BACHELOR OF COMPUTER APPLICATIONS

SEMESTER 5

DCA3102

VISUAL PROGRAMMING

Unit 2

VB.NET Development Environment

Table of Contents

1. INTRODUCTION

In the previous unit, we had an introduction of Visual Basic .NET, and you became familiar with the .NET Framework. In this unit we are going to explore Visual Studio .NET and its Microsoft Development Environment. Integrated development environment also called as integrated design environment and integrated debugging environment that helps the program developers to develop the application in a convenient way. Visual studio integrated development environment consists of solution explorer toolbox code and the designer window. These development environment supports the developers to develop the upgraded and enhanced facility to develop an application.

We are also going to discuss some basic concepts and some basic skills for working with the Development Environment. Completion of this unit will give you an idea about how to develop a simple application in VB .NET environment and to run the application.

1.1 Objectives:

After studying this unit, you will be able to:

- *Explore the VB .NET environment*
- *Work with integrated development environment*
- *Discuss on code editor and solution explorer window*
- *Develop an application on windows IDE*
- *Create VB. NET application using simple control and execute*

1.2 .NET Features

1. Applications developed with.NET can be used with any operating system. There is solid protection built into the.NET framework. Memory management is handled automatically by the.NET framework and the applications developed in the.NET framework can be packaged with the use of tools provided by the.NET environment.

Let us discuss the advantages and disadvantages of .Net environment:

Advantages:

1. The.NET framework employs an object-oriented programming language to generate a code of enterprise quality. There will be no manual formatting of the code required.
2. Your web apps and forms can take advantage of many modern technologies, such as the file system, event logs, and performance counters.
3. For creating web apps, you may take advantage of functions like an in-place menu editor, docking, and automatic dock anchoring.
4. In many programming languages, the developer is responsible for handling memory and object lifetimes. The Common Language Runtime (CLR) takes care of these details for.NET Framework applications.

Disadvantages:

1. Given their importance to programming, the.NET framework is unable to directly process pointers.
2. More lines of code mean more work for the computer, which means the app will run more slowly.
3. Although the.NET framework includes a garbage collector to address the problem of memory leaks, engineers still need to put in extra time and effort to properly manage resources, which is why the platform is frequently criticised.

The .NET framework and its usages has been discussed here , the .NET framework applications are multi-platform applications. It can be used for any of the following languages: C++, C#, Java Script, COBOL, etc. The .NET framework is a platform that helps you to write the different types of applications like: Windows Applications, Web Applications and Web Services

The . Applications built with the Net Framework can run on a variety of different platforms. The framework can be accessed from C#, C++, Visual Basic, JScript, COBOL, and many more

languages. These languages have full access to the framework and can even talk to one another.

Client languages, such as C#, leverage the .NET framework's vast code library.

The .NET framework comprises an enormous library of codes utilized by the client languages, for example VB.NET. Mono is a platform that makes it simple for programmers to write programs that run on multiple operating systems. Mono, which is supported by Microsoft, is an open source implementation of the.NET Framework that conforms to the ECMA standards for C# and the Common Language Runtime.mono is an open source version of the .NET programming framework.

Mono was included on the compiler to run on various different operating system.

Mono can even run on the Linux and Mac operating system.

Advantage of .NET Framework:

- The characteristics of .NET have been explained here in brief, .NET frameworks provides the One of the crucial and most advantageous features of .NET is easy flexible deployment. It can be installed as a part of the application you are developing as well as separately. The modular design allows including all the dependencies that you need. Moreover, the deployment with .NET is as easy as copying a folder.
- Another benefit is that you can have more than one .NET Core version running side by side on the same machine. Hence, making it easy to cover different projects and seamlessly perform a deployment task.
- We get an opportunity for integrating and surfing that is to develop an application in a multitude of domains, such as gaming, mobile, IoT, AI.
- Microsoft has recently announced a collaboration with SWIFT, which means putting AI and data in the centre of Fintech. This will include creating an ecosystem that offers efficient and secure operations for banks and corporations. It has many advantages like low investment , multitasking and also improved security and speed

2. VB .NET ENVIRONMENT

The Visual Basic .NET environment can be used to develop two types of applications.

- Windows Forms Application
- Web Forms Application

The user's PC supports the applications which are designed based on Windows Form Application. Here the forms are acting as an interface through which the user can communicate with the application.

The Windows Forms application will execute on the Windows Desktop and it can have more than one Windows forms for a complete application. Here the forms are supported with the graphical user interface to access application. Each Windows form can contain Windows Forms controls like labels, text boxes, buttons, and radio buttons. These controls let the user interact with the application.

