

OS AssignmentUnit-1

1. a. what is OS? what are function of OS?

=> OS is software system that manage computer hardware resources and provide common service for computer program. It act as bridge b/w hardware and software.

Primary functⁿ of OS -

1. Resource management
2. Process mangement
3. memory management
4. Security
5. User interface

1. b. what are system calls? explain different category of system call with example.

→ System call are type of function call that allow program running in user mode to request service or operation from operating system. , running in kernel mode.

There are several categories of system call

→ 1. Process control - Perform task of process creation and process termination. eg. `createprocess()`, `ExitProcess()`.

2. File-Management System calls - handles file manipulation like creating file, reading etc.
eg `createfile()`, `readfile()`
3. device management system calls - does job of device manipulation like reading from device buffers eg `ReadConsole()`
4. Information manipulation system call - handle info and its transfer b/w OS & user program eg `sleep()`, `settimer()`.
5. Communication system call - used for interprocess communication
eg `createpipe()`, `createfilemapping()`.

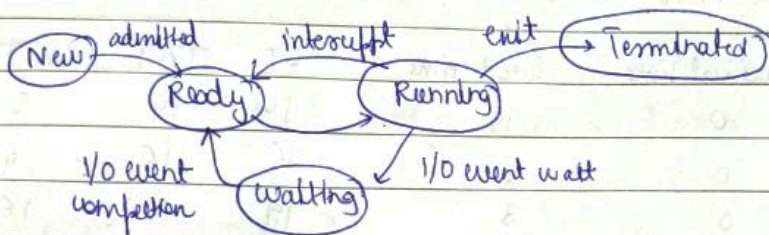
(Q) Distinguish among following terminology

- (i) multiprogramming system → an OS that allow multiple program to run simultaneously on single process machine.
- (ii) multitasking system → It is logical extension of multiprogramming. multitasking allow user to perform more than one task.
OS keep track of where you are in each job & allow you to transition b/w them without losing data.
- (iii) multiprocessor system → It is one in which 2 or more CPU control functionality of computer. each CPU contain copy of OS and these copies communicate with one another to coordinate operation.

Unit-2

1.a) What is process. explain process state diagram.

Process is program in execution & it is more than one a program code called as text section & this concept work under all OS because all task program by OS need process to perform task



New → new process being created

Running → when instruction being executed

terminated → process has finished

Ready → waiting for processor.

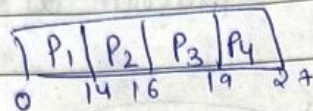
1.b explain diff b/w short-term, long-term and medium-term scheduler.

Long-term	Short term	medium-term
→ Job scheduler	→ CPU scheduler	→ Process of swapping scheduler.
→ less speed	→ fastest.	→ speed b/w that of long & short term
→ minimal in time sharing system.	→ minimal time sharing system	→ part of time sharing system
→ control degree of multiprogramming	→ Provide less control over degree of programming	→ reduce degree of programming

2a) explain FCFS scheduling algorithm And avg turn around & waiting time.

FCFS scheduling is simple scheduling algo in which process that arrive first executed first

① FCFS



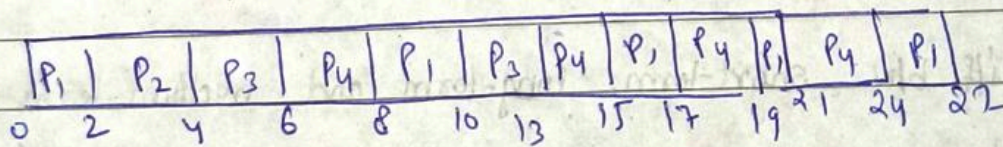
Process	arrival time	Burst time	CT	TAT	WT
P ₁	0	14	14	14	0
P ₂	0	2	16	16	14
P ₃	0	3	19	19	16
P ₄	0	8	27	27	19

$$\text{avg TA} = \frac{14+16+19+27}{4} = 19\text{ms}$$

$$\text{avg WT} = \frac{0+14+16+19}{4} = 12.25\text{ms}$$

②

Round Robbins.



