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Internal Assessment Test 1 – SEP 2016

Sub:	Operating Systems							Code:	10CS53
Date:	07 / 09/2016	Duration:	90 mins	Max Marks:	50	Sem:	V	Branch:	ISE

Note: Answer any five questions:

1. What is process?Explain process states with a diagram. What are the various fields of PCB.
2. What is critical section problem? Describe the solution using semaphore for readers-writers problem
3. What is IPC?Explain the concept of shared memory model taking producer-consumer problem as eg.
4. Explain the benefits of multi threaded programming. Also explain different multi threading models.
5. What are monitors?Describe the monitor solution to the classical dining philosopher's problem.
6. Consider the following set of processes. Draw Gantt charts showing the execution of these processes using :

(i)FCFS (ii)Preemptive SJF (iii)Non Preemptive Priority (iv)RR (Time quantum = 1 Milli sec).

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(i) FCFS 8ms 11.8 (ii) 2.4 Pre SJF 6.2 (iii) 5 8.8 Non Pri

(iv) 4.8 RR 8.6 (i) 2.75 Pre SJF 7.25 (ii) 7.25 Non Pre SJF 11.75

(iii) 7.25 Preprio 11.75 (iv) 4.5 9ms RR

Compute the average waiting time and average turn around time in each scheme and thus find the best scheme in this case.

Process	Arrival Time	Burst Time	Priority
P1	0	05	4
P2	0	01	2
P3	1	10	3
P4	1	01	1
P5	2	02	3

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P1	0	10	3
P2	1	01	4
P3	1	05	3
P4	3	02	1

.....

Compute the average waiting time and average turn around time in each scheme and thus find the best scheme in this case.

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Process	Arrival Time	Burst Time	Priority
P1	0	10 (9)	3
P2	1	01	4
P3	1	05 4	3
P4	3	02	1

SCHEME OF EVALUATION

SUB: OPERATING SYSTEMS
CODE: 10CS53
MAX MARKS: 50
SEM: V
BRANCH: ISE

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1. Process definition with diagram (2 marks)
   Process states with diagram (4 marks)
   PCB various fields with diagram (4 marks)

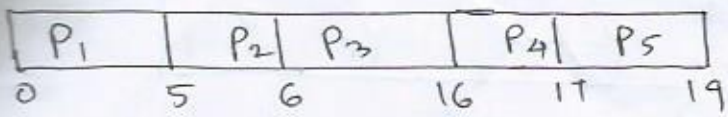
2. Critical section problems (2 marks)
   Reader-Writer problem (2 marks)
   Semaphores wrt, mutex and readcount (2 marks)
   Writer (2 marks)
   Reader (2 marks)

3. IPC definition (2 marks)
   Shared memory with diagram (2 marks)
   Buffer (2 marks)
   Producer (2 marks)
   Consumer (2 marks)

4. Benefits of multithreading (2 marks)
   4 models — 8 marks

5. Monitor definition
   Structure
   Schematic view (4 marks)
   Solution 2(6 marks)

(i) FCFS



WT for $P_1 = 0$
" " $P_2 = 5$
" " $P_3 = 5$
" " $P_4 = 15$
" " $P_5 = 15$

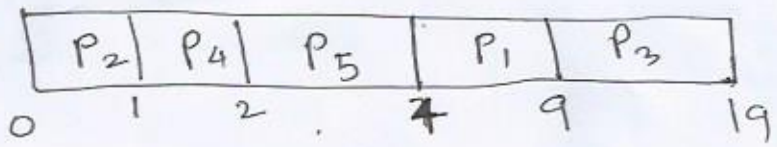
Avg WT $= \frac{0+5+5+15+15}{5}$

$= \frac{40}{5} = 8ms$

Turnaround time for $P_1 = 5$
" " $P_2 = 6$
" " $P_3 = 15$
" " $P_4 = 16$
" " $P_5 = 17$

