CS3551 - DISTRIBUTED COMPUTING
UNIT I

Q .No	Questions	Marks	CO's
	PART A		
1.	What is a distributed system?	2	CO 1
2.	Identify the features of distributed systems?	2	CO 1
3.	What are the three types of parallel systems?	2	CO 1
4.	Classify processing modes of Flynn's taxonomy?	2	CO 1
5	What do you mean by non-blocking primitive?	2	CO 1
6	Compare synchronous communication & asynchronous communication	2	CO 1
7	Explain the send primitive and receive primitive.	2	CO 1
8	What are the various forms of load balancing?	2	CO 1
9	What are Ubiquitous systems?	2	CO 1
10	What do you mean by peer-to-peer computing?	2	CO 1
11	What are agents?	2	CO 1
12	Identifythe two basic models of process communications?	2	CO 1
13	De昀椀ne global state	2	CO 1
14	Compare consistent cut and inconsistent cut	2	CO 1
15	Define scalar time	2	CO 1
16	Define vector time	2	CO 1
17	What is NTP?	2	CO 1
	PART B		
1.	Identify the key algorithmic challenges indistributed computing. (13)	13	CO 1
2.	Outline Omega and Butterfly networks withexample value n = 16 (7) Explainthe functions need to address whiledesigning a distributed computing system. (6)	13	CO 1
3.	Summerizethe primitives for distributed communication.(13)	13	CO 1
4.	Identifyvarious processing modes of flynntaxonomy.	13	CO 1

5	Explainabout the synchronous versusasynchronous communication	13	CO 1
6	Summerize the capabilities and rules forimplementation of logical clocks.	13	CO 1
7	Identifyand explain the basic properties ofscalar time.(13)	13	CO 1
8.	Identifyand explain the basic properties ofvector time.(13)	13	CO 1
9.	ExplainNTP for synchronizing system of physical clocks in distributed systems.(13)	13	CO 1
10.	Explain relation to parallel computers	13	CO 1
11.	Identify the challenges in distributed system.	13	CO 1
PART C			
1	A user arrives at a railway station that she has never visited before, carrying a PDA that is capable of wireless networking. Suggest how theuser could be provided with information about the local services and amenities at that station, without entering the station's name or attributes. What technical challenges must be overcome?Discuss in detail. (15)	15	CO 1
2	Identifythe requirements and aspects needed forreliable and fault-tolerant distributed systems. (15)	15	CO 1
3	Show that all events on the surface of the pastcone of an event are message send events. Likewise, show that all events on the surface ofthe future cone of an event are message receiveevents.(15)	15	CO 1

CS3551- DISTRIBUTED COMPUTING
UNITII

Q .No	Questions	Marks	CO's
	PART A		
1.	What are the message ordering paradigms?	2	CO 2
2.	Compare closed group Vs open group algorithm.	2	CO 2
3.	What iscrown criterion theorem?	2	CO 2
4.	Explain message broadcast.	2	CO 2
5.	Define time stamp.	2	CO 2
6.	Compare multiway rendezvous and binary rendezvous.	2	CO 2
7.	What are the roles and responsibilities of distributed systems.	2	CO 2
8.	What are the characteristics of multicast communication?	2	CO 2
9.	Differentiate multicasting Vs unicasting.	2	CO 2
10.	Identify the two popular orders for the delivery of messages in group communication.	2	CO 2
11.	Identify consistent snapshot.	2	CO 2
12.	What is the criteria that must be met by a causal ordering protocol.	2	CO 2
13.	What are the necessary conditions to satisfy the consistent global state?	2	CO 2
14.	State the property for causal delivery of messages.	2	CO 2
15.	Outlinean interpretation in terms of a cut.	2	CO 2
16.	What is consistent cut?	2	CO 2
17.	Outline marker sending rule.	2	CO 2
18.	What is marker receiving rule?	2	CO 2
19.	What is complexity?	2	CO 2
20.	Show how to prove the correctness of the algorithm.	2	CO 2
	PART B		
1	Differentiate FIFO and non-FIFO executions.(7) Explain on causally ordered executions (6)	13	CO 2
2	Show with an equivalent timing diagram of a synchronous execution on an asynchronous system.(13)	13	CO 2
3	Show with an equivalent timing diagram of a asynchronous execution on a synchronous	13	CO 2

