VIT
Vellore Institute of Technology

			SLOT : B2
School of Information Technology and Engineering			
Winter Semester 2022-2023			Continuous Assessment Test – I
Programme Name & Branch		MCA	
Course	ITA5006	Course	Distributed Operating Systems
Class	VL2022230500270 , VL2022230500524, VL2022230500243		
Faculty	Dr.M.RAJKUMAR, Dr.T.SENTHIL KUMAR, Dr.D.KARTHIKEYAN		

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s): Answer ALL Questions.

Q.No.	Question	Max. Marks
1.	(a) Identify the best choice scheduling algorithm for the following cases and justify your answer. **Case 1:** The incoming processes are short and there is no need for the processes to execute in a specific order. (2 marks) **Case 2:** The processes are a mix of long and short processes and the task will only be completed if all the processes are executed successfully in a given time. (2marks) **Case 3:** The processes are a mix of user based and kernel-based processes. (2 marks) (b) Compare and contrast the various scheduling algorithms highlighting their advantages and disadvantages. (4 marks)	10
2.	Experiment the various classical problems depicting flaws of process synchronization in systems where cooperating processes are present. Explain with the help of pseudocode.	10
3.	Consider the following process with the CPU burst time givenin milliseconds.	10

Process	Arrival Time	Burst time	Priority
P1	0	10	4
P2	1	4	2
P3	2	12	1
P4	4	5	3

Process arrives in P1, P2, P3, P4 order, all process arrives at 0 msec.

i) Draw Gantt chart to show execution using Priority, and RR (Quantum Time=2ms) Scheduling.(4 Marks)

ii) Also calculate the Average waiting time and Turnaround time. (4 Marks)

iii) Comment on the algorithm which produces minimum Average waiting time and Turnaround time. (2 Marks)

4. Assume that source and destination in the same network. One of the process in the source system wants to make a reliable communication to the one of the application in the destination system. Elaborate with the neat sketch on layer communication, protocol functionalities, encapsulation and de-capsulation happens at both sender and receiver side. **10**

5. (a) Demonstrate the need for communication primitives in Distributed OS. (5 marks) **10**

(b) Explain how remote procedure call will be implemented and how it handles the structuring and procedure call. (5 marks)

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			SLOT : B2
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Winter Semester 2022-2023		Continuous Assessment Test – II	
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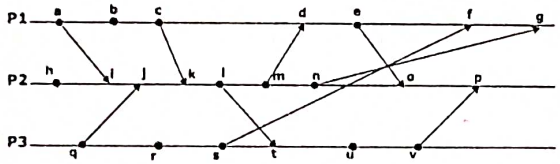
Course	ITA5006	Course	Distributed Operating Systems
Class	VL2022230500270 , VL2022230500524, VL2022230500243		
Faculty	Dr.M.RAJKUMAR, Dr.T.SENTHIL KUMAR, Dr.D.KARTHIKEYAN		

Exam Duration: 90 Min. **Maximum Marks: 50**

General Instruction(s): Answer ALL Questions.

Q.No. Question **Max Marks**

1. 

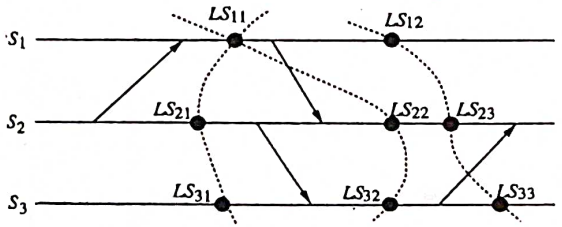
10

1.For the event diagram above, label all events with vector clocks. Assume that the vector elements are all set to zero at the beginning. (6 marks)

2. Apply the vector timestamp rules to determine whether the following event pairs are concurrent events or not? Explain why. (4 marks)

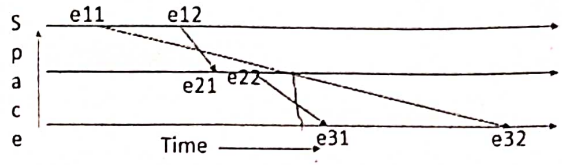
a) Is g || q? b) Is e || u?

2. 10



Analyze the above space -time diagram and identify whether the global state events are consistent or in- consistent or strongly consistent paths. Examine with Lamport's Chandy global state recording algorithm with marker rule.

