

USN

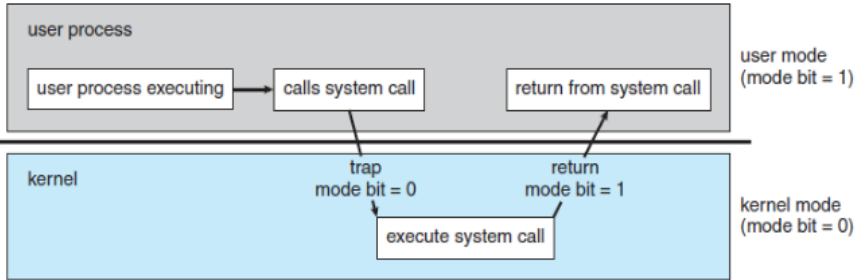
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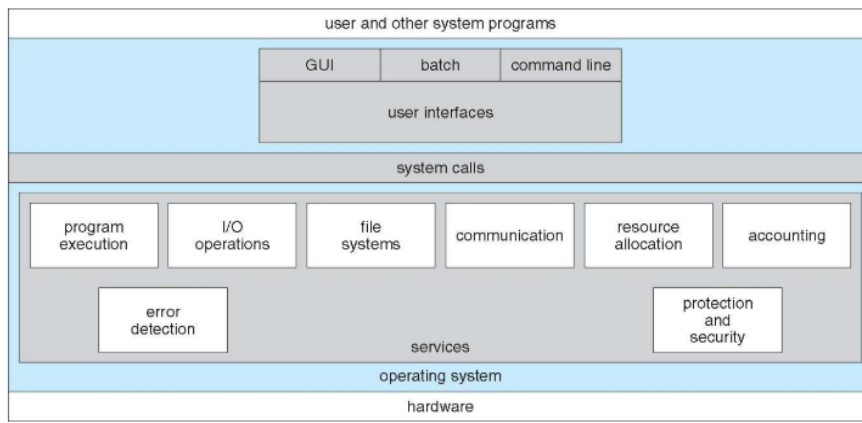
**Internal Assessment Test 1 – November 2024
Scheme & Solution**

Sub:OPERATING SYSTEMS		Sub Code: BCS303	Branch: AIML/CSEAIML																	
Date: 11.11.2024	Duration: 90 min	Max Marks: 50	Sem/Sec: III -A, B, C	IPCC																
<u>Answer any FIVE FULL Questions</u>			MARKS	CO	RBT															
1	Define operating System. Explain the dual mode of the operating system with a neat diagram		10	CO1	L2															
2	Explain the services of the operating system that are helpful for the user and the system.		10	CO1	L2															
3	Explain process state with a state transition diagram. Also explain PCB with a neat diagram.		10	CO1	L2															
4	Calculate average waiting and turnaround times by drawing the Gantt chart using FCFS and RR(quantum=2ms)		10M	CO2	L3															
	<table border="1"> <thead> <tr> <th>Processes</th> <th>Arrival Time</th> <th>Burst Time</th> </tr> </thead> <tbody> <tr> <td>P0</td> <td>0</td> <td>9</td> </tr> <tr> <td>P1</td> <td>1</td> <td>4</td> </tr> <tr> <td>P2</td> <td>2</td> <td>9</td> </tr> <tr> <td>P3</td> <td>3</td> <td>5</td> </tr> </tbody> </table>		Processes	Arrival Time	Burst Time	P0	0	9	P1	1	4	P2	2	9	P3	3	5			
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5	What is Inter Process Communication ? Explain Pipes, FIFOs with an example program or command line.		10M	CO2	L2															
6	What is race condition.? Explain Peterson’s solution to solve the critical section problem.		10M	CO3	L2															

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Scheme & Solutions

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Date: 11.11.2024	Duration: 90 min	Max Marks: 50	Sem/Sec: III -A, B, C	IPCC		
<u>Answer any FIVE FULL Questions</u>				MARKS	CO	RBT
1	<p>Define operating System. Explain the dual mode of the operating system with a neat diagram</p> <p>Diagram -3M</p> <p>Explanation 7M</p> 			10	CO1	L2
2	<p>Explain the services of the operating system that are helpful for the user and the system.</p> <p>User Services: 6M</p> <ol style="list-style-type: none"> 1. User Interfaces 2. Program Execution 3. I/O Operations 4. File-System Manipulation 5. Communications 6. Error Detection <p>System Services: 3M</p> <ul style="list-style-type: none"> Resource Allocation Accounting Protection and Security <p>Diagram 1M</p>			10	CO1	L2



3

Explain process state with a state transition diagram. Also explain PCB with a neat diagram.