Avg TT $= \frac{59}{5} = 11.8ms$

(ii) Preemptive SJF



WT for $P_1 = 4$
WT for $P_2 = 0$
WT for $P_3 = 8$
WT for $P_4 = 0$
WT for $P_5 = 0$

Avg WT $= \frac{4+8}{5}$

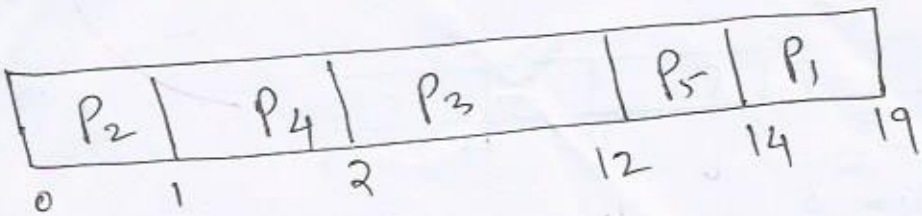
$= \frac{12}{5} = 2.4ms$

Turnaround time $P_1 = 9$
" " $P_2 = 1$
" " $P_3 = 18$
" " $P_4 = 1$
" " $P_5 = 32$

Avg TT $= \frac{31}{5}$

$= 6.2ms$

(iii) Non Preemptive Priority



WT for $P_1 = 14$

WT for $P_2 = 0$

" " $P_3 = 1$

$P_4 = 0$

$P_5 = 10$

TT for $P_1 = 19$

" " $P_2 = 1$

$P_3 = 11$

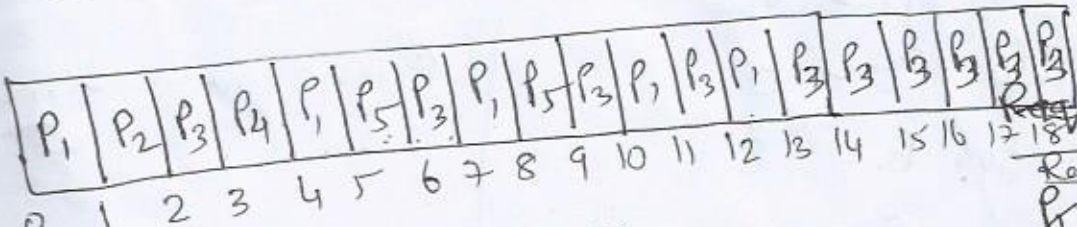
$P_4 = 1$

$P_5 = 12$

Avg WT = $\frac{25}{5} = 5$ ms

Avg TT = 8.8 ms

(iv) Round Robin



Request Queue

P1

P2

P3 - 9 8

P4 0

P1 - 3 2

P5 1

P3

12 - 4 - 0 = 8

WT for P_1 = ~~12 - 4 - 0 = 8~~

WT for $P_2 = 1 - 0 = 1$

WT for $P_3 = 13 - 4 - 1 = 8$

WT for $P_4 = 3 - 1 = 2$

WT for $P_5 = 8 - 1 - 2 = 5$

Avg WT = $\frac{24}{5}$ = 4.8 ms

TT for $P_1 = 13-0 = 13$

TT for $P_2 = 2-0 = 2$

TT for $P_3 = 19-1 = 18$

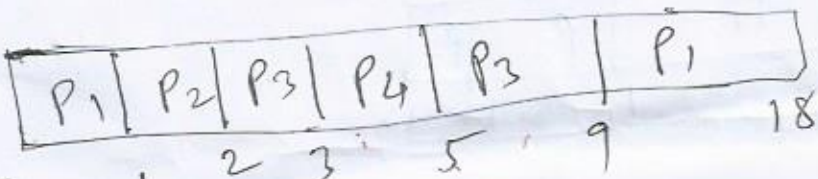
TT for $P_4 = 4-1 = 3$

TT for $P_5 = 9-2 = 7$

$$\text{Avg TT} = \frac{13+2+18+3+7}{5}$$

$$= \frac{43}{5} = 8.6 \text{ ms}$$

