# Chapter 4: Implementation

The implementation is the third phase of the software development life cycle. In this stage, the team builds the actual product using the base created through analysis and design. The team decides appropriate the programming tools and starts to write the source code for the project. All components of software are implemented in this phase.

## 4.1 Programming Language

For this project, I have selected C# as the programming language .Net framework. C# is a type-safe object-oriented language that allows developers to build a variety of robust and secure application that runs on the .NET framework. It allows to create Windows client applications, client-server applications, XML web services, distributed components, database applications and many other types of applications. Visual C# provides an advanced code editor, integrated debugger, suitable user interface designers and many other tools to develop an application on C# .Net easier.

This project is windows form .Net application.

Microsoft SQL server has been used for the database. SQL server is a relational database management system that supports a wide variety of transaction processing, analytics applications and business intelligence in corporate IT environment.

## 4.2 Design pattern and framework

I have used ADO.NET model of .NET framework for this application. This model is mainly used for establishing a connection between application and data sources i.e. SQL server. It acts as the bridge between the backend controls and the frontend database.

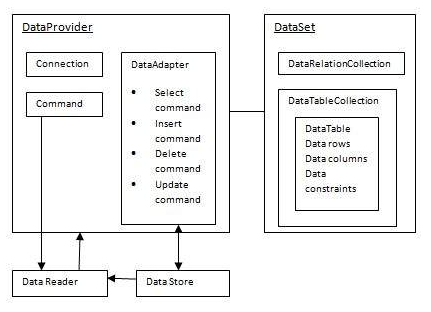


Figure 1: ADO.NET architecture

I have used ADO.NET to implement (Model View Controller) MVC design pattern. I have used database connection layer class as Model for manipulating data in the database. The business logic layer class as Controller where all business logic and SQL script are coded. The windows forms act as View. The input data are validated and sent to the controller.

## 4.3 Tool Used

Operating System used: **Windows 10 v1903**

Tools used for implementing the system:

* **Microsoft Visual studio 2017** as a source code editor, debugging and unit testing tool.
* **Microsoft Server SQL management Studio 17** to create and manipulate the database.

## 4.4 Coding Screenshots