BAHRIA UNIVERSITY (KARACHI CAMPUS)

ASSIGNMENT 4 - FALL 2022

Computer Programming (CSC-113)

Class: **BSE-1 [A/B/C]**

[CLO-4]

Course Instructor: **Engr. Muhammad Faisal**

Submission Deadline: **26th December, 2022**

RESEARCH REPORT ASSIGNMENT

In this assignment, the students will prepare a research report of the topic selected in the assignment 3. The group will be same as presentation group.
Report should contain following headings.

- **Abstract.** [Should contain the abstract/summary of your report]
- **Introduction**. [Will introduce all the technologies related to selected topic]
- **Review of Literature**. [Will discuss the existing work done in selected topic]
- **Conclusions** [Final wording]
- **References** [References of the research papers and websites used to develop the report]

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Abstract:

A well-designed RDBMS form can increase accuracy while simultaneously speeding up data entry. Data management and storage are crucial components of data science. Data is simply a collection of facts that can be stored and processed by computers. It is a snapshot of the world. It is crucial that data be kept in the proper format in order to analyze and handle it effectively. There are many other shapes and forms that data can take, but some of the most well-known ones are numbers, text, photos, and videos. There are numerous methods of data processing and storage, depending on the nature. In this chapter, we concentrate on relational database management systems, one of the most well-known and widely used methods of data storing. We offer an introduction that a reader can use to carry out the necessary tasks. We explain forms by using fields from many tables with the help of form-generating software. Another crucial component of a good form is offering simple methods for entering data into your database

Introduction:

Relational Database Management system is way to organized data in tables, rows, and columns.

In the Relational Database Management system we had introduced many topic which include the following topics

- Introduction to Relational Database Management system
- Difference between Relational Database Management system and Database Management system
- Features of Relational Database Management system
- How the Relational Database Management system Work and All Relevant Information about Tale.
- Keys in Relational Database Management system and its Types
- Normalization in Relational Database Management system and its Forms
- Relationship in Relational Database Management system

1. Introduction to Relational Database Management system:

A Relational Database Management system (RDBMS) is a type of database management system (DBMS) that that stores data in a row-based table structure that links relevant data items. An RDBMS has features that keep the data secure, accurate, reliable, and consistent.

2. Features of Relational Database Management system:

Relational databases need ACID characteristics:

ACID means Atomicity, Consistency, Isolation, and Durability. These four are the features of Relational databases. These features are also key differences between the RDBMS and DBMS.

The following Features are defined below:

Atomicity: keeps data accurate and defines all the elements in a complete database transaction.

Consistency: Relational databases have data consistency because the information is updated across applications and database copies. This means multiple instances always have the same data.

Isolation: Isolation keeps the effect of a transaction invisible until it is committed. This reduces the risk of confusion.

Durability: Recover data from a failed transaction is known as Durability. It also ensures that data changes are permanent.

3. How the Relational Database Management system Work and All Relevant Information about Table:

An RDBMS is a type of database management system (DBMS) that stores data in a row-based table structure that links relevant data items. Typically, data is organized across several tables, which might be connected by a primary key or a foreign key. It includes functions that maintain the security, accuracy, integrity, and consistency of the data.

Let's discuss the relevant information in the table:

Table:

A table is a group of data components arranged according to rows and columns. A table can have duplicate rows of data, whereas a real relation cannot. The table is the easiest way to store data.

Field:

A table is made up of many records (or rows), and each row can be further divided into numerous smaller objects called fields.

Column:

A column in a relational database is a set of data values of a special type, one value for each database of the row.

Null Value:

A null value represents an unknowable value in the relational database model. The null value indicates an unknown value, but this unknown value is not equal to a value of zero or a field that contains spaces.

Entity:

It is a real-world object that exists physically or conceptually, such as person, places, things, or events which have relevance to the database. Some specific examples of entities that exist physically are Employee, Student, and Lecturer. Some specific examples of entities that exist conceptually are Event, job title, etc.

Attribute:

An attribute describes characteristics of the entity.