7. (i) Preemptive SJF



WT for $P_1 = 8$

" " $P_2 = 0$

" " $P_3 = 3$

" " $P_4 = 0$

$$\text{Avg WT} = \frac{11}{4} = 2.75 \text{ ms}$$

TT for $P_1 = 18$

TT for $P_2 = 1$

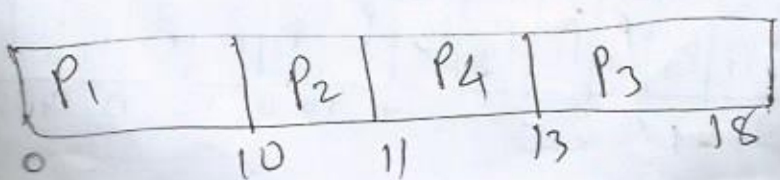
" " $P_3 = 8$

" " $P_4 = 2$

$$\text{Avg TT} = \frac{29}{4}$$

$$= 7.25 \text{ ms}$$

(ii) Non Preemptive SJF



WT for $P_1 = 0$

" " $P_2 = 9$

" " $P_3 = 12$

" " $P_4 = 8$

Avg WT $= \frac{29}{4}$

$= 7.25$ ms

TT for $P_1 = 10$

" " $P_2 = 10$

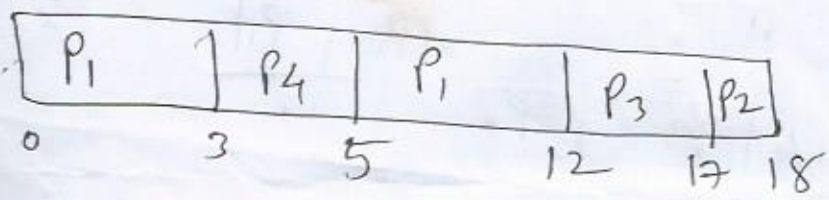
" " $P_3 = 17$

" " $P_4 = 10$

Avg TT $= \frac{47}{4} = 11.75$ ms

$= 12$ ms

(iii) Preemptive Priority



WT for $P_1 = 5-3=2$

WT for $P_2 = 16$

" " $P_3 = 11$

" " $P_4 = 0$

Avg WT $= \frac{29}{4} = 7.25$ ms

TT for $P_1 = 12$

" " $P_2 = 17$

" " $P_3 = 16$

" " $P_4 = 2$

Avg TT $= \frac{47}{4} = 11.75$ ms

$P_1 - 7$ 5

$P_2 - 2$

Request Queue

P_1

P_1

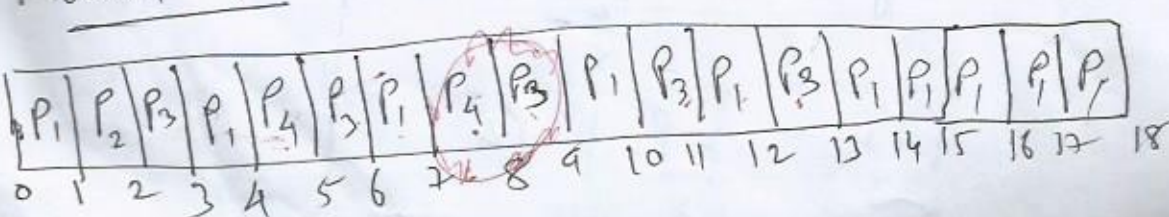
P_2

P_2

P_4

P_4

(iv) Round Robin



WT for $P_1 = 8$

WT for $P_2 = 0$

WT for $P_3 = 7$

WT for $P_4 = 3$

Avg $WT = \frac{18}{4} = 4.5ms$

TT for $P_1 = 18$

" " $P_2 = 1$

" " $P_3 = 12$

" " $P_4 = 5$

Avg $TT = \frac{36}{4} = 9ms$