

CS 2255 DATABASE MANAGEMENT SYSTEMS

OBJECTIVES&DESCRIPTION

OBJECTIVE:

- To acquire the knowledge of DBMS, both in terms of use and implementation/design
- To get experience with SQL
- To catch increased proficiency with the programming language C++
- To gain experience working as part of team
- To get more experience with the analysis and design of (DB) software

DESCRIPTION:

DBMS is a database program. Technically speaking, it is a software system that uses a standard method of cataloging, retrieving, and running queries on data. The DBMS manages incoming data, organizes it, and provides ways for the data to be modified or extracted by users or other programs. Some DBMS examples include MySQL, PostgreSQL, Microsoft Access, SQL Server, FileMaker, Oracle, RDBMS, dBASE, Clipper, and FoxPro. Since there are so many database management systems available, it is important for there to be a way for them to communicate with each other. For this reason, most database software comes with an Open Database Connectivity (ODBC) driver that allows the database to integrate with other databases. For example, common SQL statements such as SELECT and INSERT are translated from a program's proprietary syntax into a syntax other databases can understand.

A collection of programs that enables you to store, modify, and extract information from a database. There are many different types of DBMSs, ranging from small systems that run on personal computers to huge systems that run on mainframes. Computerized library systems, automated teller machines, flight reservation systems and computerized parts inventory systems are examples of database applications.

UNIT I INTRODUCTION**9**

Purpose of Database System -- Views of data – Data Models – Database Languages — Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases

UNIT II RELATIONAL MODEL**9**

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals - Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases

UNIT III DATABASE DESIGN**9**

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

UNIT IV TRANSACTIONS**9**

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery – Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency.

UNIT V IMPLEMENTATION TECHNIQUES**9**

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Catalog Information for Cost Estimation – Selection Operation – Sorting – Join Operation – Database Tuning.

TOTAL : 45 PERIODS**TEXT BOOKS:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006 (Unit I and Unit-V) .
2. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.(Unit II, III and IV)

REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition , Pearson / Addison wesley, 2007.
2. Raghu Ramakrishnan, “ Database Management Systems”, Third Edition, McGraw Hill, 2003.
3. S.K.Singh, “Database Systems Concepts, Design and Applications”, First Edition, Pearson Education, 2006.

MICRO LESSON PLAN

| HOURS | TOPICS | TEXT BOOK |
|---------------------------------|---|-----------|
| UNIT I INTRODUCTION | | |
| 1 | Purpose of Database System (AV class) | T1 |
| 2 | Views of data | T1 |
| 3 | Data Models (AV class) | T1 |
| 4 | Database Languages | T1 |
| 5 | Database System Architecture | T1 |
| 6 | Database users and Administrator | T1 |
| 7 | Entity– Relationship model (AV class) | T1 |
| 8 | E-R Diagrams | T1 |
| 9 | Introduction to relational databases | T1 |
| UNIT II RELATIONAL MODEL | | |
| 10 | The relational Model | T1 |
| 11 | The catalog- Types(AV class) | T1 |
| 12 | Keys - Relational Algebra | T1 |
| 13 | Domain Relational Calculus – Tuple Relational Calculus | T1 |
| 14 | Fundamental operations – Additional Operations | T1 |
| 15 | SQL fundamentals - Integrity – Triggers | T1 |
| 16 | Security – Advanced SQL features | T1 |
| 17 | Embedded SQL– Dynamic SQL- Missing Information | T1 |
| 18 | Views – Introduction to Distributed Databases and Client/Server Databases | T1 |
| UNIT III DATABASE DESIGN | | |
| 19 | Functional Dependencies | T1 |
| 20 | Non-loss Decomposition | T1 |
| 21 | Functional Dependencies | T1 |
| 22,23 | First, Second, Third Normal Forms | T1 |
| 24 | Dependency Preservation | T1 |

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| 25 | Boyce/Codd Normal Form | T1 |
| 26 | Multi-valued Dependencies and Fourth Normal Form | T1 |
| 27 | Join Dependencies and Fifth Normal Form (AV class) | T1 |
| UNIT IV TRANSACTIONS | | |
| 28 | Transaction Concepts - Transaction Recovery | T1 |
| 29 | ACID Properties – System Recovery | T1 |
| 30 | Media Recovery – Two Phase Commit | T1 |
| 31 | Save Points – SQL Facilities for recovery | T1 |
| 32 | Concurrency – Need for Concurrency(AV class) | T1 |
| 33 | Locking Protocols – Two Phase Locking | T1 |
| 34 | Intent Locking – Deadlock | T1 |
| 35 | Serializability – Recovery Isolation Levels | T1 |
| 36 | SQL Facilities for Concurrency. | T1 |
| UNIT V IMPLEMENTATION TECHNIQUES | | |
| 37 | Overview of Physical Storage Media – Magnetic Disks (AV class) | T1 |
| 38 | RAID – Tertiary storage | T1 |
| 39 | File Organization – Organization of Records in Files | T1 |
| 40 | Indexing and Hashing –Ordered Indices | T1 |
| 41 | B+ tree Index Files – B tree Index Files | T1 |
| 42 | Static Hashing – Dynamic Hashing – Query Processing | T1 |
| 43 | Overview – Catalog Information for Cost Estimation | T1 |
| 44 | Selection Operation -Sorting | T1 |
| 45 | Join Operation – Database Tuning | T1 |

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