

SARDAR RAJA COLLEGE OF ENGINEERING
RAJA NAGAR, ALANGULAM
Department of Computer Applications



Subject Name : DISTRIBUTED SYSEMS
Subject Code : MC9279
Year : III MCA
Semester : Fifth

Prepared By
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UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT		8
Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Unicasting, Multicasting and Broadcasting – Group Communication.		
UNIT II DISTRIBUTED OPERATING SYSTEMS		12
Issues in Distributed Operating System – Threads in Distributed Systems – Clock Synchronization – Causal Ordering – Global States – Election Algorithms – Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols.		
UNIT III DISTRIBUTED RESOURCE MANAGEMENT		10
Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.		
UNIT IV FAULT TOLERANCE AND CONSENSUS		7
Introduction to Fault Tolerance – Distributed Commit Protocols – Byzantine Fault Tolerance – Impossibilities in Fault Tolerance.		
UNIT V CASE STUDIES		8
Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System – JINI.		

TOTAL : 45 PERIODS

REFERENCES:

1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Third Edition, Pearson Education Asia, 2002.
2. Hagit Attiya and Jennifer Welch, “Distributed Computing: Fundamentals, Simulations and Advanced Topics”, Wiley, 2004.
3. Mukesh Singhal, “Advanced Concepts In Operating Systems”, McGrawHill Series in Computer Science, 1994.
4. A.S.Tanenbaum, M.Van Steen, “Distributed Systems”, Pearson Education, 2004.
5. M.L.Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley, 2004

MC9279 DISTRIBUTED SYSTEMS

Description:

- Distributed System is an environment where all types of operating systems lie in and work on different environments
- Analyze about the operating system and its services
- To know and expose about the environment and its fault tolerance system generation

Objectives:

- To know about communication criteria in Distributed Environment.
- To know about the Distributed Operating Systems and its services
- To know about the resource utilized by Distributed Environment in Operating Systems.
- To know about the fault tolerance in Distributed Environment
- To expose about the CASE Studies of Distributed Environment

Micro Lesson Plan

Hours	Lecture topics	Reading
	UNIT I - COMMUNICATION IN DISTRIBUTED ENVIRONMENT	
1	Introduction	T 5
2	Various Paradigms in Distributed Applications	
3	Remote Procedure Call	
4	Remote Object Invocation	
5	Message-Oriented Communication	
6	Unicasting	
7	Multicasting and Broadcasting	
8	Group Communication	
	UNIT II - DISTRIBUTED OPERATING SYSTEMS	
9 & 10	Issues in Distributed Operating System	T 4
11	Threads in Distributed Systems	
12	Clock Synchronization	
13	Causal Ordering	
14	Global States	
15	Election Algorithms	
16	Distributed Mutual Exclusion	
17	Distributed Transactions	
18 & 19	Distributed Deadlock	
20	Agreement Protocols	
	Unit III - DISTRIBUTED RESOURCE MANAGEMENT	
21	Distributed Shared Memory	T 1
22 & 23	Data Centric Consistency Models	
24	Client Centric Consistency Models	
25	Ivy	
26	Munin	
27	Distributed Scheduling	
28	Distributed File Systems	
29 & 30	Sun NFS	

	UNIT IV FAULT TOLERANCE AND CONSENSUS	
31	Introduction to Fault Tolerance	T 1
32 & 33	Distributed Commit Protocols	
34 & 35	Byzantine Fault Tolerance	
36 & 37	Impossibilities in Fault Tolerance.	
	UNIT V - CASE STUDIES	
38	Distributed Object-Based System	T 5 and Web Reference
39 & 40	CORBA	
41 & 42	COM+	
43 & 44	Distributed Coordination Based System	
45	JINI	

MCA DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

MC 9279 DISTRIBUTED SYSTEMS (Regulation 2009)

Time: Three hours Maximum:100 marks

Answer ALL questions.

