION**

Until the CPU doesn’t execute the instruction the program can do nothing. A program in an execution is called as process. It may exist more than one process in the system which may require the same resources at the same time. The operating system has to manage all the processes and resources in a convenient and efficient way [9]. Operating system is responsible for the following activities for making a connection with Process Management.

1. Scheduling processes and threads on the CPUs.
2. Creating and deleting both user and system processes.
4. Providing mechanisms for process synchronization.
5. Providing mechanisms for process communication.

**ATTRIBUTE OF A PROCESS**

![Process Attributes Diagram]

It is used by the Operating System to create the process control block (PCB) for each of them. This is also called context of the process. Attributes which are stored in the PCB are:

1. **Process ID**

Whenever the process created, a unique id is assigned to all the process for the unique identification of the process in the system [10].

2. **Program Counter**

It stores the address of last instruction of the process on which the process was suspended in the system. When the execution of this process is resumed then CPU uses this address.
3. **Process State**

The process from its creation towards the completion it goes from various states that are new, ready, running and waiting.

4. **Priority**

All the process has its own priority. The process which has the highest priority gets the first chance to enter in the CPU first.

5. **General Purpose Registers**

Every process has their own sets of registers for storing the data that is generated at the time of execution.

6. **List of Files Open**

At the time of execution every process uses some files which need to be present in the main memory. OS also maintains a lists of open files in the PCB.

**CONCLUSION**

This research paper started with a brief history of the personal computer industry and the role of operating systems within the industry. An Operating System plays an important role in our life. A Computer without an operating system is like a human body without heart. It controls desktop. A mobile operating system controls mobile phones, tablets and iPads. Android, Windows, Blackberry and IOS are some known operating system. The mobile OS is responsible to determine the functions and features available on our devices like keyword, thumbwheel, synchronize with application like as email, text messages etc. It also sorts out extra mobile applications used on devices. User has to write the command to proceed further. Without operating system computer is nothing because nothing happens. System for human or any other electric machine is only beneficial until it helps to minimise human effort. Without OS user cannot perform the task properly. It will become complex to use.

**REFERENCES**


