

Assignment - Operating System

- i) Write a note on evolution and generation of an operating system.

The evolution of operating system is directly dependent on the development of computer system and how we use them.

Operating systems have evolved from slow and expensive systems to present day.

- i) The 1st Gen (1945-55) :-

Vacuum tubes & plug board built and maintained by single group of people. Programming language were unknown and there were no operating system so all the programming was done in machine language.

- ii) The 2nd Gen (1955-65) :-

Transistor and batch system. Transistor led to the development of the computer system that could be manufactured and sold to paying customers. These machines were known as mainframe computers. These machines were known as mainframe and were locked in air conditioned computer rooms with stuff to operate them.

- iii) The 3rd Gen (1965-80) :-

Integrated circuit & multiprogramming until 1960's there were two types of computer system i.e., scientific and commercial computer. These were combined by IBMs in the system 1960. This used integrated circuit's and provide a major price and performance advantages over the 2nd gen system.

ii) 4th Gen (1980 - present day) in personal comp.
 Personal computers were easy to create with the development of large-scale integrated circuit. There were chips containing thousands of transistors on a square centimeter of silicon. Because of these microcomputers were much cheaper than minicomputers and that made it possible for a single individual to own one of them.

2] Describe operating system in detail.

→ An operating system (OS) is system software that manages the computer hardware, software resources and provides common service for comp. programs. Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage for easy printing & other resources. For hardware function such as I/O & memory allocation, the operating system act as intermediary b/w programs & the computer hardware.

The dominant general-purpose desktop operating system is Microsoft Windows with market share of around 76.45%, Mac OS by Apple in 2nd place (7.72%) & Linux 1.73% in 3rd position & in mobile sector Android share is up to 72% in the year 2020.

There is some type of OS

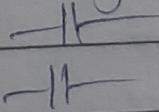
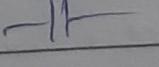
- i) single-tasking
- ii) Single & multi-tasking
- iii) Distributed
- iv) Embedded
- v) Real time
- vi) Library

Q) List the different types and function of an operating system

→ Following are the popular types of OS :-

- i) Batch OS
- ii) Multitasking / Time sharing OS
- iii) Multiprocessing OS
- iv) Real time OS
- v) Distributed
- vi) Mobile OS
- vii) Network OS

Function of OS

- i) memory management
- ii) processor management
- iii) device 
- iv) file 
- v) security
- vi) job accounting
- vii) Error detecting codes
- viii) Control over system performance

(4)

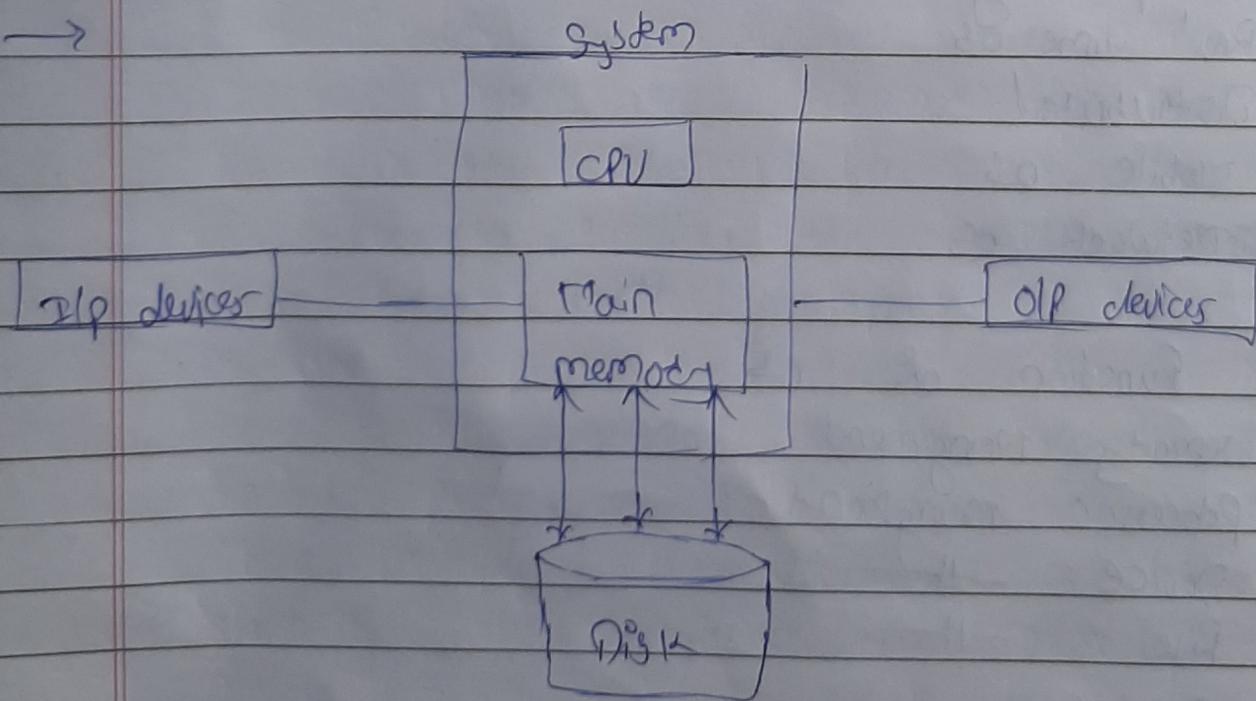
What do you mean by Batch processing system and explain.



