INDEX

Syllabus : Reviewing basic concepts of a Relational database, SQL concepts, Overview: Introduction, Query processing in DBMS, Steps of Query Processing, Measures of Query Cost Selection Operation, Sorting, Join Operation, Evaluation of Expressions.

Query Optimization Overview, Goals of Query Optimization, Approaches of Query Optimization, Transformations of Relational Expression, Estimating Statistics of Expression Results Choice of Evaluation Plans.

Chapter 1 : Introduction to DBMS 1-1 to 1-09

1.1 Introduction to DBMS 1-1
1.2 Review of Relational Database System 1-2
1.2.1 Relational Data Structure....1-2
1.3 Structured Query Language (SQL) 1-2
1.3.1 Introduction....1-2
1.3.2 Background 1-2
1.4 SQL Schema 1-3
1.4.1 Schema Design using Data Definition Language (DDL) of SQL....1-3
1.4.2 Updating Schema Using Data Manipulation Language (DML)....1-4
1.5 Data Retrieval Language (DRL)....1-5
1.5.1 Selection Operator....1-6
1.5.2 Selecting Data 1-7
1.5.3 Sorting Data 1-8

Chapter 2 : Query Processing 2-1 to 2-16

2.1 Introduction to Query Processing....2-1
2.1.1 Typical Query Processing in DBMS 2-1
2.1.2 Steps of Query Processing 2-2
2.2 Basic Algorithms for Relational Operations 2-3
2.3 Selection Operation 2-3
2.4 Join Operations 2-6
2.4.1 Nested Loop Join 2-6
2.4.2 Blocks Nested Loop Join 2-7
2.4.3 Indexed Nested Loop 2-8
2.4.4 Merge Join 2-9
2.4.5 Hash Join 2-10
2.5 Cost of Computing for All Joins....2-12
2.6 Sorting....2-12
2.6.1 Other Operations....2-13
2.7 Evaluation of Expressions 2-13
2.8 Solved problems....2-14

Chapter 3 : Query Optimization 3-1 to 3-07

3.1 Query Optimization Overview 3-1
3.1.1 Goals of Query Optimization....3-1
3.1.2 Approaches of Query Optimization 3-2
3.1.3 Query Optimizers 3-2
3.1.4 Distributed Query Optimization 3-2
3.1.5 Working of Optimization....3-3
3.2 Query Tree - Query Evaluation plan 3-3
3.3 System Catalog 3-4
3.4 Translations of SQL Queries into relational algebra 3-4
3.5 Measures of Query Cost - Choice of Evaluation Plans....3-5

Chapter 4 : Heuristics in Optimization 4-1 to 4-06

4.1 Heuristics in Optimization – Statistics of Expression Results 4-1
4.1.1 Notation for Query tree and Query Graph 4-2

4.1.2 Heuristic Optimization of Query Tree 4-2
4.1.3 Heuristic Optimization for Query Tree - Algorithm 4-4
4.2 Sample Design Problems 4-4

Syllabus : Advanced Database Access protocols: Discretionary Access Control Based on Granting and Revoking Privileges; Mandatory Access Control and Role-Based Access Control. Overview of Advanced Database models like Mobile databases, Temporal databases, Spatial databases.

Chapter 5 : Database Access Protocol and Advanced Data Models 5-1 to 5-14

5.1 Database Security 5-1
5.2 Basics of database access control....5-2
5.3 Discretionary Access Control....5-3
5.4 Database Privileges....5-3
5.4.1 Creating a User and Role (User Group)....5-4
5.4.2 Granting Privileges 5-5
5.4.3 Revoking of Privileges 5-6
5.5 Mandatory Access Control....5-6
5.6 Temporal Databases 5-7
5.7 Spatial Databases 5-9
5.8 Mobile Databases....5-11
5.8.1 Mobile Computing Architecture 5-11
5.9 Characteristics of Mobile Environments....5-12
5.10 Data Management Issues....5-13
5.11 Applications....5-14

Syllabus : Introduction : Distributed Data Processing, What is a Distributed Database System? Design Issues . Distributed DBMS Architecture. Distributed Database Design : Top-Down Design Process, Distribution Design Issues, Fragmentation , Allocation . Overview of Query Processing : Query Processing Problem, Objectives of Query Processing, Complexity of Relational Algebra Operations, Characterization of Query Processors, Layers of Query Processing, Query Optimization in Distributed Databases; Overview of Transaction Management in DDB; Overview of Concurrency Control in DDB; Overview of Recovery in DDB

