III Semester, DSC 1C
Database Management System

Unit 1

Introduction to Databases: Databases and Database Users, Introduction, Example, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach, History of Database Applications, When Not to Use a DBMS.

Database System Concepts and Architecture: Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, the Database System Environment, Centralized and Client/Server Architectures for DBMSs, Classification of Database Management Systems.

Data Models: Data Modelling and Data Models, the Importance of Data Models, Data Model Basic Building Blocks, Business Rules, the Evolution of Data Models, Degrees of Data Abstraction

Unit II

The Relational Database Model: Logical View of Data, Keys, Integrity Rules, Relational Set Operators, The Data Dictionary and the System Catalog, Relationships within the Relational Database, Data Redundancy Revisited, Indexes.

Entity Relationship (ER) Modelling: The Entity Relationship Model (ERM)- Entities , Attributes , Relationships , Connectivity and Cardinality , Existence Dependence , Relationship Strength , ,Weak Entities , Relationship Participation , Relationship Degree, Recursive Relationships, Associative (Composite) Entities; Developing an ER Diagram, Database Design Challenges: Conflicting Goals.

Unit III

ADVANCED DATA MODELING: The Extended Entity Relationship Model, Entity Clustering, Entity Integrity: Selecting Primary Keys.

Normalization of Database Tables: Database Tables and Normalization, The Need for Normalization, The Normalization Process, Improving the Design, Surrogate Key Considerations, Higher-Level Normal Forms, Normalization and Database Design, Denormalization.

Unit IV

Introduction to Structured Query Language (SQL): Introduction to SQL, Data Definition Commands, Data Manipulation Commands, SELECT Queries, Advanced Data Definition Commands, Advanced SELECT Queries, Virtual Tables: Creating a View, Joining Database Tables.

Advanced SQL: Relational Set Operators, SQL Join Operators, Subqueries and Correlated Queries, SQL Functions, Oracle Sequences, Updatable Views, Procedural SQL, Embedded SQL.

Text Books:

1. Peter Rob and Carlos Coronel, Database Systems: Design, Implementation, and Management, Thomson, Eighth Edition, 2009

2. R. Elmsasri,S. Navathe, Fundamentals of Database Systems, Pearson Education, sixth Edition, 2011

Book references:

1. MySQL : Reference Manual

2. Spoken Tutorial on "MySQL", as E-resource for Learning, http://spoken-tutorial.org

Practical: Database Management System

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.

- Faculty must take care about UG standard programs it should be minimum 25 – 30.

- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.

- External Viva-voce is compulsory.

Example programs:

1. Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College.

   LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price)

   IssuedBooks (Accession number, Borrower)

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

   b) Delete the record of book titled "Database System Concepts".

   c) Change the Department of the book titled "Discrete Maths" to "CS".

   d) List all books that belong to "CS" department.

   e) List all books that belong to "CS" department and are written by author "Navathe".

   f) List all computer (Department="CS") that have been issued.

   g) List all books which have a price less than 500 or purchased between "01/01/1999" and "01/01/2004".

2. Create a database having three tables to store the details of students of Computer Department in your college.

   Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)

   Paper Details (Paper code, Name of the Paper)

   Student's Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

   b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.

c) List all students who live in "Delhi" and have marks greater than 60 in paper 1.

d) Find the total attendance and total marks obtained by each student.

e) List the name of student who has got the highest marks in paper 2.

3. Create the following tables and answer the queries given below:

Customer (CustID, email, Name, Phone, ReferrerID)

Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)

BicycleModel (ModelNo, Manufacturer, Style)

Service (StartDate, BicycleID, EndDate)

a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

b) List all the customers who have the bicycles manufactured by manufacturer "Honda".

c) List the bicycles purchased by the customers who have been referred by customer "C1".

d) List the manufacturer of red colored bicycles.

e) List the models of the bicycles given for service.

4. Create the following tables, enter at least 5 records in each table and answer the queries given below.

EMPLOYEE (Person_Name, Street, City)

WORKS (Person_Name, Company_Name, Salary)

COMPANY (Company_Name, City)

MANAGES (Person_Name, Manager_Name)

1. Identify primary and foreign keys.

2. Alter table employee, add a column "email" of type varchar(20).

3. Find the name of all managers who work for both Samba Bank and NCB Bank.

4. Find the names, street address and cities of residence and salary of all employees who work for "Samba Bank" and earn more than $10,000.

5. Find the names of all employees who live in the same city as the company for which they work.

6. Find the highest salary, lowest salary and average salary paid by each company.

7. Find the sum of salary and number of employees in each company.

8. Find the name of the company that pays highest salary.

5. Create the following tables, enter at least 5 records in each table and answer the queries given below.

Suppliers (SNo, Sname, Status, SCity)

Parts (PNo, Pname, Colour, Weight, City)

Project (JNo, Jname, Jcity)

Shipment (Sno, Pno, Jno, Qunatity)

a) Identify primary and foreign keys.

b) Get supplier numbers for suppliers in Paris with status>20.

c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.

d) Get suppliers names for suppliers who do not supply part P2.

e) For each shipment get full shipment details, including total shipment weights.

f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.

g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.

h) Get the names of cities that store more than five red parts.

i) Get full details of parts supplied by a supplier in Delhi.

j) Get part numbers for part supplied by a supplier in Allahabad to a project in Chennai.

k) Get the total number of project supplied by a supplier (say, S1).

l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).