You can observe in the figure 2.1, the Windows Form Applications designed to support two transactions that are calculation of monthly investment or the future value. Here this form is acting as interface and it uses the Windows Form Controls. Following are the list of Windows Forms Controls used in this application like buttons, labels, radio buttons and frames. These controls will be discussed in detail in the forthcoming units. Here you can design a single Window Form Application or more than one form that is called as multiple Windows Form Applications.

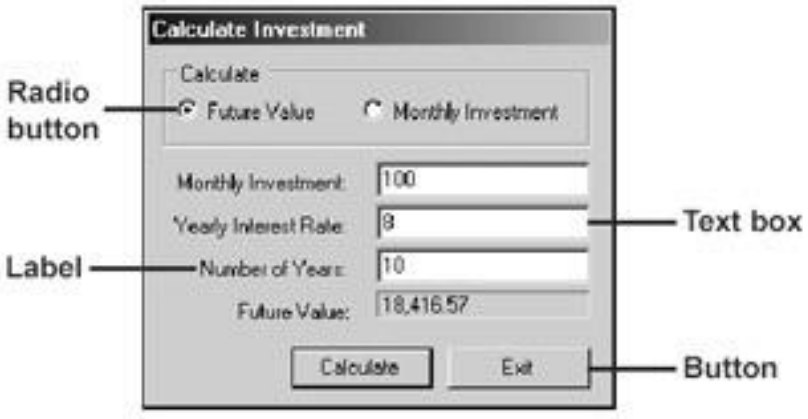

Fig. 2.1: Windows Form Application

The second type of application which we are going to discuss here is the application developed based on the Web Form application. Similar like Windows Form application the Web Form application can also have more than one window to interact with the user. A Web Forms application will be executed on the web server, but its user interface is accessible from the client machine web browser. generlly it has two types of programs one on the server side and another on the client side. Here the application will be accessed through any of the web browser. This application can have more than one web forms that provide the user application interface. Each form can contain Web Forms controls like labels, text boxes, buttons, and radio buttons. For example in the given example in figure 2.2 the web Form application is accessed through the internet explorer browser. Web Form application works similar like Window Form application except that the webforms uses web form controls.

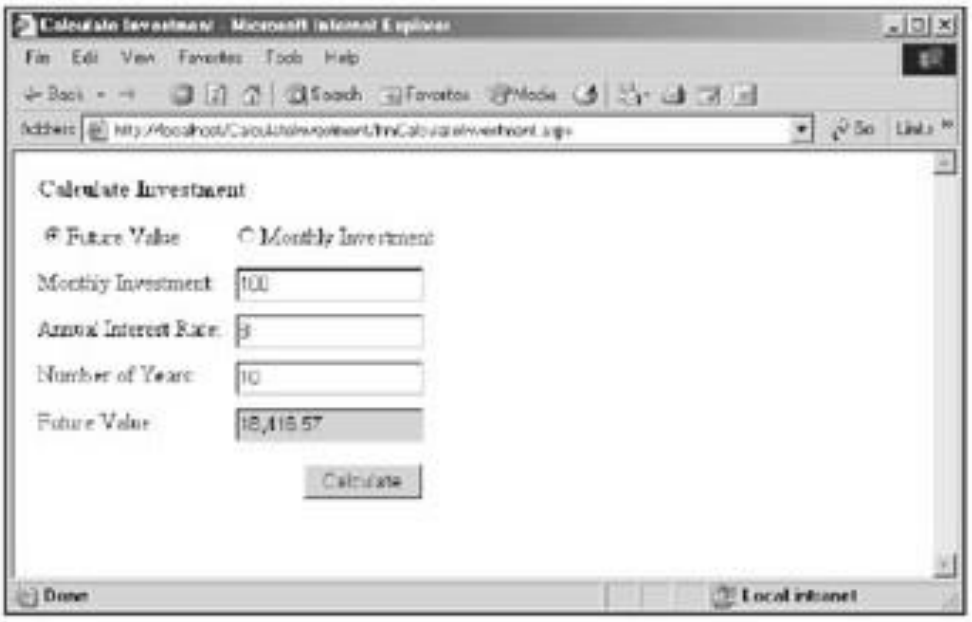

Fig. 2.2: Web Form Application through Web browser

The other difference between the two applications is in working platform. Windows Forms application runs on your personal computer whereas the Web Form applications run on the web servers. On the execution of this application the visual portion of the application is left with the browser which is running on client side in the form of Hyper Text Markup Language. Then it is the role of the browser to interpret with the Hypertext language and display the

content. In the following units we also will learn how to develop the applications through the Web Form Application.

