Data Base Management System

**Submitted To:**  Miss.Komal Intizar

**Submitted By:** Syyeda Hajra (11011510-027)

Samra Rafaqat (11011510-024)

Qurat-ul-ain Hanif (11011510-023)

Muhammad Adnan (11011510-081)

Muhammad Rizwan Hafeez (11011510-041)

Section-I

BS 2nd

**Department Of Physics**

**University Of Gujrat**



Data Base Management System

# **INTRODUCTION:**

**What is database management system?**

A database management system (DBMS) is a software package with computer programs that control the creation, maintenance, and use of a database. It allows organizations to conveniently develop databases for various applications by database administrators (DBAs) and other specialists. A database is an integrated collection of data records, files, and other objects. A DBMS allows different user application programs to concurrently access the same database. DBMSs may use a variety of database models, such as the relational model or object model, to conveniently describe and support applications. It typically supports query languages which are in fact high-level programming languages, dedicated database languages that considerably simplify writing database Application programs. A DBMS provides facilities for controlling data access, enforcing data integrity, managing concurrency control, and recovering the database after failures and restoring it from backup files, as well as maintaining database security.

**Definition:**

A database management system (DBMS) is the software that allows a computer to perform database functions of storing, retrieving, adding, deleting, and modifying data. Relational database management system (RDBMS) implements the relational model of tables and relationships.

**Examples:**

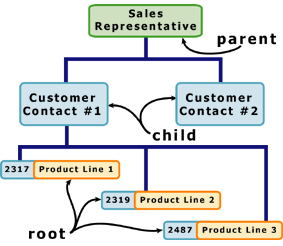
Microsoft access, MySQL, Microsoft SQL server, oracle and File maker pro are all examples of database management systems.

Types of database management system

Different types of DBMS are as follow:

* Hierarchical DBMS
* Network DBMS
* Relational DBMS
* Flat file DBMS
* Object Oriented DBMS

**1. Hierarchical DBMS:**



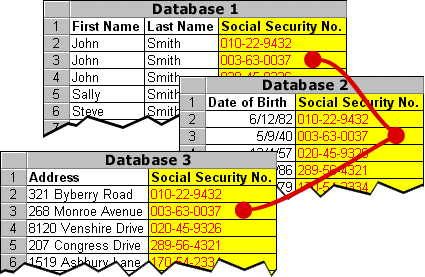
One of the earliest database management [systems](http://sqlserver-guide.blogspot.com/2009/05/data-base-system-models-or-types-of.html) was based on the Hierarchical model. Here data can be organized in the form of free structure or level-by-level manner with one limitation that is "**every sub node or child node should have only one parent node**".

**2. Network DBMS:**

**Network databases** are similar to hierarchical databases by also having a hierarchical structure. There are a few key differences, however. Instead of looking like an upside-down tree, a network database looks more like a cobweb or interconnected network of records. In network databases, children are called **members** and parents are called **owners**. The most important difference is that each child or member can have more than one parent (or owner).

Like hierarchical databases, network databases are principally used on mainframe computers. Since more connections can be made between different types of data, network databases are considered more flexible. However, two limitations must be considered when using this kind of database.

**3.** **Relational DBMS:**



**RDBMS** are most important database system used in the software industry today. It was exclusively used to establish the relation the relationship between two-database objects. One of the database objects is one table.  
The Relationship may be

One - One   
One - Many  
Many - One  
Many – Many

**4. Flat files DBMS:**

In flat file database management system the user specifies the data attributes for one table at a time, storing data independently from application.

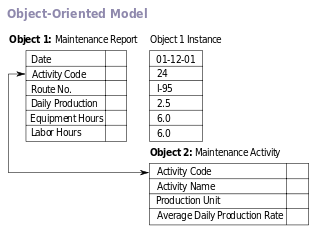
**5. Object Oriented DBMS:**

Object Oriented DBMS Database that stores data elements as objects. Uses of object-oriented concepts. The term object oriented is abbreviated by OO or O-O

An **object database** (also **object-oriented database management system**) is a [database management system](http://en.wikipedia.org/wiki/Database_management_system)

In which information is represented in the form of [objects](http://en.wikipedia.org/wiki/Object_(computer_science)) as used in [object-oriented programming](http://en.wikipedia.org/wiki/Object-oriented_programming). Object databases are different from [relational databases](http://en.wikipedia.org/wiki/Relational_database) and belongs together to the broader [database management system](http://en.wikipedia.org/wiki/Database_management_system).