PART-A-10*2=20

1. Write down the advantages of distributed systems over centralized ones.
2. Mention the characteristics of decentralized algorithm.
3. Define the term: Global states.
4. What are distributed deadlocks? State the various strategies for dealing with them.
5. In the case of distributed shared memory systems, what do you mean by granularity of update?
6. Define the term network file system.
7. Specify any four types of failures that can occur in a distributed system.
8. Define the term network partition.
9. Draw the schematic of CORBA's call back model for asynchronous method invocation.
10. Justify, with any two features of JINI, that it is a co-ordination based system.

PARTB-5*6=80

- 11.(a)(I). Discuss the strength and weakness of distributed computing.(8)
(II). What do you mean by message- oriented communication model? Describes the Berkeley Sockets.(8)

Or

- (b). Give a detailed account on the architecture and functionality of a remote object invocation systems.

- 12.(a). What is the importance of clock synchronization in a distributed operating system? Explain the Lamport's Logical clock synchronization Algorithm in detail.

Or

- (b).(I). Discuss the Chandy –Misra –Haas algorithm for distributed deadlock detection.(9)
(II). With a help of necessary schematic diagram, explain the execution of distributed transactions.(7)

- 13.(a)(I) Give a brief account on casual consistency and release consistency models.(5+5)
(II). Describe the ching and replication features of SUN NFS.(6)

Or

- (b).(I). Define the term distributed scheduling. How would you classify the load distribution algorithms? Mention the components of a load distribution algorithm(2+4+5)
(II). Briefly describe any one of the client –centric consistency models.(5)

- 14.(a) With the suitable finite state machine(FSM) notation, give a detailed account on the functionality of the Two –Phase commit.

Or

- (b).(i). Write short notes on check pointing.(5)
(II) Define the design an engineering solution for the two generals Byzantine General's problem.(11)

- 15.(a)(I). With a neat sketch, describe the general organization of CORBA system.(8)
(II) Discuss the security features of Distributed(OMC DCOM).(8)

Or

- (b) Discuss in detail the architecture, communication and processes in JINI.(4+5+7)

MCA DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.
MC 9279 DISTRIBUTED SYSTEMS (Regulation 2005)
Time: Three hours Maximum:100 marks
Answer ALL questions.

PART A- (10 X 2= 20 marks)

1. What is the main objective of distributed systems? What are the challenges?
2. What is the need for IDL?
3. Name the paradigms for distributed programming.
4. What is RAID?
5. What are the requirements for distributed mutual exclusion algorithms?
6. What is null RPC?
7. What are hierarchic locks?
8. What are phantom deadlocks?
9. What are trap door functions?
10. What is a linearizable service?

PART B - (5 X 16= 80 marks)

11. (a) (i) Describe the architectural models of distributed systems.(Marks 8)
(ii) What is marshalling? What are the different approaches of external data representation?
Discuss.(Marks 8)
(Or)
(b) (i) Describe the various RPC protocols supporting client server communication.(Marks 10)
(ii) How is IPC implemented in UNIX? Explain.(Marks 6)
12. (a) How does the communication between distributed objects take place? Describe the related issues.(Marks 16)
(Or)
(b) What is name service? What are its goals? How is it implemented? What is directory service?(Marks 16)

13. (a) Describe the architecture for multi threaded servers. Discuss the issues related to thread programming, thread lifetime, thread synchronization, scheduling and implementation.(Marks 16)

(Or)

(b) (i) What is the significance of time in distributed system? What are the ways for synchronizing clocks? Give brief overview of various techniques. (Marks 8)

(ii) What do you understand by logical time and logical clocks? What is lamport's contribution for it? Discuss.(Marks 8)

14. (a) Discuss the various concurrency control protocols.(Marks 16)

(Or)

(b) Describe the various deadlock handling techniques.(Marks 16)

15. (a) Elaborate on various cryptographic algorithms. (Marks 16)

(Or)

(b) Write notes on:

(i) Fault tolerant services.(Marks 8)

(ii) Highly available services.(Marks 8)