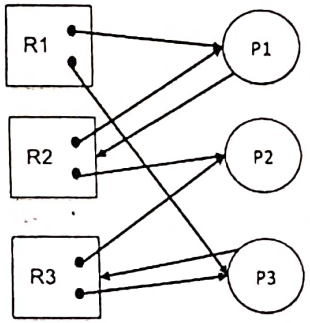
3. Consider the below space -time diagram 10



(i) Trace SES protocol to ensure the ordering of messages in above scenario. (5)

(ii) Discuss BSS protocol for causal ordering of messages for the above diagram. In what way this algorithm is different from SES protocol? (5)

4. Consider the following resource allocation graph: 10



a) Does the above allocation graph contain a deadlock? Justify your answer. (3 marks)

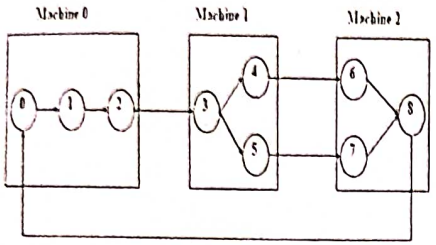
b) Assume now that P2 also demands resource R1. Does this allocation graph contain a deadlock? Explain your answer. (3 marks)

c) Assume the allocation graph at point b), and, in addition, assume that R2 has now three instances. Does this allocation graph contain a deadlock? Justify your answer. (4 marks).

5. Consider the below global state transition diagram, 10

a) construct the WFG and detect the deadlock cycle if any. (3 marks)

b) Using Chandy-Misra-Hass's algorithm evaluate the probe values at each process and justify how it detects the deadlocks in distributed systems. (7 marks)


Machine 0
Machine 1
Machine 2
0
1
2
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4
5
6
7
8

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Final Assessment Test – June 2023

Course: ITA5006 - Distributed Operating Systems

Class NBR(s): 0243 / 0270 / 0524 Slot: B2

Time: Three Hours Max. Marks: 100

Faculty Name : Prof. KARTHIKEYAN D / Prof. RAJKUMAR M / Prof. SENTHILKUMAR T

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN "OFF" POSITION IS TREATED AS EXAM MALPRACTICE

Answer ALL Questions

(10 X 10 = 100 Marks)

1. a) Experiment the Dining Philosopher problem using synchronization tool and check the critical section requirements for the above problem with the help of pseudocode. [6]

   b) Examine the data structure tools used to handle process execution and demonstrate with process state diagram. [4]

2. a) Justify the need for synchronization between two processes. Provide a solution using mutex and semaphore. Which is better, mutex or semaphore? [5]

   b) With a pseudo code enumerate the necessary condition to be satisfied for the Peterson's solution to the critical - section problem. [5]

3. a) Demonstrate the functionalities of Token bus protocol used in communication network topologies. [5]

   b) Examine the design issues of Remote Procedure Call (RPC) with respect to structure, binding and parameter passing. [5]

4. Three computers A, B and C communicate based on lamport logical clock (they include timestamp in their messages).

   At the beginning of time, all three computers begin with their logical clock set to zero (0). Later, the following sequence of events occurs:

   • A sends message M1 to B

   • After receiving M1, B sends message M2 to C

   • After receiving M2, C sends message M3 to A

   a) Represent the timestamp for the events specified above, [4]

      Send (M1)

      Send (M2)

      Send (M3)

b) In addition to the above transitions, the following messages are sent. [4]

- After receiving M3, A sends message M4 to B
- After receiving M4, B sends message M5 to A
- A receives message M5

After all of these messages have been sent and received, identify the timestamp for each event.

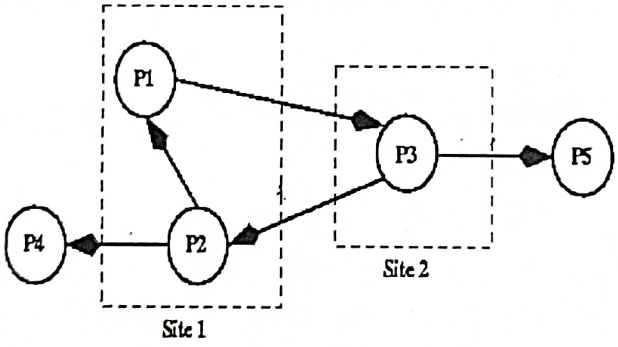
c) Is this a relatively or totally ordered system? [2]

5. a) Compare and contrast Local and global state. [4]

b) Propose a distributed algorithm to capture a consistent global state in distributed networks. [6]

6. Demonstrate how Completely Centralized Algorithm will detect the deadlock in distributed systems and elaborate how the limitations are overcome by other Centralized Algorithms.

7. Consider the below global state transition diagram, detect the deadlock cycle using Chandy-Misra-Hass's algorithm. Evaluate the probe values at each process and justify how it detects the deadlocks in distributed systems.



8. Examine the consistency models in Distributed Shared Memory and elaborate the write-update coherence protocol with relevant diagram.

9. What are the factors influenced for selecting load distribution algorithm? Differentiate symmetric & adaptive load distribution algorithms with performance.

10. Demonstrate the functionalities of two-phase commit protocol for fault tolerance handling and also examine the limitations of this protocol.

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