Q1: what are the main advantages and disadvantages of the Layered approach to System design.

Advantages

Layering makes it easier to enhance the operating system as implementation of a layer can be changed only without affecting the other layers.

* It is very easy to perform debugging and S/m verification.

Disadvantages

* In this structure the application performance is degraded as compare to Simple structure
* It requires careful planning for designing the layers as higher layers use their functionalise the lower layer.

Q2: Differentiate b/w preemitive and non preemptive algorithm.

	Preemitive	Non preemptive
Basic	In this resources (cpu cycles) are allocated to a process for a limited time.	Once resources (cpu cycle) are allocated to a process the process holds it tasl it complete its burst time or switches to waiting time.
Interrupt	process can be interrupted in b/w	process cannot be initterrupted until it terminated itself or its time up.
Overhead	It has overhead of scheduling the processes.	It doesnot have overheads.
Flexibility	Flexible	Rigid
Eg:	Round Robin, shortest remaing time First	Eg: FCFS, S.J.F.

Q3) Some CPU provides more than two modes of operations. what are the use of the modes.

Although most S/m only distinguish b/w user and kernal modes some CPU's have supported multiple modes. could be used to provide a security policy

for eg, rather than user and kernal modes you could distinguish with b/w different types of user mode.

4. FORK ~~FORK~~ #include <stdio.h>
#include <unistd.h>
int main()
{
if (fork() && fork())
fork();
printf("FORK");
return 0;
}

write the o/p of the pgm.

A: FORK.
FORK.

5) what are the two modes of IPC ? what are the strengths and weekness of these two approaches.

1) Shared m/y 2) message passing.

Shared m/y:- accuracy is of shared m/y model is that may communication is faster as compared to the msg passing model on the same machine. however, it may create problems such as synchronization and m/y protection that need be addressed.

message passing:- it is easier to build ll h/w, message passing is quite tolerable of higher communication latencies. It is slower than the shared m/y model because the connection set up time.

6) list and Explain any five services provided by an operating s/m

1) Program Execution
→ loading program into main m/y.
→ all need of resources and allocations are identified.
→ process synchronization of the concurrent programs.
→ process scheduling.
→ avoid deadlock using process synchronization.

I/o operation
→ OS provides the access to required I/o devices when it is required.

I/O ~~handling~~ operations means Read or write operation with any file or any I/O specific devices.

File handling

→ the OS gives the permission to the program for operation on files

→ permission varies from read only or write only or read/write. device and OS provides an interface to the user to create and delete files.

Error handling

Error can occur anytime anywhere. and errors may occur in CPU in I/O devices or in the memory h/w. some major activities of an OS with respect an Error-handling are OS constantly check the possible errors OS taken appropriate action to Ensure correct and consistent computing

protection and Security

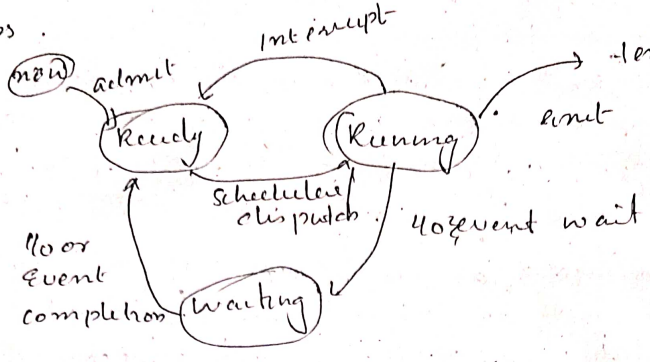
Considering a computing s/m having multiple users and concurrent Execution of multiple programs the various process must be protected from each other activities, protection refers to an mechanism or a way to control the access of programs, process or users to the resources define by a computer s/m. following are the major activities as required to protection.

B) Explain the actions taken by an OS to perform a Context - switching b/w processes,

* save the context of the process that is currently running on the CPU. update the process control block and other important fields.
* move the process control block of the above process into the relevant queue such as the ready queue, I/O queue.
* Select a new process for execution.
* update the PCB of the selected processes. this includes updating the process state to running.
* update the mm management data structures as required.
* Restore the context of the process that was previously

running when it is loaded again" on the processor. this is done by loading the previous value of the process control block and registers.

7A) with help of a diagram, Explain different states of a process.



As a process Executes, it changes states, each process may be in one of the following states.

