PNS School of Engineering & Technology,
Branch: Computer Science & Engineering
Internal Assessment Question & Answer: 2023
Subject : OS(Th1)
4th Semester

No.1

a)Write down the components of OS with figure.

Ans. Basically OS divided into two components, i.e.

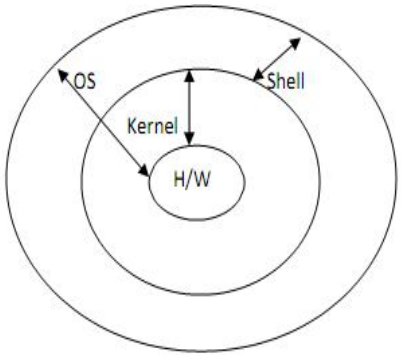
i) Kernel
ii) Shell

i) Kernel:

⇒ This part of OS deals with h/w (hardware instructions).
⇒ It is that part of OS who is always in a running mode.

ii) Shell:-

⇒ It is that part of OS who is directly related to the user.
⇒ It deals with a high level language or commands or instruction.



b)What is job queue?

Job Queue:

When the process enters into the system, they are put into a job queue.

This queue consists of all processes in the system on a mass storage device such as hard disk.

c)Write down different types of scheduler.

Ans: Schedulers are of three types.

Long Term Scheduler: Job scheduler selects processes from the job queue and loads them into the main memory forexecution.

Short Term Scheduler: selects the process from ready queue and allocates CPU to it.

Medium Term Scheduler: process moves from running state to waiting state and from waiting state to ready state

d)What is context switching?

Ans: Transferring the control of the CPU from one process to other requires saving the context of currently running process and loading the context of another ready process. This mechanism of saving and restoring the context is known as **context switch**.

The switching periods depends upon the memory speed and the number of registers used.

e)Explain IPC briefly.

Ans: I nterprocess communication is the mechanism provided by the operating system that allows processes tocommunicate with each other.

Ways to Implement IPC

Shared Memory: Multiple processes communicate by shared memory, where one process makes changes at a time and then others view the change. Shared memory does not use kernel.

Message Passing: Message passing provides a mechanism to allow processes to communicate and to synchronize their actions without sharing the same address space.

No.2

a)Explain semaphore with example.

Ans: **SEMAPHORE**

⇒ It is a synchronization tool, denoted as 'S' which is an integer variable whose value can be changed and altered.

⇒ Its value indicates the status of shared resources, a process which needs the resource, will check the semaphore for determining the status for the resource (available/unavailable).

⇒The value of the semaphore variable can be changed by two operations.

i) Wait (P)

ii) Signal (v)

Wait(S) :-

⇒ The wait operation decrements the value of its argument S, if it is positive.

If S is negative or zero, then no operation is performed.

```
if (S>0)
  wait(s)
  {
        while (S<=0);
         S--;
   }
```

Signal (S) :-

⇒ The signal operation increments the value of its argument S

```
Signal(s)
{
       S++;
}
```

⇒ When one process modifies the value of the S, no other process can simultaneously modify the same S value.

Types of Semaphore:

There are two types of semaphore:

i) Binary Semaphore

ii) Counting Semaphore

i) Binary Semaphore:-

⇒ Binary semaphore can take 2 values i.e 0 or 1.

⇒ Initially the value of S is set to 1, and if some process wants to use some resource then the wait() function is called and value is set from 1 to 0.

The process then uses the resource and when it releases the resource signal() function is called .

The value of S becomes 0 to 1.

When the value of S=0 then other processes wait.

⇒ The lock used by the binary S is termed as MUTEX lock.

```
do
{
Waiting (mutex);
// c.s
```

Signal (mutex);
//reminder section
{while (true);

ii) Counting Semaphore -

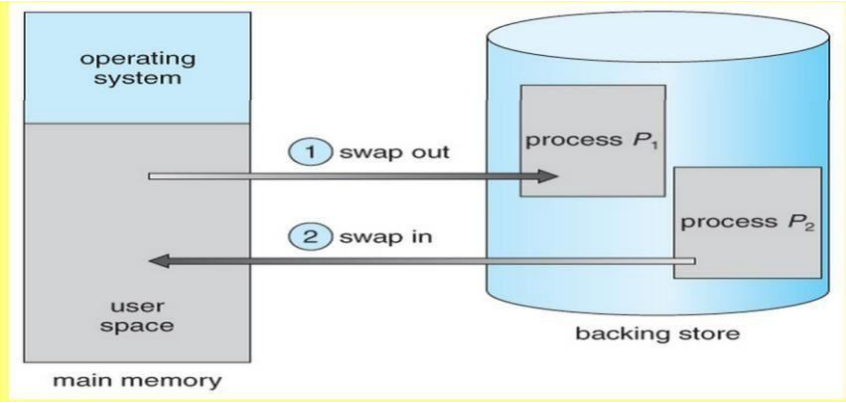
⇒ The counting semaphore is applicable for multiple instances of resource type.
⇒ Each process that wants to use the resource performs wait operation on the S.
⇒ When a process release the resource, it perform signal operation.
⇒ When the count of the S goes to zero all the resources are being used.

b)Write short note on swapping.

Swapping is the method to improve main memory utilization.
When a process is executed it must be in the main memory.
A process can be swapped out temporarily to secondary memory or hard disk or backing memory and then again brought back to secondary memory for execution. This technique is known as "**Swapping".**
The basic operation of swapping is

Swap-out (roll-out)
Swap-in (roll-in)

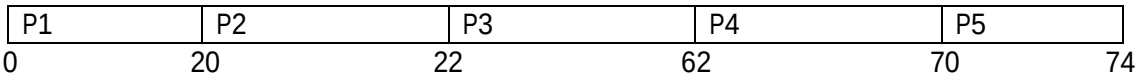
Swap-out:- The mechanism to transfer the process from main memory to secondary memory.
Swap-in:- The mechanism that shifts the process from secondary memory to primary memory.



c)Find average waiting time and average turn around time for the following processes in FCFS algorithm.

Process	Arrival time	Burst time
P1	0	20
P2	4	2
P3	6	40
P4	8	8
P5	10	4

Ans: The Gantt chart for the following processes is:



The waiting time for process P1=0

The waiting time for process P2 = 20 – 4 = 16

The waiting time for process P3 = 22 – 6 = 16

The waiting time for process P4 = 62 – 8 = 54

The waiting time for process P5 = 70 – 10 = 60

The avg. waiting time = (0+16+16+54+60)/5 = 146/5 =29.2ms

TAT for process P1 = 20-0=20

TAT for process P2 = 22-4=18

TAT for process P3 = 62-6=56

TAT for process P4 = 70-8=62

TAT for process P5 = 74- 10=64

Avg. TAT = =(20+18+56+62+64)/5=44 ms