4. Keys in Relational Database Management system and its Types:

Keys in RDBMS:

Keys are consider as important part of Relational database. They are used to identify relationships between tables and also to identify any unique record of data inside a table. A Key can be consider as a single attribute or group of attributes

Types of keys:

There are seven types of keys which are given below:

- Primary key.
- Foreign Key.
- Candidate key.
- Alternate Key.
- Super key.
- Composite key.
- Artificial Key.

Primary key:

It is the first key used to identify one and only one instance of an entity uniquely. An entity can contain multiple keys. The key which is most suitable from those lists is primary key.

Foreign Key:

A table's foreign key is a column that is used to refer to another table's primary key. For example, each employee in the personnel table works in a distinct department inside a corporation. Because of this, we cannot keep departmental data in our personnel table. Instead, we connect these two tables using the primary key of one of the tables.

Super key:

Super key is an attribute set that can uniquely identify a tuple (row). A super key is a superset of a candidate key.

Alternate Key:

Each row in a relation may have one, many, or a combination of attributes that uniquely identify it. Candidate keys are made up of these characteristics or combinations of characteristics. Out of these candidate keys, one is selected as the primary key, and the remaining candidate key is referred to as the alternate key.

Composite Key:

A main key is referred to as a composite key if it contains many attributes. Concatenated Key is another name for this key.

Artificial Keys:

When a primary key is huge and complex, these keys are produced. Artificial keys are those that were produced using data that was assigned at random. The artificial keys' data values are often numbered in a serial fashion to make them easy to read and use for complex computer programs.

5. Normalization in Relational Database Management system and its Forms

Normalization of RDBMS:

Normalization is the process of reducing and eliminate redundancy from a relation or set of relations. Or in short we can say that Normalization is a technique of organizing the data in the form of database.

The Six types of database normalization are:

- First normal form (1NF)
- Second normal form (2NF)
- Third normal form (3NF)
- Boyce & Codd normal form (BCNF)
- Fifth normal form (5NF)
- Sixth normal form (6NF)

6. Relationship in Relational Database Management system:

When one table's foreign key refers to the other table's primary key, there is a relationship between the two tables that relation is known as relationship in relational databases.

Cardinality:

The ***cardinality*** of a relationship is the number of instances of entity B that can be associated with entity A.

There are 4 different types of relations in the database:

- one-to-one
- one-to-many
- many-to-one
- many-to-many

One-To-One:

One record in one entity only references another record in another entity and vice versa.

One-To-Many:

A single record in one entity may reference multiple records in another entity. Though within the other entity the records may only reference a single record of the initial entity.

Many-To-Many:

Many record in one entity may reference too many records in another entity.

Literature Review:

In history there was histrionic use of RDBMS (Relational Database Management System) for storing data in the form of structured data. Moreover, data are growing rapidly such as structured data and unstructured data due to increases of giant technologies as well as mass data produced by users.

An enterprise's multiple apps and services are built on the Relational Database Management System (RDBMS). RDBMS is seen as being outdated technologically. However, relational database technology has remained relevant in a dynamic business because of its strong theoretical underpinnings.

For this reason, even databases that are not relational, like Hadoop's SQL interface, use RDBMS-like features to store data. Microsoft SQL Server and MySQL are two common examples of relational database management systems that can hold employee, customer, and other company information

RDBMS programmers are in charge of maintaining performance while enhancing database security measures. Additionally, the user has responsibilities, particularly with regard to using sensitive data ethically.

Particularly for the data set of an association, security in the database administrator (DBA) administration system is essential. Because the data set framework plays such a large role, security issues should exist. As we are all aware, the modern world is characterized by digital assaults and the loss of data that is detrimental to any nation. Additionally, due to assaults, many crimes have thus far been committed that we need to strengthen our data set as much as we can, deal with malicious assaults, and provide protection for our sensitive data.

Conclusions:

RDBMSs have developed over time to provide business developers with increasingly powerful query optimization and complex plugins. In several applications, including reporting, analytics, and data warehousing, they also act as a focus point.

A well-designed form can increase accuracy while simultaneously speeding up data entry. You can design forms using fields from many tables with the help of form-generating software. Another crucial component of a good form is offering simple methods for entering data into your database.

References:

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