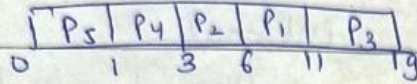
Process	Burst-time	TA	WT
P ₁	14	27	0
P ₂	2	4	2
P ₃	3	11	4
P ₄	6	27	6

$$\text{avg TA} = 15.75\text{ms}$$

$$\text{avg WT} = 3\text{ms}$$

2.6 1. SJF

Process	Burst-Time	TA	WT
P ₁	5	11	6
P ₂	3	6	3
P ₃	8	19	11
P ₄	2	3	1
P ₅	1	1	0

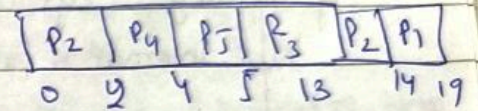


$$\text{avg TA} = 8 \text{ ms}$$

$$\text{avg WT} = 4.2 \text{ ms}$$

2. Priority (Preemptive)

Process	Burst-Time	WT	ST
P ₄	2	0	14
P ₅	1	2	0
P ₂	3	3	5
P ₃	2	6	2
P ₁	5	4	4



$$\text{avg wt} = 5 \text{ ms}$$

Unit-3

1.a) what is paging. explain paging hardware.

Paging is storage mechanism used to retrieve process from storage into main memory in form of pages.

One page of process is to store in one of frame of memory.

Page can be stored at diff location of memory by priority is always to find contiguous frame or holes.

Page are brought into main memory only when they are request otherwise they reside in storage.

1.6. What is fragmentation. explain its type.
 It is unwanted problem in OS in which process are loaded and unloaded from memory & free space is fragmented. Process can't be assigned to memory blocks due to their small size &
 2 types

Internal
 Process is allocated a memory block of size of that process. due to this, some part of memory left unused and thus internal fragmentation.

External
 although we have total space available that is wanted by process still we are not able to put that process in memory because space not contiguous.

2. ~~Q1~~ FCFS

1	2	3	4	2	1	5	6	2	1	2	3	7	6	3	2	1	2	3	6
1	1	1	4	4	4	4	6	6	6	6	3	3	3	3	2	2	2	2	6
	2	2	2	2	1	1	1	2	2	2	2	7	7	7	7	1	1	1	1
	3	3	3	3	3	5	5	5	1	1	1	6	6	6	6	6	6	3	3

Page fault = 16

② Optimal

1	2	3	4	2	1	5	6	2	1	2	3	7	6	3	2	1	2	3	6
1	1	1	4	4	4	5	5	5	1	1	3	3	3	3	3	2	2	2	2
	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1

Page fault = 14

unit-4

1.) deadlock? explain necessary conⁿ for its occurrence.

deadlock is situation where each of computer process wait for resource being assigned to some other process.

In this situation, none of process get executed since resource in need is held by some other process which is also waiting for other resource to be released.

→ mutual exclusion -

Resource can be held by only one person at time.

If P_1 is using some resource R at particular instant of time, then other process P_2 can't hold or use R at that time.

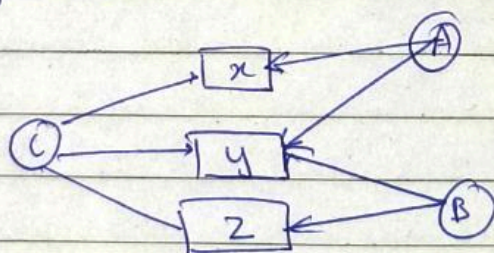
→ Hold & wait - Process can hold no. of resources at a time.

→ No preemption Resource can't be preempted from process by another process.

→ Circular.

↓
conⁿ when first process is waiting for resource held by 2nd process.

(2.)



Circle represent process and rectangle represent resources, there is formation of cycle causing deadlock situation.

To avoid deadlock, we need to ensure that atleast one of 4 necessary conⁿ don't hold.

Can be prevented by resource allocation policy.