	system.(13)		
4	Illustrate realizable with synchronouscommunication (RSC) execution.(13)	13	CO 2
5	Compare the hierarchy of execution classes. (7) Explain the crown test to determine theexistence of cyclic dependencies among messages.(6)	13	CO 2
6	Explain the channels to simulate an execution using asynchronous primitives on a synchronous system.(13)	13	CO 2
7	Model the channels to simulate an execution using synchronous primitives on an asynchronous system.(13)	13	CO 2
8	Explain a simple algorithm defined by Bagrodia. (13)	13	CO 2
9	Construct chandy and lamport algorithm (13)	13	CO 2
10	Explain in detail about the centralized algorithm to implement total order and causal order ofmessages. (13)	13	CO 2
11	Explain the necessary and sufficient conditions for causal ordering. (13)	13	CO 2
12	Explain in detail about the distributed algorithm to implement total order and causal order ofmessages. (13)	13	CO 2
PART C			
1	Consider a distributed system where every nodehas its physical clock and all physical clocks areperfectly synchronized. Construct an algorithmto record global state assuming the communication network is reliable.(15)	15	CO 2
2	Illustrate the asynchronous executions and of crowns. Crown of size 2. Another crown of size 2. Crown of size 3. (15)	15	CO 2

CS3551- DISTRIBUTED COMPUTING

UNIT III

Q .No	Questions	Marks	CO's
	PART A		
1.	What are the three basic approaches for implementing distributed mutual exclusion?	2	CO 3
2	Explain idle token.	2	CO 3
3	Outlinethe conditions for maekawa's algorithm.	2	CO 3
4	List the three types of messages for Deadlock handling.	2	CO 3
5	What are the essential requirements of mutual exclusion?	2	CO 3
6	Identify the two design issues for suzuki–kasami's.	2	CO 3
7	How ricart–agrawala algorithm achieves mutual exclusion.	2	CO 3
8	Explain howmaekawa's algorithm achieves mutual exclusion.	2	CO 3
9	Showin diagram the wait for graph (WFG).	2	CO 3
10	What are the states in a process.?	2	CO 3
11	Explain the three strategies for handling deadlocks.	2	CO 3
12	What is broadcast algorithm?	2	CO 3
13	Outline some algorithms of mutual exclusion	2	CO 3
14	Whatis deadlock resolution?	2	CO 3
15	Developthe facts of global state detection-based deadlock detection?	2	CO 3
16	Definethe features of Mitchell and Merritt's algorithm.	2	CO 3
17	Compare the various models of deadlock	2	CO 3
18	Explain about Knapp's classification.	2	CO 3
19	Compare AND model and the OR model.	2	CO 3
20	Summarize about issues in deadlock detection.	2	CO 3
	PART B		
1.	Explain in detail about Lamport's algorithm.	13	CO 3
2	ExplainRicart-Agrawala algorithm with required pseudocode	13	CO 3
3	Explainin detail about Maekawa's algorithm with example.	13	CO 3
4	Explainabout Suzuki–Kasami's broadcast algorithm.	13	CO 3
5	Outline the basic need of Deadlock detection in distributed systems.	13	CO 3

6	Explain the system model of deadlock detection in distributed systems.	13	CO 3
7	Interpret Knapp‘s classi的椀cation with example	13	CO 3
8	Compare features of AND model and the OR model.	13	CO 3
	PART C		
1	Show that in the ricart–agrawala algorithm the criticalsection is accessed in increasing order of timestamp. Does the same hold in maekawa’s algorithm?(15)	15	CO 3
2	Suppose all the processes in the system are assigned priorities which can be used to totally order the processes. Modify chand y*et al.*’s algorithm for the ANDmodel so that when a process detects a deadlock, it also knows the lowest priority deadlocked process.(15)	15	CO 3
3	Consider the following simple approach to handle deadlocks in distributed systems by using “time-outs”: a process that has waited for a specified period for a resource declares that it is deadlocked and aborts to resolve the deadlock. Explain what are the shortcomingsof using this method?(15)	15	CO 3

