Sardar Patel Institute of Technology

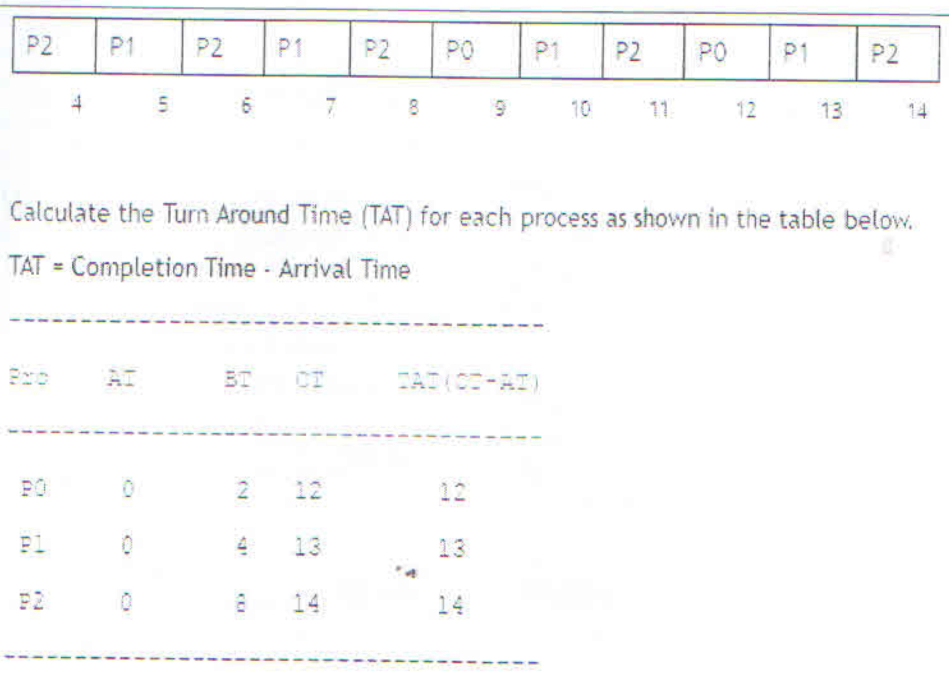
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination Synoptic

March 2018

Max. Marks: 30
Class: SE
Course Code: CE43/IT44
Name of the Course: Operating System Synoptic

Duration: 90 Minutes
Semester: IV
Branch: Computer/IT

<table>
<tr><th>Question No.</th><th></th><th>Max. Marks</th></tr>
<tr><td>Q.1 (A)</td><td>1023 new processes are created – 1 mark
Formula -> 2^n-1 where n is number of times fork() is called --- 1 mark</td><td>02</td></tr>
<tr><td>Q.1 (B)</td><td>Each service carries 1 mark</td><td>04</td></tr>
<tr><td>Q.2</td><td>

<table>
<tr><td>P2</td><td>P1</td><td>P2</td><td>P1</td><td>P2</td><td>P0</td><td>P1</td><td>P2</td><td>P0</td><td>P1</td><td>P2</td></tr>
<tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td></tr>
</table>
Calculate the Turn Around Time (TAT) for each process as shown in the table below.
TAT = Completion Time - Arrival Time
<pre>

Pro   AT   BT   CT   TAT(CT-AT)

 P0   0   2   12   12
 P1   0   4   13   13
 P2   0   8   14   14

</pre>
Avg TAT = (12+13+14)/3 = 13
Waiting time for P0 =10
Waiting time for P1 =9
Waiting time for P2 =6
Average waiting time = (10+9+6)/3=25/3=8.33
1mark for correct Gantt chart
</td><td>5</td></tr>
</table>

Correct Waiting/Turn around time for each process – 0.5 marks so total 3 marks
0.5 marks for correct average waiting time
0.5 marks for correct turn around time

OR

Gantt Chart for Round robin scheduling

P1	P2	P1	P3	P4	P3	P4	P3	P3
30	50	70	100	130	160	170	200	210

Waiting time for P1 =20
Waiting time for P2 =10
Waiting time for P3 =30+30+10 =70
Waiting time for P4 =40+30 =70

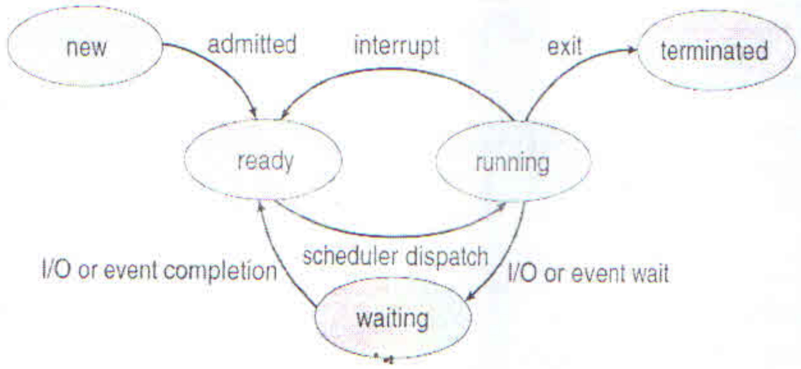
Average waiting time = 170/3=56.66

Tat for P1= 70
Tat for P2=30
Tat for P3=170
Tat for P4=110
Average TAT =380/3

1mark for correct Gantt chart
Correct Waiting/Turn around time for each process – 0.5 marks so total 3 marks
0.5 marks for correct average waiting time
0.5 marks for correct turn around time

Q.3

1 mark for correct diagram



4 marks for explaining all the states mentioned in the diagram.

5

Q.4

Need

Process	A	B	C	D
P1	2	1	0	1
P2	0	2	0	1
P3	0	1	4	0

A B C D
Work=available= 3 1 1 2

	work= A	B	C	D
P1=T,	4	3	3	3
P2=T,	5	3	6	6
P3=T,	6	5	7	6

Safe sequence <p1,p2,p3>

New allocation

Process	A	B	C	D
P1	1	2	2	1
P2	1	1	3	3
P3	1	2	1	0

Need

Process	A	B	C	D
P1	2	1	0	1
P2	0	1	0	1
P3	0	1	4	0

available=
A B C D
3 0 1 2
P1=F
P2=F
P3=F

System is in unsafe state.

Marks distribution→
Correct need matrix – 1 mark
Finding and writing any possible safe sequence – 2 marks

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Q.5

P value should be -→ flag[j] && turn == j --- 2 marks
Explanation of following three points
1.Mutual exclusion is preserved. --- 1 mark
2. The progress requirement is satisfied. --- 1 mark
3. The bounded-waiting requirement is met. --- 1 mark

OR

Explanation of 3 requirements for critical section problem- 3 marks

Justification of the given scenario- 2 marks
suppose p1 wants to enter into the critical section then it makes lock value as 0 to 1 now p1 is going into the critical section ,now if any higher priority process arrives then it will get critical section only if p1 leaves the critical section and makes lock value 0, it always follow atomic value into the critical section due to it is the problem of TSL..!

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Q.6

	Monitor	Semaphore
Basic	ADT	int var
Action	Shared var and procedure operate on those	Values indicates no of shared resources available

Access	Through procedures	Wait(s)
		Signal(s)

Condition var	Present	absent
Wait operation	When wait statement is executed it always block the process.	When process executes p operation, it does not necessarily block that process because counting semaphore may be grater than 1.
ME and synchronization	Monitor construct itself enforces mutual exclusion.	ME and synchronization are responsibility of programmer.

Any 3 differences- 3 marks

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