Create and Manage Databases

Session 1: Explain RDBMS

Database Management Systems (DBMS)

A database management system is a software designed to store, retrieve, define and manage large sets of inter-related data. Database Management Systems (DBMS) is also widely used software.

Examples:

Universities

The student enrollments, curriculum, grade management, class schedules, faculty profiles and registers are all under the control of DBMS.

Banks

All records related to customers like their accounts, deposits and withdrawal transactions are under the control of DBMS.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Database Models

Hierarchical Model:

The hierarchical model organises data into a tree-like structure, with a single root, to which all the other data is linked. The hierarchy starts from the Root data. It then expands like a tree, adding child nodes to the parent nodes.

Relations Model:

In the relational model, data is stored in the form of tables.

Network Model:

The network model allows many-to-many relationships between linked records, implying multiple parent records.

Object-oriented Model:

In the object-oriented model, the database is defined as a collection of objects.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

RDBMS Vs. OODBMS

Relational DBMS (RDBMS)
- Table-oriented
- Handles comparatively simple data
- Data is stored in tables
- Applies normalisation to eliminate data redundancy

Example
- MS Access
- MSSQL
- MySQL
- Oracle

Object-oriented DBMS (OODBMS)
- Object-oriented
- Handles larger and complex data
- Structure of data is complex due to the involvement of different data types
- Uses inheritance and encapsulation to reduce data redundancy

Example
- Versant Object Database
- Object Store
- Cache
- ZODB

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

SQL Vs. NOSQL

SQL

1. SQL is a structured query language used for storing and managing data in RDBMS.
2. Allows users to query the database using an English-like statement.

NOSQL

1. NoSQL stands for "Not Only SQL" or "Not SQL".
2. NoSQL is used for distributed data stores with massive data storage such as Twitter, Facebook and Google.

SQL Vs. NoSQL

- Relational
- Is a structured query language having predefined schema
- Is better for multi-row transactions

- Non-relational
- Has a dynamic schema for unstructured data
- Is better for unstructured data like

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Session 2: Create and Modify Database Structure

Steps To Create a Blank Database

The steps to create a blank database are as follows:

1. Click blank database from the 'Access Welcome' screen.
2. If the Access database is already open:
3. Go to the 'File' menu at the top-left corner.
4. Click the 'New' option.
5. Click the blank desktop database to create a new database.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Basic Elements of MS Access

Elements of MS Access

1. **Tables:** A table is a collection of related data held in a table format within a database. It consists of columns and rows.

2. **Forms:** Forms are used to enter, edit or display data from a table.

3. **Reports:** Reports are the formatted result of database queries that contain useful data for decision-making and analysis.

4. **Queries:** A query is a way of requesting information from a database. It is either a 'select' query or an 'action' query. A select query is used for retrieving data, while an action query is used for data insertion, deletion or updation.

5. **Macros:** Macros are tools used for automating tasks and to add functionality to forms, reports and controls.

6. **Modules:** Module is a collection of user-defined functions, subroutines, and global variables that can be used from anywhere in your Access database.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Hide Database Objects

The steps to **Hide Database Objects**

1. Right-click on the table.
2. Select 'Table Properties' from the drop-down list.
3. Next to attributes, click on 'Hidden' (enable the hidden option).
4. Click on 'Apply'. This will hide the table.
5. Close the window. The table will be gone

Display Database Objects

The steps **to Display Database Objects**

6. Right-click on the 'Navigation' pane and then select 'Navigation Options'.

7. A dialog box will be opened where the user selects the categories.

8. Click on 'Show Hidden Objects'.

9. Click on the 'OK' button.

10. The table will be displayed on the 'Navigation' pane in a dull mode.

11. Right-click on the table which is in dull font and go to the 'Table' properties.

12. A dialog box will be opened, where you can see next to attributes, deselect on hidden or disable the hidden option and click on 'Apply'. This will unhide your table.

13. Close the dialog box window. The table will be displayed in full-font mode.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Delete Database Objects

The steps to **Delete Database Objects**

1. Right-click the 'Table' pane.
2. Select the table you want to delete.
3. Right-click on it and select the 'Delete' option.