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UNIT IV

Q .No	Questions	Marks	CO's
	PART A		
1.	De旳椀ne a checkpoint.	2	CO 4
2	Mention the types of rollback recovery schemes.	2	CO 4
3	Contrast Coordinated and Communication-induced check pointing?	2	CO 4
4	De旳椀ne a consistent system state.	2	CO 4
5	What is a recovery line? Which lead to domino effect?	2	CO 4
6	What is meant by Garbage collection?	2	CO 4
7	List the disadvantages Uncoordinated Check pointing.	2	CO 4
8	What are the steps needed for Rollback Dependency Graph?	2	CO 4
9	How does the garbage collection algorithm based on a rollback dependency graph work?	2	CO 4
10	List the advantages Coordinated Check pointing.	2	CO 4
11	What is Model-based Communication-induced check pointing?	2	CO 4
12	De旳椀ne Log-based Recovery.	2	CO 4
13	What are the failures in Distributed Systems?	2	CO 4
14	What is Byzantine Agreement?	2	CO 4
15	What do you mean by Consensus Problem?	2	CO 4
	PART B		
1.	Explain about a Local Checkpoint, DifferentTypes of Messages and the issues in Failure Recovery.	13	CO 4
2	Analyze in brief about uncoordinated, coordinated check pointing and Communication-Induced Check pointing techniques.	13	CO 4
3	Explain about Koo and Toueg coordinated check pointing and recovery technique.	13	CO 4

4	Summerize about Asynchronous Check pointing and Recovery.	13	CO 4
5	ExplainManivannan-Singhal Quasi Synchronous Check pointing and Recovery Algorithm.	13	CO 4
6	Explain the steps for Bzantine Generals(iterative formulation), Synchronous, Message-passing.	13	CO 4
7	Explain the code for the Phase King Algorithm.	13	CO 4
8	Explain the code for the Epsilon Consensus (message-passing, asynchronous).	13	CO 4
9	Explain about Two-process Wait-free Consensus using FIFO Queue, Compare & Swap	13	CO 4
10	Outline the features of Non-blocking Universal Algorithm.	13	CO 4
	PART C		
1	Consider the following simple check pointing algorithm. A process takes a local checkpoint right after sending a message. Createthat the last checkpoint at all processes will always be consistent. What are the trade-offs with this method?(15)	15	CO 4
2	Give and analysea rigorous proof of the impossibility of a min-process, non-blocking checkpointing algorithm.(15)	15	CO 4

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UNIT V

Q .No	Questions	Marks	CO's
	PART A		
1.	Explain NIST definition of cloud computing	2	CO5
2	What is cloud service?	2	CO5
3	What is public cloud?	2	CO5
4	What is private cloud?	2	CO5
5	Explain about virtual machines.	2	CO5
6	What is NIST definition of IaaS?	2	CO5
7	Explain characteristics of IaaS.	2	CO5
8	List the situations where PaaS may not be the best option.	2	CO5
9	What is Amazon EC2?	2	CO5
10	List the function of EC2.	2	CO5
11	What is Azure?	2	CO5
12	What is Azure queue?	2	CO5
13	How virtualization employed in Azure?	2	CO5
14	What is service cloud?	2	CO5
15	What are the advantages of private cloud?	2	CO5
	PART B		
1.	What is cloud computing? Explain the advantages and disadvantages of cloud computing.	13	CO5
2	Define virtualization. Explain full virtualization andpara virtualization. Discuss difference between full virtualization and para virtualization.	13	CO5
3	What is queuing service? Discuss amazon simple queue service.	13	CO5
4	Explain the cloud service models.	13	CO5
5	Explain in detail about cloud deployment models.	13	CO5