Object databases have been considered since the early 1980s and 1990s; they may be slower in simple mass commercial data transaction. Object databases main usage is in object oriented areas.

[](http://en.wikipedia.org/wiki/File:Object-Oriented_Model.svg)

**Advantages of Database Management System:**

There are many advantage of database management system; some of them are as follows.

**Warehouse of Information:**

The database management systems are warehouses of information, where large amount of data can be stored. The common examples in commercial applications are inventory data, personnel data . The best examples for the same would be the address book of a Cell phone, digital diaries, etc.

**Defining Attributes:**

The unique data field in a table is assigned a primary key. The primary key helps in the identification of data. It also checks for duplicates within the same table, thereby reducing data redundancy. There are tables, which have a secondary key in addition to the primary key. The secondary key refers to the primary key of another table, thus establishing a relationship between the two tables.

**Systematic Storage:**

The data is stored in the form of tables. The tables consist of rows and columns.

**Changes to Schema:**

The table schema can be changed and it is not platform dependent. Therefore, the tables in the system can be edited to add new columns and rows without hampering the applications that depend on that particular database.

**No Language Dependence:**

The database management systems are not language dependent. Therefore, they can be used with various languages and on various platforms.

**Table joins:**

The data in two or more tables can be integrated into a single table. This enables to reduce the size of the database and helps in easy retrieval of data.

**Multiple Simultaneous Usages:**   
 The database can be used simultaneously by a number of users.

**Data Security:**

Database management systems help to keep the data secured.

**Data Consistency:**   
 Data consistency ensures a consistent view of data to every user. It includes the accuracy, validity and integrity of related data.

**Disadvantages of DBMS:**

**Some disadvantages of DBMS are as follow:**

* A complex conceptual design process;
* The need to hire database-related employees;
* High DBMS acquisition costs;
* A more complex programmer environment;
* Potentially catastrophic program failures;
* A longer running time for individual applications;
* Database systems are complex, difficult, and time-consuming to design
* Substantial hardware and software start-up costs
* Damage to database affects virtually all applications programs
* Initial training required for all programmers and users**.**

**Example of database management system**

1. SQL
2. ORACLE
3. FOXPRO
4. MS ACCESS
5. MY SQL

**1.SQL:**

**Definition :**

Structured query language (SQL) makes it possible to obtain information fast from millions of records stored database though query commands.. SQL software is extensively used in business, industry and government for designing custom databases that can be queried for hidden information.

**History and Components:**

Developed in the 1970s by IBM, SQL was standardized by ANSI, American National Standards Institute. SQL has two main components, namely data definition language (DDL) and data manipulation language (DML). A sub-component of DDL called data control language (DCL) controls what actions a user is allowed to perform. Nowadays the standard is subject to continuous improvement by the Joint Technical Committee ISO/IEC JTC 1

**FEATURE:**

* Add/Edit/Delete databases ,table ,view, roles ,rules ,defaults ,function
* Register multiple servers and manage them all from one application
* Set primary keys, trigger ,indexes ,constraints.
* Change column properties
* View/Edit/Export data in the data management section
* Backup & Restore Databases
* Attach, Detach and Shrink databases
* Relationships management screen for foreign keys etc.
* Transfer database wizard to transfer databases from server to server

**2.ORACLE:**

Databasecommonly referred to as *Oracle*  is an produced and marketed by Oracle Corporation.

**“Larry Ellison”** and his friends, former co-workers “**Bob Miner”** an “**Ed Oates”** started the consultancy Software Development Laboratories (SDL) in 1977. SDL developed the original version of the Oracle software. The name *Oracle* comes from the code-name of a **CIA**-funded project Ellison had worked on while previously employed by Ampex.

