Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

MoE, UGC & AICTE Approved; NAAC Accredited A++

Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India.

END SEMESTER EXAMINATION – APRIL / MAY 2024

Course Code	20CS2021	Duration	3hrs
Course Name	DISTRIBUTED COMPUTING	Max. Marks	100

Q. No.	Questions	CO	BL	M
	PART – A (10 X 1 = 10 MARKS)			
1.	Define transparency.	CO1	R	1
2.	List the generations of distributed systems.	CO1	R	1
3.	Define Remote Object Reference.	CO2	R	1
4.	Predict the method used by clients to invoke remote operations	CO2	U	1
5.	Differentiate Synchronous and Asynchronous Communication.	CO3	U	1
6.	Illustrate the concept of deadlock with its representation.	CO3	A	1
7.	Describe the characteristics of Multicast Communication.	CO4	R	1
8.	Summarize the limitations of Bully algorithm.	CO4	U	1
9.	State the importance of linearizability in data replication.	CO5	R	1
10.	Define distributed shared memory.	CO6	R	1
	PART – B (6 X 3 = 18 MARKS)			
11.	Distinguish between the physical and architectural models of distributed systems.	CO1	An	3
12.	Explain publish-subscribe paradigm.	CO2	U	3
13.	Describe Christian's method of clock synchronization.	CO3	R	3
14.	Differentiate growing phase and shrinking phase of 2PL protocol.	CO4	An	3
15.	Describe Update propagation in gossip architecture.	CO5	R	3
16.	Explain EDF scheduling.	CO6	U	3
	PART – C (6 X 12 = 72 MARKS) **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)**			
17.	a.	Discuss the different client-server architectures employed in a distributed environment. Explain the rationale behind focusing on thin clients instead of fat clients. State a few relevant applications of client-server architecture.	CO1	U	8
	b.	Distinguish between different types of omissions and arbitrary failures that affect channels and processes in a distributed environment.	CO1	An	4
18.	a.	Explain the key steps and considerations involved in implementing RMI with a suitable diagram.	CO2	U	6
	b.	Describe the modules of distributed file service architecture.	CO2	R	6

19.	a.	Illustrate the mechanism by which pastry routes messages to the addressed node in the distributed system.	CO3	An	12
20.	a	Explain the edge-chasing protocol for deadlock detection. Consider a distributed system with three sites in the following situation: i) Site S1 has 3 processes, P1, P2, and P3, where process P2 is waiting to acquire a resource held by process P4. ii) Site S2 has 2 processes, P4, and P5, where process P4 is waiting to acquire a resource held by process P7. iii) Site 3 has 3 processes, P6, P7, and P8, where process P7 is waiting to acquire a resource held by process P2. Analyze the edge-chasing protocol and identify if any deadlock arises for the given scenario.	CO4	An	6
	b	Illustrate two phase commit protocol with suitable example.	CO4	A	6
21.	a	Determine the strategies and operations to minimize the overhead associated with maintaining primary replication manager in passive replication.	CO5	A	6
	b	Describe the role of group communication in a distributed environment.	CO5	R	6
22.	a.	Explain network partition algorithm. Why is it not suitable for banking applications?	CO5	An	6
		Describe the components of a gossip replica manager.	CO5	U	6
23.	a.	Discuss various memory consistency models.	CO6	U	12
COMPULSORY QUESTION					
24.	a.	Analyze the distributed multimedia systems by considering its characteristics, QoS management and parameters.	CO6	An	12

REGISTER NO.

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END SEMESTER EXAMINATION – NOV / DEC – 2023

Course Code	20CS2021	Duration	3hrs
Course Name	**DISTRIBUTED COMPUTING**	Max. Marks	100

