

COURSE CODE (CREDITS): 10M1WCI131(3)

MAX. MARKS: 35

COURSE NAME: System and Network Security Techniques

COURSE INSTRUCTORS: Kuntal Sarkar

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	(a) LAS = 128MW, PA = 24 bits. PAS is divided into 8K frames and memory is word addressable. Calculate page size and number of pages in LAS.	2
	(b) Write the conditions of Deadlock and explain.	1
	(c) In CRC checksum data frame for transmission is 1101011011 and generator polynomial $G(x) = x^4+x+1$, what is the encoded word sent from sender side?	2
Q2	(a) Describe the paging architecture.	2
	(b) Describe the Virtual Memory concept.	2
	(c) Write the difference between process and threads.	1
Q3	(a) Consider the page references 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3 with 4 page frame. Find number of page fault using Optimal Page Replacement Algorithm, FIFO Algorithm, LRU Algorithm.	3
	(b) Find the number of child processes created for the following code and also find how many times "Hello" is printed. <pre> main() { fork(); fork(); printf("Hello"); } </pre>	2
		1

	(c) Write the difference of user level thread and kernel level thread. (3 points)																																																																	
Q4	<p>(a) Write all the safe state sequences.</p> <table border="1"> <thead> <tr> <th rowspan="2">Process</th> <th colspan="3">Allocation</th> <th colspan="3">Max</th> <th colspan="3">Available</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> <th>A</th> <th>B</th> <th>C</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>P₀</td> <td>0</td> <td>1</td> <td>0</td> <td>7</td> <td>5</td> <td>3</td> <td rowspan="6">3</td> <td rowspan="6">3</td> <td rowspan="6">2</td> </tr> <tr> <td>P₁</td> <td>2</td> <td>0</td> <td>0</td> <td>3</td> <td>2</td> <td>2</td> </tr> <tr> <td>P₂</td> <td>3</td> <td>0</td> <td>2</td> <td>9</td> <td>0</td> <td>2</td> </tr> <tr> <td>P₃</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>P₄</td> <td>0</td> <td>0</td> <td>2</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>(b) How much hit ratio to reduce the effective memory access time(EMAT) from 300 ns without TLB to 250 ns with TLB? TLB access time is 60 ns.</p> <p>(c) Describe the Process state diagram.</p>	Process	Allocation			Max			Available			A	B	C	A	B	C	A	B	C	P ₀	0	1	0	7	5	3	3	3	2	P ₁	2	0	0	3	2	2	P ₂	3	0	2	9	0	2	P ₃	2	1	1	2	2	2	P ₄	0	0	2	4	3	3								3 2 2
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Q5	<p>(a) IP Sub netting 2 marks A company is granted the site address 181.56.0.0(class B). The company needs 1000 subnets. What is the DBA of the first subnet?</p> <p>(b) Consider the following table of arrival time and burst time for four processes P1, P2, P3, and P4 and given Time Quantum = 2</p> <p>Calculate TAT and AWT.</p> <table border="1"> <thead> <tr> <th>Process</th> <th>Burst Time</th> <th>Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>5 ms</td> <td>0 ms</td> </tr> <tr> <td>P2</td> <td>4 ms</td> <td>1 ms</td> </tr> <tr> <td>P3</td> <td>2 ms</td> <td>2 ms</td> </tr> <tr> <td>P4</td> <td>1 ms</td> <td>4 ms</td> </tr> </tbody> </table> <p>(c) A sender uses the stop and wait protocol for reliable transmission of frames. Frames are of size 1000 bytes and the transmission rate at the sender</p>	Process	Burst Time	Arrival Time	P1	5 ms	0 ms	P2	4 ms	1 ms	P3	2 ms	2 ms	P4	1 ms	4 ms	2 2 2																																																	
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	<p>is 80Kbps. Size of an acknowledgement is 100 bytes and the transmission rate at the receiver is 8 Kbps. The one way propagation delay is 100 milliseconds. The channel utilization in %?</p>	
Q6	<p>(a) Assume a scenario where the size of congestion window of a TCP connection be 40KB when a timeout occurs. The MSS be 2KB. Let the propagation delay 200 msec. The time taken by the TCP connection to get back to 40KB congestion is?</p> <p>(b) What is key logger? Describe man in the middle attack. Calculate no of persistent HTTP and non persistent HTTP connections if the server contains 6 files and client wants to download all 6 files?</p> <p>(c) Describe the TCP architecture.</p>	<p>2</p> <p>2</p> <p>2</p>