Development of library system using ADO.NET Technology and Microsoft SQL

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ABSTRACT: At first the Home Page has been made where the database will be there to answer the security question (Like the User Name and Password). If the right answer is given then go to the Selection Section and if the wrong answers are type then it show the message Invalid User Name and Password. From the Selection then go to the Create, Update, Delete and View Section. It can also back to the Home Page or Exit the window. In Delete Section it can easily delete any particular account very easily by typing the unique Book No. In this section it can also delete all the account by clicking on the Delete All Account button. From this section the system can easily get back to the Create, Update and View Section also, by the help of Shortcut Key.

KEYWORDS: Common Language Runtime; Framework Class Library; Object-relational mapping; Entity Framework; .NET Framework; BLOB

I. INTRODUCTION

With the development of science and technology, the information system has become necessary in our daily life. According to the speed of user response, QOS and the performance of database system we determine the vitality of the information system. With the going of time, the performance of SQL server database system degrades, and its response time increases. Optimization of the database system plays a very important role, and it runs through the entire life cycle of the database system. SQL is mainly used to communicate with the database. SQL statements are mainly used to perform the tasks such as update the data on a database, or to retrieve the data from a database etc [1, 2].

Advantages of SQL:
- SQL is used to execute queries against the database.
- SQL can be used to retrieve data from the database.
- SQL is used to insert the records into the database.
- SQL can be used to update the records in the database.

.NET Framework: - The .NET Framework which is pronounced as DOT NET is a partially open source freeware software for framework developed by Microsoft that is primarily runs on Microsoft Windows. .NET Framework includes a large class library which is known as the Framework Class Library (FCL) and across the several programming languages it provides language interoperability. Programs which written for the .NET Framework execute in a software environment, which is known as the Common Language Runtime (CLR) [3], which is basically an application virtual machine that provides the services such as the security system, management of memory, and handling the exception.

ADO DOT NET: - ADO.NET can be represented as a set of computer software components that are mainly used to access data and the data services which are based on the disconnected DataSets and the XML. It is also a part of the base class library which includes the Microsoft .NET Framework.

Object-relational mapping: - In case of computer science Object-relational mapping (ORM, O/RM, and O/R mapping) is basically a programming technique which is use to convert the data between the incompatible type systems in object-oriented programming languages [4]. In object-oriented programming, the data management tasks are act on the object-oriented (OO) objects which are always almost non-scalar values.

II. RDBMS

RDBMS stands for the Relational Database Management System which is the basis of SQL, and all the modern database systems such as the MS SQL Server, IBM DB2, Oracle, MySQL and the Microsoft Access etc [5, 6].
Database Tables: Mostly a database contains one or more than one tables and each table is uniquely identified by a name (such as the "Customers" or "Orders" etc.). Each table contains the records (rows) with the data.

An example of the database system is given below:

<table>
<thead>
<tr>
<th>CustomerID</th>
<th>CustomerName</th>
<th>ContactName</th>
<th>Address</th>
<th>City</th>
<th>PostalCode</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abhishake Chakrabarty</td>
<td>Abhishake</td>
<td>A.J.c.bose road street- 40</td>
<td>Kolkata</td>
<td>700020</td>
<td>India</td>
</tr>
<tr>
<td>2</td>
<td>Bibek Nandi</td>
<td>Bibek</td>
<td>Behala street- 34</td>
<td>Kolkata</td>
<td>700034</td>
<td>India</td>
</tr>
<tr>
<td>3</td>
<td>Antonio Moreno Taquería</td>
<td>Antonio Moreno</td>
<td>Mataderos 2312</td>
<td>México D.F.</td>
<td>05023</td>
<td>Mexico</td>
</tr>
<tr>
<td>4</td>
<td>Around the Horn</td>
<td>Thomas Hardy</td>
<td>120 Hanover Sq.</td>
<td>London</td>
<td>WA1 1DP</td>
<td>UK</td>
</tr>
<tr>
<td>5</td>
<td>Berglunds snabbköp</td>
<td>Christina Berglund</td>
<td>Berguvsvagen- 8</td>
<td>Lulea</td>
<td>S-958 22</td>
<td>Sweden</td>
</tr>
</tbody>
</table>

SQL Statement: Most of the actions which we need to perform on the database are done with the help of the SQL statements. The following SQL command is used to see all the records in the table "Customers":- SELECT * FROM Customers. In this project 1-st a database then a table is created in following manner.
III. ADO.NET

ADO.NET is a very important feature of .NET Framework [7], which is used to work with data that are, stored in the database, such as Microsoft SQL files, XML files etc. For creating an ADO.NET file we have to create a web form in the Visual Studio as shown in the figure 2.

Features:-
- ADO.NET contains a number of classes that provides various methods and attributes to manage the communication between the applications and the data sources.
- ADO.NET provides a set of features, such as connection and commands that can be used to develop the highly efficient data services and many other important services in .NET applications.

Difference between classic ADO and ADO.NET:-
- In ADO we have a set of records and in ADO.NET we have a set of data.
- In the case of record-set we have only one table. If we want to accommodate more than one table then we need an inner join and fill the record-set. In the case of dataset it can have multiple tables.