Q. No.	Questions	CO	BL	Marks
	PART – A (10 X 1 = 10 MARKS) **(Answer all the questions)**			
1.	List the challenges of a distributed system.	CO1	R	1
2.	State the difference between concurrency and replication transparency.	CO1	R	1
3.	Identify the middleware layers of inter-process communication.	CO2	U	1
4.	Give examples of network operating systems.	CO2	U	1
5.	Define the term binding.	CO4	R	1
6.	Differentiate between pure and non-pure names.	CO4	U	1
7.	State the pictorial representation for multicast communication for a process in mutual exclusion.	CO3	R	1
8.	Identify the technique used in a distributed approach for deadlock detection.	CO3	U	1
9.	Summarize the basic operations of a gossip service in a distributed system.	CO5	U	1
10.	State the meaning of granularity in distributed shared memory.	CO6	R	1
	PART – B (6 X 3 = 18 MARKS) **(Answer all the questions)**			
11.	Differentiate between a physical model and an architectural model.	CO1	U	3
12.	State the strengths and weaknesses of a remote procedure call.	CO2	R	3
13.	Summarize the three conditions for mutual exclusion.	CO3	U	3
14.	Describe the drawbacks of Napster.	CO4	R	3
15.	Identify the fault tolerance services available in the distributed environment.	CO5	U	3
16.	List the update options available in distributed shared memory with example.	CO6	R	3
	PART – C (6 X 12 = 72 MARKS) **(Answer any five Questions from Q.No. 17 to 23, Q.No. 24 is Compulsory)**			

17.	a.	Explain architectural elements and show how they are mapped onto the physical distributed infrastructure with their placement. Indicate their roles and responsibilities.	CO1	U	8
	b.	Describe object serialization in Java.	CO1	R	4
18.	a.	Explain the working principle of the Remote Procedure Call protocol.	CO2	A	6
	b.	Explain the notification of an event to a subscriber in the publish-subscribe paradigm with a neat diagram.	CO2	A	6
19.	a.	Analyze the pitfalls of Cristian's algorithm and explain how Berkley's algorithm tries to resolve them.	CO4	An	6
	b.	Explain how the URL "http:/www.flowers.in:1212/pictures/rose.png" can be resolved by Name Service.	CO4	A	6
20.	a.	Explain the edge-chasing protocol for deadlock detection. Consider a distributed system with three sites in the following situation: i) Site S1 has 3 processes, P1, P2, and P3, where process P2 is waiting to acquire a resource held by process P4. ii) Site S2 has 2 processes, P4, and P5, where process P4 is waiting to acquire a resource held by process P7. iii) Site 3 has 3 processes, P6, P7, and P8, where process P7 is waiting to acquire a resource held by process P2. Analyze the edge-chasing protocol and identify if any deadlock arises for the given scenario.	CO5	An	12
21.	a.	Analyze Ricart-Agarwala and Maekawa non-token based mutual exclusion algorithms with suitable examples.	CO3	An	12
22.	a.	Illustrate the active and passive models of replication for fault tolerance with suitable diagrams.	CO5	U	12
23.	a.	State the four problems caused by concurrent transactions and discuss them with suitable examples.	CO5	R	8
	b.	Describe the methods through which QoS is maintained in distributed systems.	CO6	R	4
COMPULSORY QUESTION					
24.	a.	Correlate various consistency models used in distributed shared memory and discuss the release-consistency model with a case study.	CO6	An	12

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Course Code	20CS2021	Duration	3hrs
Course Name	DISTRIBUTED COMPUTING	Max. Marks	100

Q. No.	Questions	Course Outcome / Bloom's level	Marks
	PART – A (10 X 1 = 10 MARKS)		
1.	A _____ is one in which components located at networked computers communicate and coordinate their actions only by passing messages.	CO1 / R	1
2.	Interaction models deals with the structure and sequencing of the communication between the elements of the system. True or False.	CO2 / U	1
3.	_____ is used to establish a server on remote machine that can respond to queries and to retrieve information by calling a query by other computers.	CO1 / R	1
4.	Define thread.	CO2 / U	1
5.	Define name space.	CO2 / U	1
6.	Why are logical clocks required in distributed system?	CO1 / R	1
7.	Define nested transaction.	CO1 / R	1
8.	_____ is a set of technologies for copying and distributing data and database objects from one database to another.	CO1 / R	1
9.	What is the purpose of using distributed shared memory?	CO2 / U	1
10.	The planned allocation and scheduling of resources to meet the needs of multimedia and other applications is referred to as _____.	CO1 / R	1

	PART – B (6 X 3 = 18 MARKS)		
11.	Write the important characteristics of IPC.	CO1 / R	3
12.	List the major goals of Sun NFS?	CO2 / U	3
13.	Give the important features of peer-to-peer systems.	CO2 / U	3
14.	How are transactions recovered in distributed system?	CO3 / A	3
15.	Why do we require replication in distributed system?	CO2 / U	3
16.	Discuss the sequential consistency in DSM.	CO2 / U	3

PART – C (6 X 12 = 72 MARKS)

