DISTRIBUTED DATABASES

Course Code: 13IT1109
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Course Educational Objectives:
The main objective of the course is to expose the students to database creation and maintenance in distributed environment.

✧ Understand how data is collected and distributed in a database across multiple physical locations.

✧ To gain advanced knowledge on creating and maintaining databases in distributed environment, how to handling all types of queries, query optimization techniques.

✧ To improve database performance at end-users worksites.

✧ Understand and to get knowledge of advanced features of object orientation and interoperability object management in distributed environment.

✧ Management of distributed data with different levels of transparency.

✧ Understand how to use database management tools in resolving deadlock situations.

Course Outcomes:
At the end of the course the student will be able to

✧ Gain advanced knowledge on creating and maintaining databases in distributed environment.

✧ Understand how to handle all types of queries, query optimization techniques.

✧ Understand how to use Foundations of Distributed Concurrency Control.

✧ Understand how to Query Processing Layers in Distributed Multi-DBMSs

✧ Understand how to implement push based technologies
UNIT-I (12 Lectures)

DISTRIBUTED DATABASES:
Features of Distributed versus Centralized Databases, Distributed Database Management Systems (DDBMSs)

PRINCIPLES OF DISTRIBUTED DATABASES -
Levels of Distribution Transparency: Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT-II (12 Lectures)

DISTRIBUTED DATABASE DESIGN:
A Framework for Distributed Database Design, the Design of Database Fragmentation, the Allocation of Fragments.

TRANSLATION OF GLOBAL QUERIES TO FRAGMENT QUERIES:
Equivalence Transformations For Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

THE MANAGEMENT OF DISTRIBUTED TRANSACTIONS:

UNIT-III (12 Lectures)

CONCURRENCY CONTROL:
Foundations of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control Based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

RELIABILITY:
Basic Concepts, Nonblocking Commitment Protocols, Reliability and Concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints And Cold Restart.

DISTRIBUTED DATABASE ADMINISTRATION:
Catalog Management in Distributed Databases, Authorization and Protection
UNIT-IV (12 Lectures)

**DISTRIBUTED OBJECT DATABASE MANAGEMENT SYSTEMS**

**OBJECT MANAGEMENT**:
Object Identifier Management, Pointer Swizzling, Object Migration Distributed Object Storage

**OBJECT QUERY PROCESSOR**:
Object Query Processing Architectures, Query Processing Issues, Query Execution.

**TRANSACTION MANAGEMENT**:
Transaction Management in Object DBMSs, Transactions as Objects.

UNIT-V (12 Lectures)

**DATABASE INTEROPERABILITY**:
Database Integration: Scheme Translation, Scheme Integration.

**QUERY PROCESSING**:
Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues.

**TRANSACTION MANAGEMENT**:
Transaction and Computational Model, Multi database Concurrency Control, Multi database Recovery.

**OBJECT ORIENTATION AND INTEROPERABILITY**:
Object Management Architecture, CORBA and Database Interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability.

**PUSH BASED TECHNOLOGIES**:
Delivery Schedule Generation, Client Cache Management, Propagating Updates.
TEXT BOOKS:

REFERENCE: