Set - 3

Q-1. Explain the concept of paging and segmentation with suitable example.

→ Paging and Segmentation are both memory management schemes used in operating systems to manage how processes access and use memory.

* Paging

- **Concept:-** paging divides the physical memory into fixed-size blocks called "frames" and the logical memory into blocks of the same size called "pages". When a process is executed, its pages can be loaded into any avialable memory frams, allowing for non-contiguous memory allowcation.

- **Example!-** Imagine a system with a physical memory of 16 KB divided into 4KB frams. If a process requires 8 KB, it will be divided into two pages (2 pages of 4KB each). The pages can be loaded into any two available frames in memory.

. Process Pages:	Memory Frames:
Page 0 : 4 KB	frame 0: Page 0
Page 1 : 4 KB	Frame 1: Page 1

→ This allows for efficient use of memory and minimizes fragmentation

* Segmentation

• Concept :- Segmentation divides the logical memory into variable-sized Segment based on the logical structure of the program. Each Segment represents a logical unit such a function, array or object.

• Example:-

Segment Number	Segment Size	Physical
31	4KB	1000
32	16 KB	1400
33	4 KB	2200

Q-2 Explain SJF and Round robin CPU scheduling algorithm with suitable examples.

SJF:- SJF is a non-preemptive scheduling algorithm that selects the process with the smallest execution time next. It minimizes the average waiting time and is optimal in that regard.

Example:-

Process	Brust Time
P1	8
P2	4
P3	9
P4	5
P5	6

→ Scheduling Order:

1. P2 (4)   Avrage Time: $\dfrac{0 + 4 + 9 + 17}{4}$
2. P4 (5)
3. P6 (6)
4. P1 (8)   Average = 7.5
5. P3 (9)

Round Robin (RR):-
       Round Robin is a preemptive scheduling algorithm
where each process is assigned a fixed time slice
(quantum). When a process' time slice expires, it is
placed at the back of the queue, allowing other
processes to execute.

Process	Brust Time
P1	8
P2	4
P3	9
P4	5

A Scheduling order:

1. P1 (4 remaining 4)   Avrar
2. P2 (4 remaining 0)
3. P3 (4 remaining 5)
4. P4 (4 remaining 1)
5. P1 (4 remaining 0)
6. P3 (5 remaining 1)
7. P4 (1 remaing 0)

Turnaround Time calculation
$P_1 = 26 - 0 = 26$
$P_2 = 10 - 0 = 10$
$P_3 = 26 - 0 = 26$
$P_4 = 18 - 0 = 18$

Avrage Turnaround Time $= \dfrac{26 + 10 + 26 + 18}{4}$

$= 20$