1) New: the process is being created.
2) Running: the instructions are being executed.
3) ~~Running~~ Waiting: the process is waiting for some event to occur
4) Ready: the process waiting to be the assigned to a prcess
4) terminated: the process has finished execution.

7B) Explain the information held by the PCB associated with each process.

process state: the state may be new, Ready, Running, waiting, halted, and so on.
PC: the counter indicates the address of the next instruction to be executed for this process
CPU Registers: the Registers vary in no: and type, depending on the computer architecture. they include accumulators, index Registers, stack pointers, and general-purpose registers, plus any condition code information. along with the program counter, this state information must be saved when an interrupt occurs, to allow the process to be continued correctly afterward.
CPU scheduling information: this information includes a process priority, pointers to scheduling queues, and any other.

scheduling parameters.

mly-mngmnt-information: this information may include such items as the value of the base and limit registers and the page tables, or the segment tables, depending on the mly s/m used by the operating s/m.

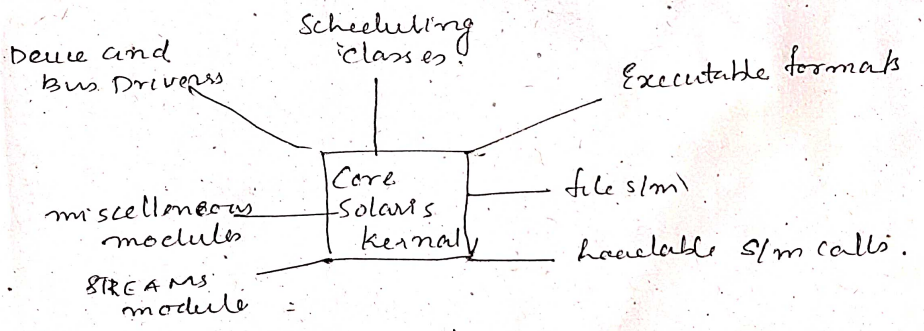
9 A what are the advantages of the micro-kernel approach to s/m design? How do the user programs and s/m service interact in a micro-kernel architecture.

Disadvantages of microkernal structure

* Increased level of inter module communication degrades s/m performance.

9B) Explain loadable kernal modules approach to S/m design with advantages.

* It is considered as the best approch for an OS.
* It involves designing a modular kernal
* the kernal has only a set of core component and other service are added as dynamically loadable modules to the kernel either during runtime or boot time, It resembles layered structure due to the fact that each kernal has defined and protected interfaces but it is more flexible than the layered structure as a module can call any other module.
* For example Solaris OS is organized as shown.



Advantages of modular structure

* advantages of layered structure but with more flexible
* advantages of microkernal approach - without message passing overhead.

Disadvantages of modular structure

* not as clean a design as the layered approach
* not as small as kernal as a microkernal.
* But achieves best of both worlds as far as possible.

10 A) Explain any three activities of an operating s/m with regard to memory management.

1. Keeping track of which portion of m/y are currently being used and who is using them.
2. Determining which process and data to move in and out of m/y.
3. Allocation and de-allocation of m/y blocks as needed by the program in memory (Garbage collection).

10 B) Explain any three activities of an operating s/m with regard to process Management

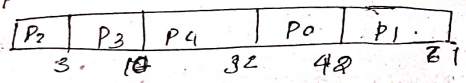
1) the creation and deletion of both user and s/m processes.
2) the suspension and resumption of processes.
3) The provision of mechanisms for process communication
4) the provision of mechanism for process Synchronization.
5) the provision of mechanism for deadlock handling

8 A) consider the FCFS, SJF and RR (Quantum = 10 milliseconds) Scheduling algorithms for the set of given processes. which algorithm would give the minimum average waiting time.

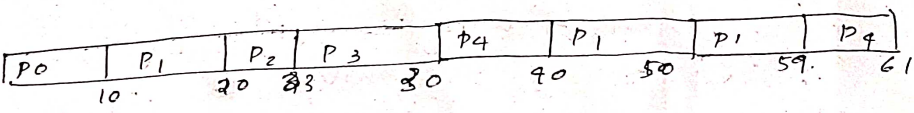
process	Burst time (ms)
P_0	10
P_1	29
P_2	3
P_3	7
P_4	12.

FCFS

SJF


P2
P3
P4
P0
P1
3
10
32
40
61

RR


P0
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8B)