Batch processing is process by which a computer completes batches of the job, often simultaneously non stop, sequential order. It's also a command that encloses large jobs and computed in small parts for efficiency during the clockticking for large enterprises, batch processing became a normal way of data compilation organization report generalization around the middle of the 20th century with the introduction of mainframe computers.

(5)

Describe spooling with diagram.



Spooling is a process in which data is temporary held to be used and executed by

devices, program or the system.
 Spooling work like a typical instruction and
 processes ex spool where data instruction and process
 from multiple sources and accommodates for execution
 later on.

Computer generally the spool is maintained on the
 devices - physical memory buffers of the I/O
 specific interrupts. The on the basis of a
 lifo algorithm.

Q) State the difference b/w multiprogramming and multitasking.

→ Multiprogramming

i) Both of these concepts are for single CPU

Multitasking

Both of these concepts are for single CPU

ii) Concept of context switching is used

concept of context switching and time sharing is used

iii) Multi-programming increase but it also increase as utilization CPU utilization by organization it also include responsiveness by jobs.

iv) The idea is to reduce the CPU idle time for as long as possible. The idea is to further extend the CPU utilize concept of by increasing responsiveness by time sharing.

Multiprogramming

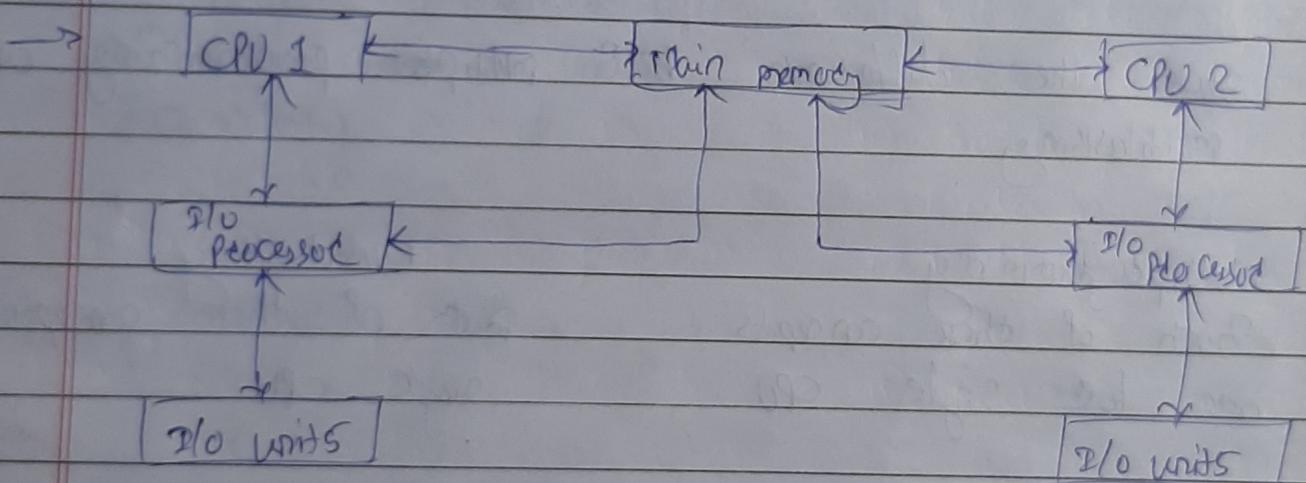
- v) In multiprogrammed system the OS simply switches to and execute another job when current job needs to wait.