10

CO1

L2

State transition diagram-2M

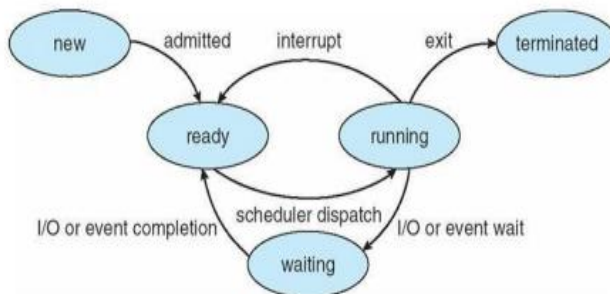


Figure: Diagram of process state

Explanation- 3M

PCB Explanation- 3M

Diagram-1M



Figure: Process control block (PCB)

Process Switch -1M

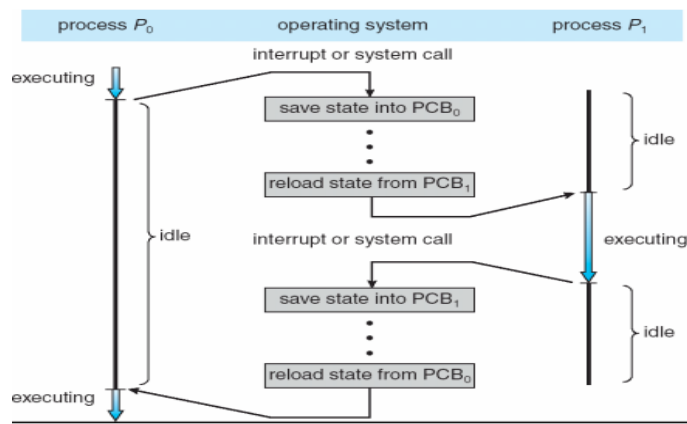


Figure: Diagram showing CPU switch from process to process.

4

Calculate average waiting and turnaround times by drawing the Gantt chart using FCFS and RR(quantum=2ms)

10M

CO2

L3

Processes	Arrival Time	Burst Time
P0	0	9
P1	1	4
P2	2	9
P3	3	5

Solution for FCFS---5M

Average Waiting Time (FCFS):

$$\text{Average Waiting Time} = \frac{0 + 8 + 11 + 19}{4} = 9.5\text{ms}$$

Average Turnaround Time (FCFS):

$$\text{Average Turnaround Time} = \frac{9 + 12 + 20 + 24}{4} = 16.25\text{ms}$$

Solution for RR---5M

Average Waiting Time (RR):

$$\text{Average Waiting Time} = \frac{17 + 7 + 16 + 13}{4} = 13.25\text{ms}$$

Average Turnaround Time (RR):

$$\text{Average Turnaround Time} = \frac{26 + 11 + 25 + 18}{4} = 20\text{ms}$$

5

What is Inter Process Communication ? Explain Pipes, FIFOs with an example program or command line.

10M

CO2

L2

	<p>IPC—2M</p> <p>Pipes with commands-----4M</p> <p>FIFO with commands-----4M</p>			
6	<p>What is race condition.? Explain Peterson’s solution to solve the critical section problem.</p> <p>Race Condition---- 2M</p> <p>Critical section explanation---4M</p> <p>Peterson’s Solution---4M</p> <pre> do { flag[i] = true; turn = j; while (flag[j] && turn == j); critical section flag[i] = false; remainder section } while (true); </pre> <p>It proves that</p> <ol style="list-style-type: none"> 1. Mutual exclusion is preserved 2. Progress requirement is satisfied 3. Bounded-waiting requirement is met 	10M	CO3	L2