Import Data or Objects from Other Sources

The steps to **Import Data or Objects from Other Sources**

1. Go to the 'External Data' tab in the ribbon.
2. Look for the 'New Data Source' option which contains sub-options like

    - From file
    - From database
    - From online services
    - From other sources

3. Click on the 'From File' option which shows options such as:

    - Import from excel
    - Import from html
    - Import from xml file
    - Import from a text file and so on

4. Select an option, for example, let us import the data from 'artists.csv'.
5. Use the 'Browse' button to navigate to and select the import file.
6. Select 'Append' a copy of the records to the table and then select the 'Artists' table from the drop-down list.
7. Click 'OK' to continue.
8. 'Import Wizard' will ask to confirm the file's format. In our case, 'Access' has (correctly) detected that our file is in a delimited format.
9. Click 'Next'.
10. Click 'Finish' to run the import.
11. Once the import operation has completed, Access will ask you if you want to save the import steps for another time.
12. Check the box or leave it unchecked and click 'Close'.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Session 3: Manage Table Relationships and Keys

RDBMS in MS Access

1. Database in MS Access is a collection of relations that are nothing but tables of values.

2. Every row in a table represents a collection of related data values. Every column represents a set of values for a specific attribute.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Primary Key, Foreign Key

The primary key should satisfy some rules such as:

1. No two rows can have the same primary key value.
2. Every row should have a primary key value, that is, the primary key value should not be NULL.
3. The primary key value can never be updated or modified.

Set **Primary Key**

- The column 'Student ID' is chosen as a primary key for this table. It has no NULL values. All row values are unique.

Set **Foreign Key**

- The column 'Student ID' is chosen as a primary key for this table. It has no NULL values. All row values are unique.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Database Relationships

One-to-one Relationship

1. One-to-one relationship means each record or row in Table 1 relates to one and only one record in Table 2.

2. In other words, each primary key value relates to none or only one record in the related table.

One-to-many Relationship

1. One-to-many relationship means a record in Table 1 can relate to none, one or many records in Table 2.

Many-to-many Relationship

1. In many-to-many relationships, each record in both tables can relate to none or any number of records in the other table.

2. These relationships require a third table called an associate or linking table. It is because relational systems cannot directly accommodate this type of relationship

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Manage Table Relationships and Keys

Display Relationships:

1. In relationships, data is linked between two or more tables using a foreign key.

Referential Integrity:

1. Referential integrity is the accuracy and consistency of data within a relationship.
2. It requires that, whenever a foreign key value is used, it must refer to a valid, existing primary key in the parent table.

Enforce Referential Integrity:

1. Referential Integrity can be set between two tables in Microsoft Access:
2. If both the tables are in the same database,
3. If the matching field is a primary key in one table or has a unique index,
4. If the related fields have the same data type.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Session 3: Print and Export Data

Print and Export Data

The steps to **Configure Print option** are:

1. Go to the 'Print Preview' tab.

2. Select your print options and then click 'OK'.

The steps to **Print data** are:

To print data in MS Access:

1. Look for the 'Print' option on the left pane of the window.

2. Click on the 'Print' button to print.

To print data in Navigation Pane:

1. Right-click the report that you want to print.

2. Select your print options and then click 'OK' to print your report.

The steps to **Export data** are:

1. Open the external data tab in the ribbon.

2. Click on the 'PDF or XPS' option.

3. A dialog box will be opened and saying that "Artists.pdf" was created successfully in the 'F' drive.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Recap:

- A database is an organised collection of related information

- A database management system is a software designed to store and manage large sets of inter-related data

- DBMS is based on four models:

  • Hierarchical model

  • Network model

  • Relational (RDBMS) model

  • Object-oriented model

- In RDBMS, data is stored in the form of tables

- SQL is a structured query language used for storing and managing data in RDBMS

- The six objects used in MS Access are:

  • Tables

  • Queries

  • Forms

  • Reports

  • Macros

  • Modules

- Some common data types available in MS Access are:

  • Short text

  • Long text

  • Numbers

  • Date and time

  • Currency

  • AutoNumber

- Database in MS Access is a collection of relations in the form of tables

- Row represents a collection of related data values

- Column represents a set of values for a specific attribute

- Primary key is a column or a set of columns in a table that uniquely identifies rows in that table

- Foreign key is a column or columns of a table that refers to the primary key of another table

- There are two ways to view data outside the system

  • By print

  • By export

- When exporting, use the external data tab and choose PDF or XPS format to convert and export the data

_____

_____

_____