Switching

Switching happens when either allowed time expires or when there other reasons for current process need to wait.

(7)

With the help of fig explain multiprocessor system (parallel)



Multiprocessor system supports the processor to run in parallel processing. Parallel processing is the ability of CPU to simultaneously process incoming jobs. This becomes most important in computer systems as the CPU divides and conquers the jobs.

It refers to the use of two or more control processing within a single computer system. These multiple CPU's are in a close communication sharing the computer bus, memory and other peripheral devices. It is based on the symmetric multiprocessing model.

Q) Write a note on distributed systems

A distributed system is also known as a distributed computing system. It is a system with multiple components located on different machines that communicate and coordinate actions in order to appear as a single coherent system to the end user.

The part of distributed system may be composed of servers, virtual machine containers or any other nodes that can connect to the network have local memory and communicate by pipeline ways that distributed system function. Obviously, there is no global clock and all components fail independently of each other.

What do you mean by worst case response time? Explain.

The non-prenative nature of subtask may cause blocking of a task by at most one local priority task under FPTB. The maximum blocking of task T_i by a lower priority task is equal to the longest computation time of any subjob of a task with a priority lower than task T_i which is given by

$$B_i = \max_{j > i} \max_{1 \leq k \leq m(j)} C_j, K$$

To determine worst case response time under FDDs and arbitrary phasing, we have to revisit critical instant.

b3

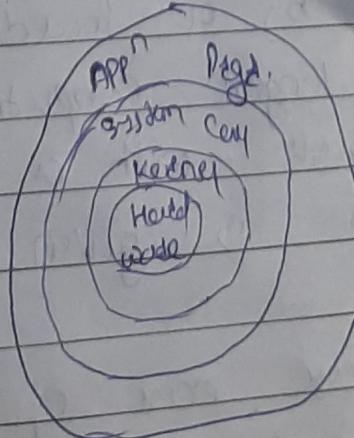
Show the difference between Time sharing & Real time sharing.

→ TIME sharing

Real time

- i) In time sharing system ii) In real time as computation quick response is emphasis tasks are emphasised sized for a request before its nominative point
- ii) switching method is iii) switching method is not available available
- iii) modification in the program iv) modification does not take place
- iv) Resources are shared to the external v) Resources are not shared to the external.
- v) It deal with more than one process or applications simultaneously. vi) It deal with only one process or app at a time.

b3 with the help of dig. describe UNIX layered structure



The Unix operating system (os) consist of a Kernel layer . shell layer and utilities and applications .

Kernel Layer :-

The Kernel layer is the heart of the Unix os . It is a software application that provide the interface between the hardware and the user. It handle the process, memory, file device and network management for the operating system. The kernel is responsible for ensuring that all system and user tasks are performed correctly. Shell is a program that sits between the user and the kernel.

Utilities and applications :-

The final layer of the unix os is the utilities and application layer . This layer include the commands , word processor , graphic program and database management programs. These program can be accessed by typing the command to start the program on the command line .

Explain ms-dos layer structure and its layered approach .

MS-DOS operating system is split into various layers and each of the layer have different function . Application program is these program perform a particular function .

directly for the user. In other words, these programs provide an application to the end user so they are known as application programs.

