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Benha University

Research Article / Research Project / Literature Review

in fulfillment of the requirements of

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Division	----------
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Title: -

Database Systems

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Project link : https://github.com/rwanahmed/html_project

Website link : https://rwanahmed.github.io/html_project/

Abstract

A database is an organized collection of structured information, or data, typically stored electronically in a computer system. A database is usually controlled by a database management system (DBMS). Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system, often shortened to just database. Data within the most common types of databases in operation today is typically modeled in rows and columns in a series of tables to make processing and data querying efficient.

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Introduction

Database is a systematic collection of data. Databases support storage and manipulation of data. Databases make data management easy. Let us discuss few examples. An online telephone directory would definitely use database to store data pertaining to people, phone numbers, other contact details, etc. Your electricity service provider is obviously using a database to manage billing, client related issues, to handle fault data, etc. Let's also consider the facebook. It needs to store, manipulate and present data related to members, their friends, member activities, messages, advertisements and lot more. We can provide countless number of examples for usage of databases.

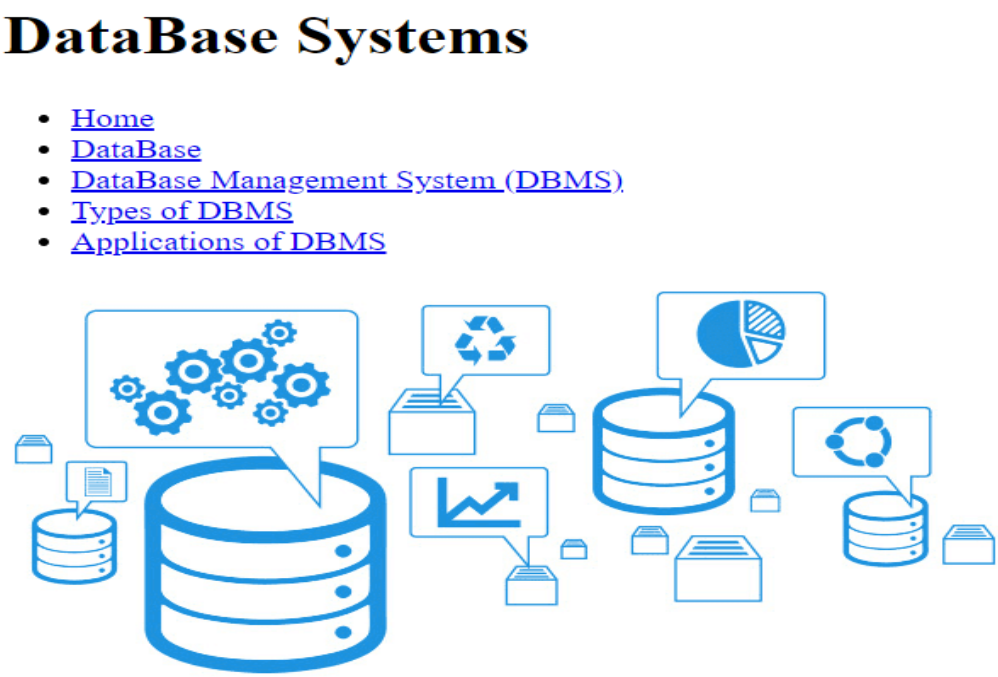
Database Management System (DBMS) is a collection of programs which enables its users to access database, manipulate data, reporting / representation of data . It also helps to control access to the database. Database Management Systems are not a new concept and as such had been first implemented in 1960s. Charles Bachmen's Integrated Data Store (IDS) is said to be the first DBMS in history. With time database technologies evolved a lot while usage and expected functionalities of databases have been increased immensely.

Literature Review

I have been searching about database and to review the search results I have created this website using HTML tp preview all these search results.

The website contains some pages will be shown with their source code here :

1- Home page:



Source code :

```
<html>
<head><h1>DataBase Systems</h1></head>
<body style="font-size:20px;">
<ul>
<li><a href="index.html">Home</a></li>
<li><a href="db.html" target="iframe">DataBase</a></li>
<li><a href="dbms.html" target="iframe">DataBase Management System (DBMS)</a></li>
<li><a href="types.html" target="iframe">Types of DBMS</a></li>
<li><a href="applications.html" target="iframe">Applications of DBMS</a></li>
</ul>
<iframe src="home.png" name="iframe"style="border-style: none;width: 100%; height:200%;"></iframe>
</body>
</html>

```

2- Applications page:

DataBase Systems

- Home
- DataBase
- DataBase Management System (DBMS)
- Types of DBMS
- Applications of DBMS

Applications of Database Management Systems

Sector	Use of DBMS
Banking	For customer information, account activities, payments, deposits, loans, etc.
Airlines	For reservations and schedule information.
Universities	For student information, course registrations, colleges and grades.
Telecommunication	It helps to keep call records, monthly bills, maintaining balances, etc.
Sales	Use for storing customer, product & sales information.
Manufacturing	It is used for the management of supply chain and for tracking production of items. Inventories status in warehouses.
HR Management	For information about employees, salaries, payroll, deduction, generation of paychecks, etc.

