21BCE7371

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OS - Theory Assignment -1

Sol-1 Avg. waiting and Avg. Turnaround Time using SJF and Round Robin CPU scheduling Algo.

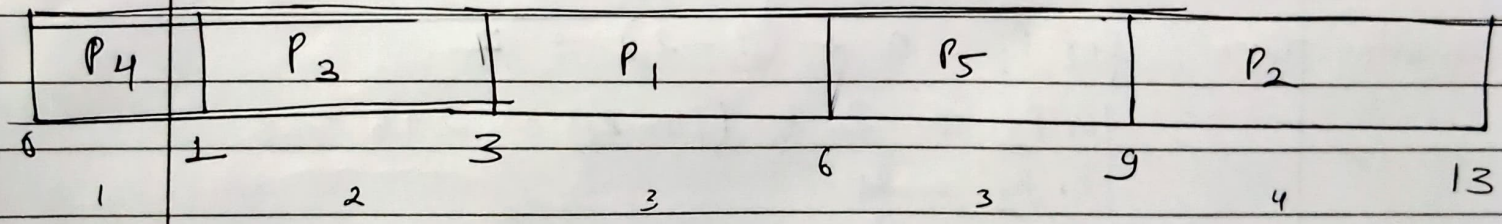
All Processes arrived at 0.

Time slice = 2

PROCESS	BURST TIME
P_1	3
P_2	4
P_3	2
P_4	1
P_5	3

USING SJF → Shortest Job first.

SJF GANTT CHART



Waiting Time : for $P_1 = 3$, for $P_2 = 9$, for $P_3 = 1$, for $P_4 = 0$
for $P_5 = 6$

$$\text{Avg waiting Time} = \frac{3+9+1+0+6}{5} = \frac{19}{5} = 3.8$$

Turn around Time : for $P_1 = 6$, for $P_2 = 13$
for $P_3 = 3$, for $P_4 = 1$, for $P_5 = 9$

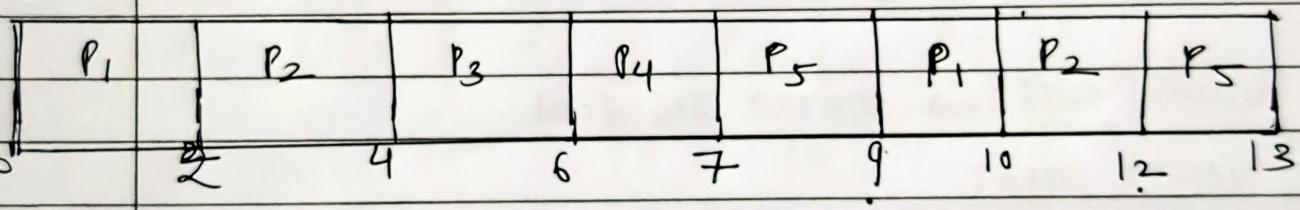
Avg. Turn around Time $= \frac{6 + 13 + 3 + 1 + 9}{5} = \frac{32}{5} = 6.4$

USING Round Robin

PROCESS	BURST TIME
P_1	3
P_2	4
P_3	2
P_4	1
P_5	3

Time Slice = 2

GANTT CHART



Waiting Time ; for $P_1 = 0 + (9 - 2) = 7$
; for $P_2 = 2 + (10 - 4) = 2 + 6 = 8$
for $P_3 = 4$
for $P_4 = 6$
for $P_5 = 7 + (12 - 9) = 7 + 3 = 10$

Avg. Waiting Time $= \frac{7 + 8 + 4 + 6 + 10}{5} = \frac{35}{5} = 7$

Turn around Time; for $P_1 = 2 - (0 - 0) = 10$

for $P_2 = 12 - 0 = 12$

for $P_3 = 6 - 0 = 6$

for $P_4 = 7 - 0 = 7$

for $P_5 = 13 - 0 = 13$

Avg. Turn around Time $= \frac{10 + 12 + 6 + 7 + 13}{5} = \frac{48}{5} = 9.6$

Ans-2 OS provides various kinds of functionalities:

1. I/O services/operation.
To execute a programe, we need I/O which consists of file, or I/O device. Due to the protection and effectiveness, users are not able to manage the I/O device. So OS helps users to perform I/O operations such as Read, write etc.

2. Program execution
OS responsible for loading a programe into memory and execute it

3. file System manipulation
file is collection of information, for long term storage computers stores it in disk which is a secondry storage.
e.g Magnetic disk, CD, DVD etc.
for easy and effictive usuage, file system is organised in the form of directories that cointains files & other directories.

4. Communication

The OS offers facility of communication. One process requires information exchange with another process. done with the help of message passing & shared memory.

5. Error Handling

Provides service of error handling. It may arise any where like in I/O devices, Memory, CPU & in the user programs.

6. Resource Allocation

In system when multiple Jobs are executing concurrently, (multiple Jobs) then resource allocation is needed for each Job Resources like main Memory, I/o devices etc.

7. Accounting

Accounting Service of OS keeps track of system usage means which user use the resource for how much time and it's type.

8. protection

If ~~OS has~~ Computer System has different users. and permits the concurrent execution of different process then it is must to protect each process from one other's activities.

PCB (Process Control Block)

Also called Task control Block

Contains Information Related to each process.

(1) Process State → current state of Process

Running, waiting. etc.

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② Programe Counter :- location of Instruction to be executed next.

③ CPU Registers :- Contents of all process centric Registers.

④ CPU Scheduling Info :- Priority scheduling, Queue pointers etc.

⑤ Memory Management Info :- Memory allocated to the Process

⑥ Accounting Info :- CPU used, clock time elapsed since start time limits

⑦ I/O Status Info :- I/O devices allocated to Process, List of open files.