**Features:**

* Concurrency
* Read Consistency
* Self managing database
* Backup and Recovery
* High availability
* Business Intelligence
* Table compression
* Parallel Execution
* Data mining
* Content Management
* Security
* Improved query performance and scalability

**3. FoxPro:**

This is a text-based [procedurally-oriented](http://en.wikipedia.org/wiki/Procedural_programming) [programming language](http://en.wikipedia.org/wiki/Programming_language) and [DBMS](http://en.wikipedia.org/wiki/DBMS), originally published by **“**[Fox Software](http://en.wikipedia.org/wiki/Fox_Software)**”** and later by [Microsoft](http://en.wikipedia.org/wiki/Microsoft), for [MS-DOS](http://en.wikipedia.org/wiki/MS-DOS), [MS Windows](http://en.wikipedia.org/wiki/MS_Windows), [Apple Macintosh](http://en.wikipedia.org/wiki/Apple_Macintosh), and [UNIX](http://en.wikipedia.org/wiki/UNIX). **Visual FoxPro** is a [data-centric](http://en.wikipedia.org/wiki/Database-centric_architecture) [object-oriented](http://en.wikipedia.org/wiki/Object-oriented) and [procedural](http://en.wikipedia.org/wiki/Procedural_programming) [programming language](http://en.wikipedia.org/wiki/Programming_language) produced by [Microsoft](http://en.wikipedia.org/wiki/Microsoft). It is derived from [FoxPro](http://en.wikipedia.org/wiki/FoxPro_2) which was developed by Fox Software beginning in 1984. Fox Technologies merged with Microsoft in 1992, after which the software acquired further features and the prefix "Visual". The last version of [FoxPro (2.6)](http://en.wikipedia.org/wiki/FoxPro_2) worked under [Mac OS](http://en.wikipedia.org/wiki/Mac_OS), [DOS](http://en.wikipedia.org/wiki/DOS), [Windows](http://en.wikipedia.org/wiki/Microsoft_Windows), and [Unix](http://en.wikipedia.org/wiki/Unix): Visual FoxPro 3.0, the first "Visual" version, reduced platform support to only Mac and Windows, and later versions were Windows-only. The current version of FoxPro is [COM](http://en.wikipedia.org/wiki/Component_Object_Model)-based and Microsoft has stated that they do not intend to create a [Microsoft .NET](http://en.wikipedia.org/wiki/Microsoft_.NET) version.

**FEATURE:**

* Create a database or format structure to store data
* Add records in database
* Modify records, Edit records.
* Search particular records.
* Arrange records in particular order (ascending or descending order).
* Delete records
* Delete Database or modify structure.
* Prepare Reports and Labels.

**4.Microsoft Access:**

**Microsoft Access**, is a [database management system](http://en.wikipedia.org/wiki/Database_management_system). It is a member of the [Microsoft Office](http://en.wikipedia.org/wiki/Microsoft_Office) suite of applications, included in the Professional and higher editions or sold separately. On May 12 2010, the current version of Microsoft Access 2010 was released by Microsoft in Office 2010; Microsoft Office Access 2007 was the prior version.MS Access stores data in its own format based on the Access Jet Database Engine. It can also import or link directly to [data](http://en.wikipedia.org/wiki/Data) stored in other applications and databases. [Software developers](http://en.wikipedia.org/wiki/Software_developer) and [data architects](http://en.wikipedia.org/wiki/Data_architect) can use Microsoft Access to develop [application software](http://en.wikipedia.org/wiki/Application_software), and "[power users](http://en.wikipedia.org/wiki/Power_users)" can use it to build software applications. Like other [Office applications](http://en.wikipedia.org/wiki/Microsoft_Office), Access is supported by [Visual Basic for Applications](http://en.wikipedia.org/wiki/Visual_Basic_for_Applications), an [object-oriented](http://en.wikipedia.org/wiki/Object-oriented) programming language that can reference a variety of objects including DAO (Data Access Objects), [ActiveX](http://en.wikipedia.org/wiki/ActiveX) Data Objects, and many other ActiveX components**.**