Source code :

```
<html>
<style>
table, th, td {
  border: 1px solid black;
  border-collapse: collapse;
  padding:10px;
}
</style>
<body style="font-size:20px;">
        <h2>Applications of Database Management Systems</h2>

        <table style="width:80%; border: 1px solid black;font-size:25px;text-align:left;">
                <th>Sector </th><th>Use of DBMS</th>
                <tr><td>Banking </td><td>For customer information, account activities, payments, deposits, loans, etc.</td></tr>
                <tr><td>Airlines</td><td>For reservations and schedule information.</td></tr>
                <tr><td>Universities</td><td>For student information, course registrations, colleges and grades.</td></tr>
                <tr><td>Telecommunication</td><td>It helps to keep call records, monthly bills, maintaining balances, etc.</td></tr>
                <tr><td>Sales</td><td>Use for storing customer, product & sales information.</td></tr>
                <tr><td>Manufacturing</td><td>It is used for the management of supply chain and for tracking production of items. Inventori
                <tr><td>HR Management</td><td>For information about employees, salaries, payroll, deduction, generation of paychecks, etc.<
        </table>
</body>
</html>
```

3- Types of database

DataBase Systems

- Home
- DataBase
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- Types of DBMS
- Applications of DBMS

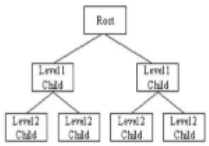
Types of Database Management Systems

There are several types of database management systems such as:

1. Hierarchical databases
2. Network databases
3. Relational databases

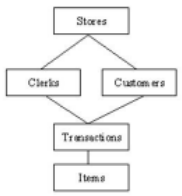
Hierarchical Databases

In a hierarchical database management system (hierarchical DBMSs) model, data is stored in a parent-children relationship node. In a hierarchical database, besides actual data, records also contain information about their groups of parent/child relationships.



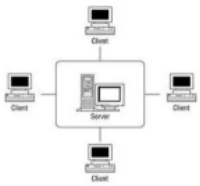
Network Databases

Network database management systems (Network DBMSs) use a network structure to create a relationship between entities. Network databases are mainly used on large digital computers. Network databases are hierarchical databases, but unlike hierarchical databases where one node can have a single parent only, a network node can have a relationship with multiple entities. A network database looks more like a cobweb or interconnected network of records.



Relational Databases

In a relational database management systems (RDBMS), the relationship between data is relational and data is stored in tabular form of columns and rows. Each column if a table represents an attribute and each row in a table represents a record. Each field in a table represents a data value. Structured Query Language (SQL) is the language used to query RDBMS, including inserting, updating, deleting, and searching records. Relational databases work on each table that has a key field that uniquely indicates each row. These key fields can be used to connect one table of data to another.



Results and discussion

1- Types of DBMS

Let's see how the DBMS family got evolved with the time. Following diagram shows the evolution of DBMS categories.

There are 4 major types of DBMS. Let's look into them in detail.

- **Hierarchical** - this type of DBMS employs the "parent-child" relationship of storing data. This type of DBMS is rarely used nowadays. Its structure is like a tree with nodes representing records and branches representing fields. The windows registry used in Windows XP is an example of a hierarchical database. Configuration settings are stored as tree structures with nodes.
- **Network DBMS** - this type of DBMS supports many-to many relations. This usually results in complex database structures. RDM Server is an example of a database management system that implements the network model.
- **Relational DBMS** - this type of DBMS defines database relationships in form of tables, also known as relations. Unlike network DBMS, RDBMS does not support many to many relationships.Relational DBMS usually have pre-defined data types that they can support. This is the most popular DBMS type in the market. Examples of relational database management systems include MySQL, Oracle, and Microsoft SQL Server database.
- **Object Oriented Relation DBMS** - this type supports storage of new data types. The data to be stored is in form of objects. The objects to be stored in the database have attributes (i.e. gender, ager) and methods that define what to do with the data. PostgreSQL is an example of an object oriented relational DBMS.

2- SQL : stands for **Structured Query language,** pronounced as "S-Q-L" or sometimes as "See-Quel". SQL is the standard language for dealing with Relational Databases. SQL can be used to insert, search, update and delete database records. SQL can do lots of other operations including optimizing and maintenance of databases. Relational databases like MySQL Database, Oracle, Ms SQL server, Sybase, etc uses SQL.

Conclusions

- DBMS stands for Database Management System.
- We have four major types of DBMSs namely Hierarchical, Network, Relational, Object Oriented
- The most widely used DBMS is the relational model that saves data in table formats. It uses SQL as the standard query language
- SQL language is used to Sql query a database
- The database approach has many advantages when it comes to storing data compared to the traditional flat file based systems.

reference

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