Chapter 6 : Distributed Databases 6-1 to 6-26

6.1 Introduction to Distributed Databases 6-1
6.1.1 Distributed Data Processing: What is Distributed databases?....6-1
6.1.2 Features of Distributed Computing System....6-2
6.1.3 Advantages of Distributed Database System....6-2
6.2 Types of Distributed Databases....6-4
6.2.1 Homogeneous Distributed Database System....6-4
6.2.2 Heterogeneous Distributed Database System 6-4
6.3 Architecture of Distributed Databases....6-5
6.4 Design Issues – Transperency Management....6-8
6.4.1 Distribution Transperency....6-8
6.4.2 Performance Transperency 6-10
6.4.3 DBMS Transperency 6-10
6.5 Distributed Database Design Concepts 6-10
6.5.1 Objectives of Data Distribution....6-10
6.6 Top-Down Distributed Database Design....6-11
6.6.1 Introduction 6-11
6.7 Data Fragmentation / Distributed Database Design....6-12
6.7.1 Introduction 6-12
6.7.2 Fragmentation Schema 6-12
6.7.3 Types of Data Fragmentation 6-12
6.7.3.1 Horizontal Fragmentation 6-12
6.7.3.2 Vertical Fragmentation 6-14
6.7.3.3 Mixed (Hybrid) Fragmentation 6-15
6.8 Data Replication....6-16
6.8.1 Introduction 6-16
6.8.2 Goals....6-16
6.8.3 Types 6-16

6.9 Data Allocation 6-17
6.10 Distributed Databases Query Processing problems ...6-19
6.10.1 Objectives of Distributed Databases Query Processing 6-19
6.10.2 Layers of Distributed Query Processing....6-20
6.11 Distributed Transaction Management 6-21
6.12 Concurrency Control in Distributed Databases 6-21
6.12.1 Overview 6-21
6.12.2 Solutions for Concurrency Problems in Distributed Databases 6-22
6.12.2.1 Maintaining a Distinguished Copy of a Data Item....6-22
6.12.2.2 Voting Method 6-23
6.13 Overview of Recovery in Distributed Databases 6-23
6.13.1 Two Phase Commit Protocol 6-24

Syllabus : The Need for Data Warehousing; Data Warehouse Defined; Benefits of Data Warehousing ; Features of a Data Warehouse; Data Warehouse Architecture; Data Warehouse and Data Marts; Data Warehousing Design Strategies.

Dimensional Model Vs ER Model; The Star Schema; How Does a Query Execute? The Snowflake Schema; Fact Tables and Dimension Tables; Factless Fact Table; Updates To Dimension Tables, Primary Keys, Surrogate Keys & Foreign Keys; Aggregate Tables; Fact Constellation Schema or Families of Star

Need for Online Analytical Processing; OLTP vs OLAP; OLAP Operations in a cube: Roll-up, Drill-down, Slice, Dice, Pivot ; OLAP Models: MOLAP, ROLAP, HOLAP.

Chapter 7 : Data Warehousing, Dimension Modeling and OLAP 7-1 to 7-36

7.1 Need for Data Warehouse 7-1
7.2 Overview of Data Warehouse....7-2
7.2.1 Features of Data warehouse....7-3
7.2.2 Advantages of Data Warehouses 7-4
7.2.3 Disadvantages of Data Warehouses....7-4
7.3 Data Warehouse Components....7-4
7.4 Data Warehouse Architecture....7-8
7.5 Data Warehouse and Data Mart 7-9
7.5.1 Data Warehouse Design Strategy....7-9
7.6 Introduction to Dimensional Modeling 7-10
7.6.1 Features of Good Dimensional Model....7-12
7.7 Dimensional Model Versus ER Model....7-12
7.8 Data Warehouse Modeling Versus Operational Database Modeling....7-13
7.9 Fact Tables and Dimension Tables....7-13
7.10 Multidimensional Schema Types 7-16
7.10.1 Star Schema....7-17
7.10.2 Snowflake Schema....7-18
7.10.3 Fact Constellation Schema / Galaxy Schema / Families of Star 7-20
7.11 Updates in Dimensional Table 7-21
7.12 Keys in the Data Warehouse Schema 7-23
7.13 Need for OLAP System / Introduction 7-24
7.13.1 Operational System (OLTP) vs Information System (OLAP) 7-24
7.13.2 OLAP - Multidimensional Analysis / Hypercube 7-25
7.14 Hypercube and Operations of OLAP....7-27
7.14.1 Rollup vs Drill-Down 7-27
7.14.2 Dice Vs Slice 7-28
7.14.3 Pivot or Rotate Operation 7-29
7.15 OLAP Models 7-32
7.15.1 ROLAP (Relational OLAP)....7-32
7.15.2 MOLAP....7-33
7.15.3 Comparison between ROLAP and MOLAP....7-34
7.15.4 HOLAP....7-35

Syllabus : Challenges in ETL Functions; Data Extraction; Identification of Data Sources; Immediate Data Extraction, Deferred Data Extraction; Data Transformation: Tasks Involved in Data Transformation, Techniques of Data Loading, Loading the Fact Tables and Dimension Tables

Chapter 8 : ETL Process 8-1 to 8-10

8.1 Challenges in ETL Activities 8-1

8.2 Data Extraction.....8-2

8.2.1 Issues in data extraction.....8-3

8.2.2 Method of extraction.....8-3

8.2.2.1 Immediate Data Extraction 8-3

8.2.2.2 Deferred Data Extraction.....8-4

8.3 Data Transformation.....8-5

8.4 Data Loading.....8-7

8.5 Data Quality; Issues in Data Cleansing and Others 8-9

❑❑❑