## Features:

* Users can create tables, queries, forms and reports, and connect them together with the help of this.
* Access also has report creation features that can work with any data source that Access can "access".
* The original concept of Access was for end users to be able to "access" data from any source.
* Other features include: the import and export of data to many formats including [Excel](http://en.wikipedia.org/wiki/Microsoft_Excel), [Outlook](http://en.wikipedia.org/wiki/Microsoft_Outlook), [ASCII](http://en.wikipedia.org/wiki/ASCII), [dBase](http://en.wikipedia.org/wiki/DBase), [Paradox](http://en.wikipedia.org/wiki/Paradox_(database)), [FoxPro](http://en.wikipedia.org/wiki/FoxPro_2), [SQL Server](http://en.wikipedia.org/wiki/Microsoft_SQL_Server), [Oracle](http://en.wikipedia.org/wiki/Oracle_Database), [ODBC](http://en.wikipedia.org/wiki/Open_Database_Connectivity), etc.
* It also has the ability to link to data in its existing location and use it for viewing, querying, editing, and reporting. This allows the existing data to change while ensuring that Access uses the latest data.
* Access is often used by people downloading data from [enterprise level databases](http://en.wikipedia.org/wiki/Enterprise_software) for manipulation, analysis, and reporting locally.
* One of the benefits of Access from a programmer's perspective is its relative compatibility with [SQL](http://en.wikipedia.org/wiki/SQL) (structured [query language](http://en.wikipedia.org/wiki/Query_language)) — queries can be viewed [graphically](http://en.wikipedia.org/wiki/Graphical_user_interface) or edited as SQL statements, and SQL statements can be used directly in Macros and VBA [Modules](http://en.wikipedia.org/wiki/Modular_programming) to manipulate Access tables.
* Microsoft Access is designed to [scale](http://en.wiktionary.org/wiki/scale) to support more data and users by linking to multiple Access databases or using a [back-end](http://en.wikipedia.org/wiki/Back-end) database like [Microsoft SQL Server](http://en.wikipedia.org/wiki/Microsoft_SQL_Server)

**5. My SQL:**

It is named after developer [Michael Widenius](http://en.wikipedia.org/wiki/Michael_Widenius)' daughter, My. The [SQL](http://en.wikipedia.org/wiki/SQL) phrase stands for Structured Query Language.

The MySQL development project has made its [source code](http://en.wikipedia.org/wiki/Source_code) available under the terms of the [GNU General Public License](http://en.wikipedia.org/wiki/GNU_General_Public_License), as well as under a variety of [proprietary](http://en.wikipedia.org/wiki/Proprietary_software) agreements. MySQL was owned and sponsored by a single [for-profit](http://en.wikipedia.org/wiki/Business) firm, the [Swedish](http://en.wikipedia.org/wiki/Sweden) company [MySQL AB](http://en.wikipedia.org/wiki/MySQL_AB), now owned by [Oracle Corporation](http://en.wikipedia.org/wiki/Oracle_Corporation). MySQL is an open source database management system and is used in some of the most frequently visited websites on the Internet, including [Flickr](http://en.wikipedia.org/wiki/Flickr), [Nokia.com](http://en.wikipedia.org/wiki/Nokia), [YouTube](http://en.wikipedia.org/wiki/YouTube) and as previously mentioned, [Wikipedia](http://en.wikipedia.org/wiki/Wikipedia), [Google](http://en.wikipedia.org/wiki/Google), [Facebook](http://en.wikipedia.org/wiki/Facebook) and [Twitter](http://en.wikipedia.org/wiki/Twitter).

**Features:**

They have a common code base and include the following features:

* Cross-platform support
* [Stored procedures](http://en.wikipedia.org/wiki/Stored_procedure)
* [Triggers](http://en.wikipedia.org/wiki/Database_trigger)
* [Cursors](http://en.wikipedia.org/wiki/Cursor_(databases))
* Updatable [Views](http://en.wikipedia.org/wiki/View_(database))
* Replication support (i.e. Master-Master Replication & Master-Slave Replication) with one master per slave, many slaves per master, no automatic support for multiple masters per slave.
* Embedded database library