Architecture: - ADO .NET is the part of .NET which is introduced in the year June 2000 as a completely new strategy for the development and execution of highly distributed application referred to as the Web Services [7]. Conceptually the ADO.NET is divided into consumers and data providers. The consumers are the application that is needed to access the data, and the providers are the software component that is used to implement the interface and provide the necessary data to the consumer.
Different types of data providers available in .NET Framework:-

1. .NET Framework Data Provider for SQL Server – It provides the access of Microsoft SQL Server 7.0 or later version. It uses the command `System.Data.SqlClient` namespace.

2. .NET Framework Data Provider for OLE DB – It provides the access of databases which is exposed by using OLE DB. It uses the command `System.Data.OleDb` namespace.

3. .NET Framework Data Provider for ODBC – It provides the access of databases which is exposed by using ODBC. It uses the command `System.Data.Odbc` namespace.

4. .NET Framework Data Provider for Oracle – It provides the access of Oracle database 8.1.7 or later versions. It uses the command `System.Data.OracleClient` namespace.

Entity Framework: - Entity Framework (EF) is an open source object-relational mapping (ORM) framework which is used for ADO.NET, and is a part of .NET Framework. The Entity Framework is a set of technologies in ADO.NET that deals with the development of different type of data-oriented software applications. Architects and developers of data-oriented applications have typically struggled to achieve two very important objectives. They must model some business problems like the entities, relationships, and logic, and they also must work with the data engines that are used to store and retrieve the data.

BLOB: - In the recent year’s the storing of digital data like image, video and document etc. in the database make a very important role for the advancement of the computer science and growing of the information technology. The indexing of the image is one of the important categories for retrieving the information from multimedia databases [8]. Images are stored in a large database, so the retrieving of image by the content attracted more attention [8]. In our project for storing the images in the database we use the BLOB technique.

According to Eric Raymond, the main idea about a BLOB is that the handler of the file has no way of understanding the file’s order to figure out how to deal with it. The database storage of large multimedia objects, such as films and television programs is the example of application that deals with BLOB.

IV. LITERATURE REVIEW

SQL statements are mainly used to perform the tasks such as update the data on a database, or to retrieve the data from a database etc [1, 2]. .NET Framework execute in a software environment, which is known as the Common Language Runtime (CLR) [3]. In case of computer science Object-relational mapping (ORM, O/RM, and O/R mapping) is basically a programming technique which is use to convert the data between the incompatible type systems in object-oriented programming languages [4]. RDBMS stands for the Relational Database Management System which is the basis of SQL, and all the modern database systems such as the MS SQL Server, IBM DB2, Oracle, MySQL and the Microsoft Access etc [5, 6]. ADO .NET is the part of .NET which is introduced in the year June 2000 as a completely new strategy for the development and execution of highly distributed application referred to as the Web Services [7].

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V. PROCEDURE AND OPERATION

1. At first in the Home Page where we have to answer the security question (Like the User Name and Password). If we type the right answer then we go to the Selection Section and if we type the wrong answers then it show the message Invalid User Name and Password.

![Figure 4: Home Page](image)

2. From the Selection we can go to the Create, Update, Delete and View Section. We can also back to the Home Page or Exit the window.

![Figure 5: Selection Section](image)

3. In the Create Section create new account are created. In this Section we type a unique Book No. and all the necessary information and if the Book No. is exist then it show a message that the Book No. is already exist. From this section we can easily go to the Update, Delete and View Section also by the help of Shortcut Key.

![Figure 6: Create Section](image)

4. In Update Section we can easily update the account by the help of unique Book No. In this section, first we have to type the recent Book No. then we have to type the details what we want to change like the Name, Branch, Year of Passing, Roll No., Phone No., Email Id, Date of Issue etc. From this Section we can easily go to the Create, Delete and View Section by the help of Shortcut Key.
5. In **Delete Section** we can easily delete any particular account very easily by typing the unique Book No. In this section we can also delete all the account by clicking on the **Delete All Account** button. From this section we can easily get back to the **Create**, **Update** and **View Section** also, by the help of Shortcut Key.

6. In **View Account** Section we can view a particular account by the help of the Book No. Here we first type the unique Book No. then we click on the **Show Details** button, after that automatically all the details related to that particular Book No. is come on the screen as shown in the following figure. From this section we can go to the **View All Section** to view all the account. We can also get back to the **Create**, **Update** and **Delete Section** from this section very easily, simply by clicking on the **Create** or **Update** or **Delete** button.

7. In **View All Section** we can view all the Account which is very much useful to know the information about all Users as shown in the following figure.
In this Section we can also view the account with respect to the Date of Issue, Name, Branch, Year of Passing, Roll No., and the Phone No., by filling up the necessary information then clicking on the button as shown in the above figure. From the View All Section we can get back to the Show Details Section simply by clicking on the Back button.

VI. Process Diagram

![Process Diagram](image)

VII. CONCLUSION

In this article a robust library system has been developed to maintain the book and other content of a digitized library using ADO.NET Technology and Microsoft SQL. This system can also be modified and make it more and more user friendly by certain modification of the ADO.NET code in future.

REFERENCES

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