NOC:Fundamentals of Database Systems(Course sponsored by Aricent) - Video course

NPTEL

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Computer Science and Engineering

COURSE OUTLINE

Databases are at the core of all successful digital systems. The course will introduce the basics of database systems. In addition to the traditional relational database systems, it will also introduce briefly the new paradigm of NoSQL databases used in big data systems. The topics will cover all important aspects including normalization, query processing and transactions

COURSE DETAIL

Sl.No.	Topics
1.	Introduction to Databases
2.	Relational Data Model
3.	Relational Algebra: Basic Operators
4.	Relational Algebra: Additional Operators
5.	Relational Algebra: Updates
6.	Entity-Relationship Diagram
7.	SQL: Creation and Basic Query Structure
8.	SQL: Basic Operations

Pre-requisites:

Basic programming; Data structures and algorithms

Coordinators:

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9.	SQL: Aggregate and Grouping
10.	SQL: Nested Subqueries and Sets
11.	SQL: Updates and Joins
12.	SQL: Views and Triggers
13.	Recap
14.	Database Normalization: Functional Dependencies
15.	Database Normalization: 1NF and 2NF
16.	Database Normalization: 3NF
17.	Database Normalization: BCNF
18.	Database Normalization: Multi-valued Dependencies
19.	Physical Design
20.	Indexing: Basics and Hashing
21.	Indexing: B-tree and B+-tree
22.	Recap
23.	Query Processing: Selection
24.	Query Processing: Sorting

25.	Query Processing: Basic Nested Loop Join
26.	Query Processing: Block and Indexed Nested Loop Joins
27.	Query Processing: Merge and Hash Joins
28.	Query Optimization: Equivalent Expressions
29.	Query Optimization: Joins
30.	Query Optimization: Joins
31.	Query Optimization: Estimating Sizes
32.	Recap
33.	Database Transactions: Definition of Transactions
34.	Database Transactions: Features of Transactions
35.	Recovery Systems: Types of Recovery Systems
36.	Recovery Systems: Log-based Schemes
37.	Transaction Schedules: Conflicts and Aborts
38.	Transaction Schedules: Serializability
39.	Transaction Schedules: Recoverability
40.	Concurrency Control Protocols: Two-phase Locking Protocols
	Concurrency Control Protocols: Timestamp

41.	Ordering Protocol
42.	Concurrency Control Protocols: Multiple Granularity Locks
43.	Concurrency Control Protocols: Deadlock Prevention
44.	NoSQL: CAP Theorem and BASE Properties
45.	NoSQL: Types of NoSQL Systems
46.	Graph Databases
47.	Big Data
48.	Recap