System program is

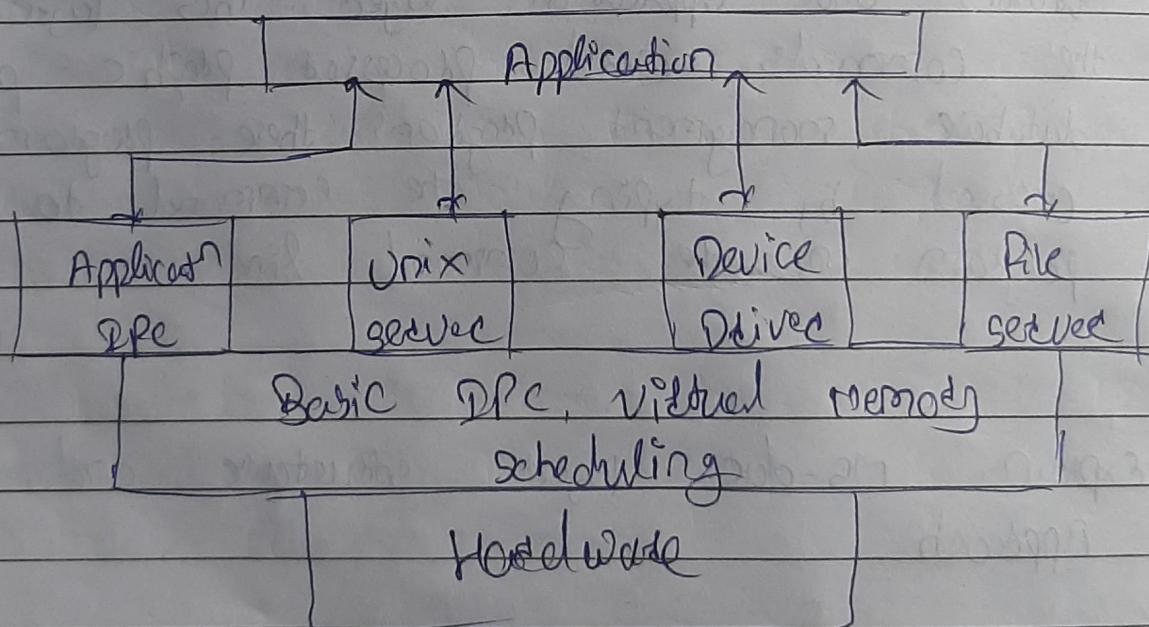
The system programs are used to perform the operating system software which application programs provide s/w that is used directly by the user.

MS-DOS device drivers &

most of the MS-DOS device drivers are part of the operating system such as keyboard and screen control drivers, floppy and hard-disk drivers, printer port driver, serial port driver etc.

(B)

Discuss microkernel in details and draw the diagram of Rod Johnson's microkernel.

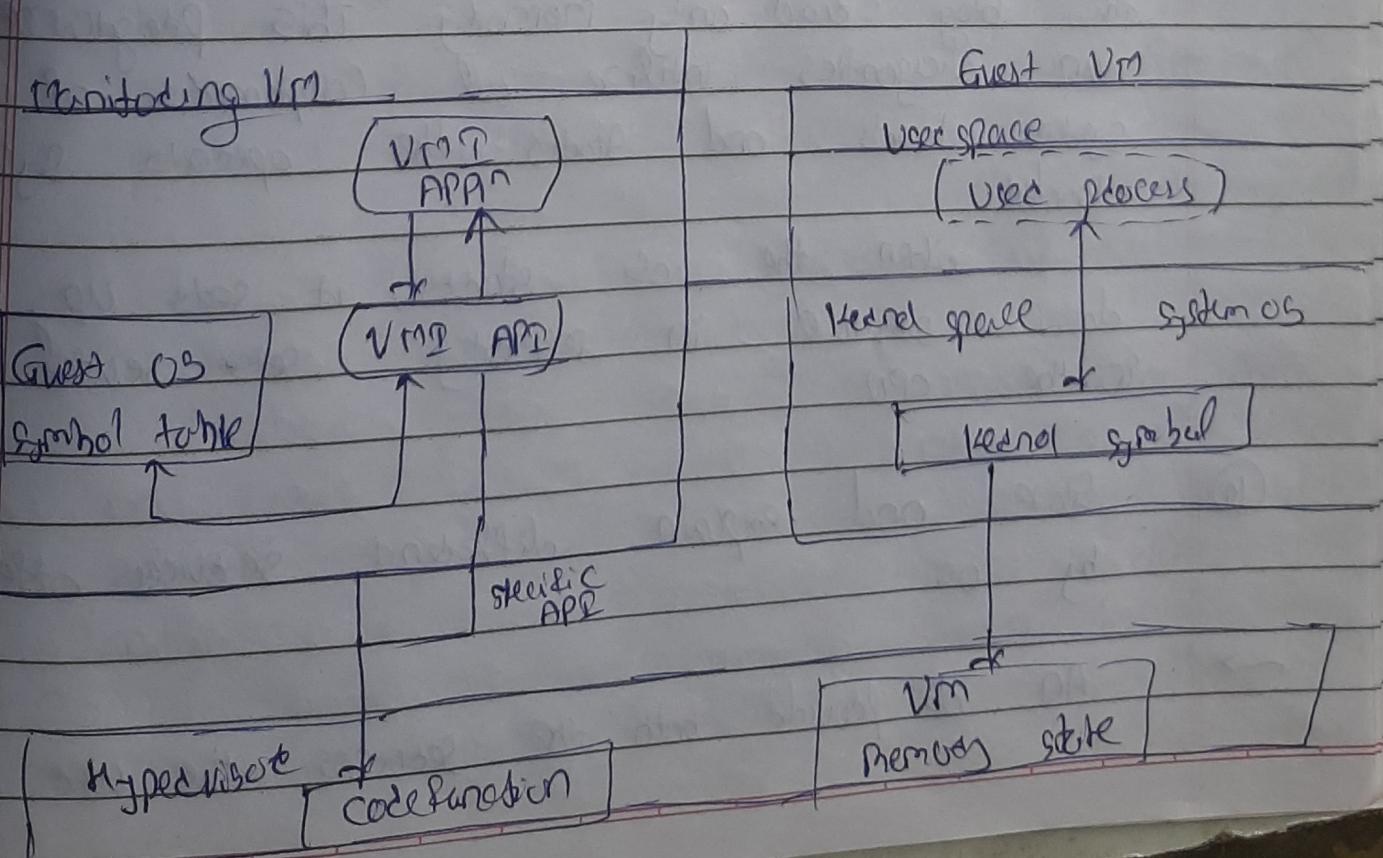


Microkernel is a s/w or code which contains the required minimum amount of functionality and features to implement an operating system.

A microkernel is the most important part of the implementation of an OS you can see operations like memory process scheduling mechanism of the OS are removed from the kernel mode and run in the user mode. These functions may be device driver's application, file service, interprocess communication etc.

(4) What do you mean by Virtual machine explain with the help of diag.

→ A Virtual machine (Vm) is a computer descended that uses s/w instead of physical computer to run program and delay apps. It runs its own OS & function separately from the other VM.



Multiple virtual machines can run simultaneously on the same physical computer for services the multiple operating computer for each side by side with a piece of software called hypervisor to manage them, while desktop to run other as within its program windows each virtual machine provides its own virtual hardware including CPU's, memory hard drives, network interfaces, and other devices.

(15)

Write a note on System Boot.

Booting the system is done by loading the kernel into main memory and selecting its execution. The CPU is given a reset event and instruction register is loaded with predefined memory location where execution starts. The initial bootstrap program is found in the BIOS dual-only memory. This programme can run diagnostics, initialize all components of the system, loads and starts the operating system loader.

When the OS starts, it sets up needed data structures in memory. It sets several registers in the CPU.

State and explain different services offered by OS.

