

(CT(DE)-22005) Distributed Systems

Teaching Scheme

Lectures: 3 Hrs/ Week

Examination Scheme

Assignment/Quizzes : 40 marks

End Semester Exam: 60 marks

Course Outcomes

Students will be able to:

1. Identify challenges faced while designing a distributed system,
2. Apply appropriate algorithms in distributed systems in various scenarios,
3. Analyse the trends in distributed systems

Course Contents

Introduction Motivation, goals, advantages , disadvantages, hardware concepts, software concepts, design issues, middleware, overview of distributed systems .

[6 Hrs]

Communication. Client server model, middleware and client server model, relation of Network models with distributed system (TCP/IP, OSI, ATM etc.) , Remote Procedure Call, group communication and its protocol (IS-IS)

[6 Hrs]

Synchronization. Clock synchronization, logical clocks, lamport's algorithm, global state, vector algorithm, election algorithms, mutual exclusion algorithms, dead locks in distributed systems, deadlock avoidance, prevention and detection.

[8 Hrs]

Models in DS. Threads, system models, processor allocation, workstation model, Processor Pool Model, Hybrid Model, real time distributed systems, time triggered systems, event driven systems, distributed shared memory, consistency models, page based distributed shared memory.

[8 Hrs]

Distributed File System. design, implemetation, trends.

[6 Hrs]

Applications of distributed systems. distributed object based systems, distributed co-ordination based systems, distributed document based systems.

[6 Hrs]

Text Books

- "Distributed Systems –Principles and Paradigms" , Andrew S. Tanenbaum & Maarten van Steen, PHI, ISBN-978-81-203-2215
- "Distributed Operating Systems Concepts and Design" , Pradeep K. Sinha, PHI Publication

Reference Books

- "*Distributed Operating Systems*", Andrew S. Tanenbaum, Pearson Education

- "Distributed Systems, Concepts and Design" , George Coulouris, Jean Dollimore & Tim Kindberg, Fifth Edition, Pearson.
- "Distributed Operating Systems: Concepts and Practice", Galli D.L., Prentice-Hall.
- "Distributed Systems", Mullender S., Addison Wesley.

Suggested List of Assignments

1. Implement a client server model to read/write a file present at single server from multiple clients. Trace packets using tool like tcpdump and show the data which is passed on and from server from and to client.
2. Implement a RPC program to read/write a file present at single server from multiple clients. Trace packets using tool like tcpdump and show the data which is passed on and from server from and to client. Also show the protocol used.
3. Implement election algorithm in distributed system.
4. Implement deadlock detection algorithm for distributed system.
5. Implement synchronization algorithm like lamports algorithm or its variants for clock synchronization in distributed system.
6. Case Study of real time distributed system.
7. Configure of NFS client and server in order to read and write a file present on NFS server. Trace packets using tool like tcpdump and show the data which is passed on and from server from and to client. Also show the protocol used.
8. Implement an application using distributed system techniques like DCOM/CORBA/TIB-RENDVOUS etc. [mini-project]

This is an illustrative list of assignments. The instructor is expected to update the list.

(CT(DE)-22007) Advanced Database Management Systems

Teaching Scheme

Lectures: 3 Hrs/ Week

Examination Scheme

Assignment/Quizzes : 40 marks

End Semester Exam: 60 marks

Course Outcomes

Students will be able to:

1. Examine different parallelism techniques for parallel databases .
2. Analyze Distributed Transaction and Query Processing.
3. Think and analyze parallel processing of queries.
4. Analyze the cost of different SQL joins.
5. Demonstrate NoSQL.

Course Contents

Introduction: Database System Architectures: Centralized and Client-Server Architectures, Three-tier Architecture , Server System Architecture, Parallel System, Distributed System, Network Types.