		(Answer any five Questions from Q.no 17 to 23. Q.No 24 is Compulsory)		
17.	a.	Describe the architectural models of distributed systems.	CO1 / R	8
	b.	List the approaches used in external data representation in distributed system. Explain.	CO2 / U	4
18.	a.	Sketch the file service architecture and explain in detail the functions of these components in file service architecture.	CO 2 / U	8
	b.	How does the NFS Auto mounter help to improve the performance and scalability of NFS?	CO4/ An	4
19.		Write short notes on the following:		
	a.	Napster and its legacy	CO 2 / U	6
	b.	Peer-to-peer middleware	CO 2 / U	6
20.	a.	Describe the working of bully algorithm with an example.	CO 2 / U	8
	b.	Give the read and write rules based on timestamp ordering.	CO 2 / U	4
21.	a.	Describe the view-synchronous group communication with illustration.	CO3 / A	8
	b.	Write in brief about fault tolerant services offered by replication.	CO2 / U	4
22.	a.	Discuss the working procedure for RPC Model.	CO2 / U	8
	b.	Cite few examples of distributed systems.	CO1 / R	4
23.	a.	How the clock synchronization done in Cristian's method? Explain with illustration.	CO3 / A	8
	b.	List the two ways for synchronizing a clock? Explain.	CO2 / U	4
		COMPULSORY		
24.	a.	Discuss about design and implementation issues of DSM.	CO2 / U	8
	b.	Describe the resource management in DMS.	CO2 / U	4

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END SEMESTER EXAMINATION – MAY / JUNE 2023

Course Code	20CS2021	Duration	3hrs
Course Name	DISTRIBUTED COMPUTING	Max. Marks	100

Q. No.	Questions	CO	BL	Marks
	PART – A (10 X 1 = 10 MARKS) **(Answer all the questions)**			
1.	Define Inter-process Communication.	CO1	R	1
2.	List the characteristics of Distributed System.	CO2	R	1
3.	Differentiate Synchronous and Asynchronous Communication.	CO3	U	1
4.	Differentiate shared memory and distributed memory.	CO4	R	1
5.	What is concurrency in Distributed Systems?	CO5	U	1
6.	List the types of system model.	CO1	A	1
7.	Define Multicast operation.	CO1	U	1
8.	What is peer to peer system?	CO2	R	1
9.	Name the two basic file system used in distributed computing.	CO1	U	1
10.	List out the design issues in threads.	CO3	R	1
	PART – B (6 X 3 = 18 MARKS) **(Answer all the questions)**			
11.	Write a short note on quality of service in distributed systems.	CO1	R	3
12.	Write the key design issues for distributed file systems.	CO2	U	3
13.	What is the need of Name service?	CO3	U	3
14.	State the use of election algorithm. Mention the different election algorithms.	CO4	U	3
15.	Mention the use of Locking.	CO5	U	3
16.	What type of infrastructure is provided by multicast message for distributed system?	CO6	R	3
	PART – C (6 X 12 = 72 MARKS) **(Answer any five Questions from Q. No. 17 to 23, Q. No. 24 is Compulsory)**			
17. a.	Distinguish between Centralized vs Distributed scheduling algorithm.	CO1	U	6
17. b.	What are the different types of models for developing distributed systems? Explain each model in brief.	CO2	R	6

18.	a.	Differentiate between Structured vs unstructured peer-to-peer systems.	CO4	C	6
	b.	What are the different ways to control concurrency in distributed transactions? Explain with examples.	CO5	R	6
19.	a.	Discuss in detail the design and implementation of name services and Domain Name services.	CO1	U	6
	b.	Explain optimistic concurrency control in detail.	CO2	C	6
20.	a.	What is resource sharing? Explain.	CO3	U	6
	b.	What are the characteristics of inter-process communications? Explain.	CO5	E	6
21.	a.	Explain about Sun network file system.	CO3	R	6
	b.	Discuss the design issues for Remote Procedure Call.	CO4	U	6
22.	a.	Write short notes on Napster and its legacy and Peer to Peer Middleware.	CO2	C	6
	b.	Explain directory services.	CO1	R	6
23.	a.	Briefly discuss the architecture and server operation of NFS.	CO1	R	6
	b.	What are the different ways of synchronizing physical clocks? Explain.	CO2	U	6
COMPULSORY QUESTION					
24.	a.	Explain the basic model for the management of replicated data.	CO1	U	6
	b.	Explain passive replication model for fault tolerance.	CO2	R	6

CO – COURSE OUTCOME   **BL** – BLOOM'S LEVEL