An OS provides both the services the user and

the programs.

I> Program execution is

Context A process includes the complete execution
Registers code to execute data to manipulate
Memory as resources in used following are
Management activities of an OS wrt to program

- loads of program into memory
- execute the program
- handles program's execution
- provide a mechanism for
- process synchronization
- provide a mechanism for deadlock handling.

II> I/O operation :-

An I/O operation subsystem comprises of I/O devices and their corresponding drivers. Software drivers hide the particularities of specific hardware devices from the users.

- As OS manages the communication b/w user & device drivers.
- op. os provides the access to the required I/O device when required.

III> Error Handling :-

Error can occur anytime & anywhere in CPU, in CPU devices or in the memory hardware. Following are the activities of an OS wrt to error handling.

- The OS constantly checks for possible errors.

- The OS takes an appropriate action to ensure correct and consistent computing.
- VI) Protection is

It is way to control access of processes or users to the resources defined by a computer system.

Major Activities w.r.t. to protection.

- The OS ensures that all access to system resources is controlled.
- The OS ensures that external I/O devices are protected from invalid access attempts.

- Q) What do you mean by system call?

→ System call is a mechanism that provide the interface between a process and the OS. It is a programmingmatic method which a computer program requires a service from the kernel to the OS.

- Q) List of adv of distributed os.

- i) Failure of one will not affect the other network communication as well as system call independent from each other.
- ii) Electronic mail increase the data exchange speed.
- iii) Since resources are being shared, computation is highly fast & durable.
- iv) Lead on best computer technology.
- v) Delay in data processing reduces.

(9)

Give

any two benefits of Linux OS.

- i) Perl source is easily available. As it is open source. It's source code is available.
- ii) security the linux security feature is the major reason that is the most favorable option for developers.

(10)

Explain Multiprocessor system with advantages.

The Multiprocessor is a computer system with two or more CPUs sharing full access to a common RAM.

At the OS level multiprocessing is sometime used to refer to the execution of multiple concurrent process in a system with each process running on a separate CPU or core, as opposed to a single process at any one instant.

Advantages :-

- i) Increased Throughput - By increasing the number of processor more works can be completed in a unit time.
- ii) Cost Saving - Parallel system share the memory buses peripheral etc. Multiprocessor system thus saves money as compared to multiple single system.
- iii) Increased Reliability - In this system, as the workload is distributed among the several processor which results in increased reliability. If one processor fails then its failure may slightly slow down the speed of system but system will work smoothly.

①

What is Virtual Machine? Give two example of Virtual machine.

→

A Virtual Machine is a computer resources that uses software into of a physical computer to run program and deploy app.

- i) Type of Virtual Machines
- i) windows VM
- ii) Android VM
- iii) RAE VM.
- iv) DOS VM.

Ex. of Virtual Machines

- i) VMware :- It's run both on the windows ^{MAC} and Linux OS.
- ii) Virtual Box :- It's run on windows MAC & Linux OS.

②

Benefits of Virtual machine.

- i) They allow multiple OS environment to exist simultaneously on the same machine.
- ii) They empower users to go beyond the limitation of hardware to achieve their end goals.

③

What is OS? Explain its Services.

→

An operating system is system software that manages computer hardware, software resources and provide common services for computer program.

OS Services

i) Error handling :-

Error can occur any time and anywhere. An error may occur in CPU, in I/O devices or in the memory hardware.

ii) Protection :-

It is a way to control the access of program process, or user to the resources defined by a computer system.

iii) Communication :-

The OS handles routing and connection strategies and the problems of contention & security.

iv) File System manipulation :-

A file system is normally organized into directories for easy contain file and other directions.

Q) Write short note on buffering.

A buffer contains data that is stored for a short amount of time typically in the computer's memory (RAM). The purpose of a buffer is to hold data right before it is used for ex. when you download an audio or video file from the internet. It may load the first 20% of it into buffer and then begin to play while the clip plays back, the computer continuously download the rest of the clip and it is on buffer.

Buffering is used to improve several other areas of computer performance.