Now we are going to learn the basic techniques of Microsoft environment IDE to develop visual basic application. The applications developed through the Visual Studio consist of all of the tools that need to develop .NET programs using Visual Basic, C#, or C++.

Start page

To start the Visual Studio IDE, click the Start button in the Windows taskbar, then choose Programs->Microsoft Visual Studio-> .NET Microsoft Visual Studio .NET

When you start the visual studio the start page will appear as shown in the figure 2.3. It is the home page where you get the options to open an existing project or you can create a new project. Also there is a provision to change the visual studio configuration settings. . The home page incorporates a web browser with links to external sites that can be used in conjunction with Visual Studio.

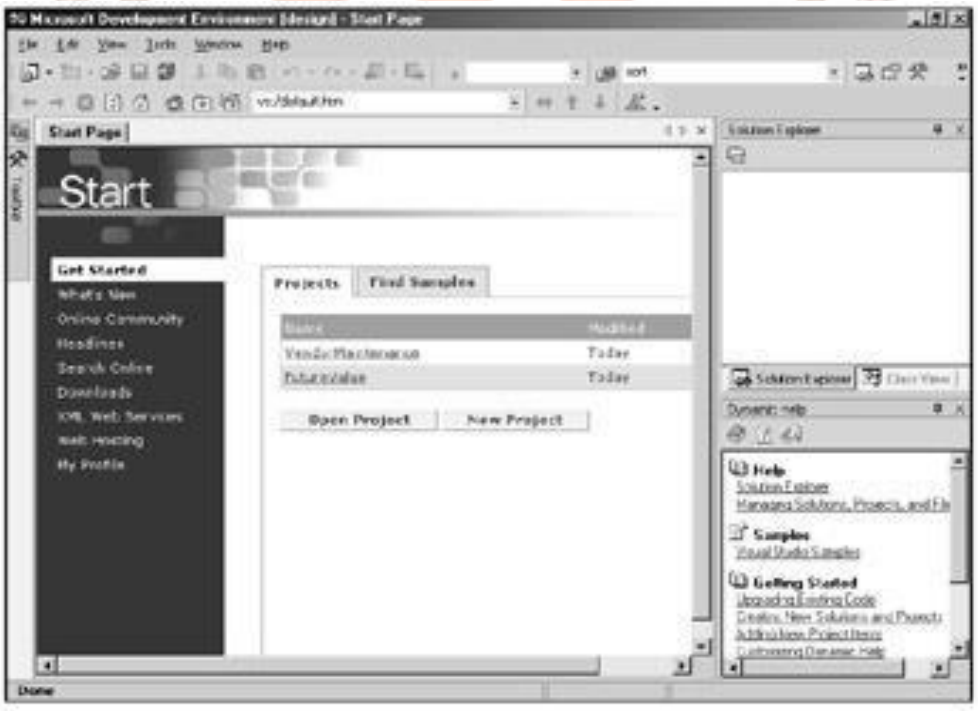

Fig. 2.3: Start Page

If you are familiar with some web browser like Internet Explorer, it will be easy to access the pages in the Visual Studio browser. A special Web toolbar is designed to navigate between the various pages and this appears once you work with VB tools. As you begin using VB tools, a customised Web toolbar emerges, allowing you to quickly switch between different webpages. A variety of online resources including various online communities and download libraries are available.

Customizing Visual Studio to use Visual Basic

There is a facility to make the visual studio display apart from the start page. In order to customize your window you need to do the following procedure, select Visual Basic Developer for the Profile setting. Then Keyboard Scheme and Windows Layout settings automatically change to Visual Basic 6, and the Toolbox is displayed on the left side of the window. The above said changes you can observe from the figure 2.4.

Fig. 2.4: Visual Studio with Visual Basic page

SELF-ASSESSMENT QUESTIONS - 1

1. _____ and _____are the two types of applications can be developed using VB .NET environment.
2. Web Form applications require web servers to run. State [True/False].
3. is considered as the home page in Micro Soft Visual Studio environment.

3. INTEGRATED DEVELOPMENT ENVIRONMENT

The figure depicted in 2.5 shows the various tabbed windows in the Visual Studio integrated development environment. These forms are used for multiple purposes like Form Designer Window used to design the form and using code editor window you can develop the business logic. The figure also explores the following windows that help to develop the visual basic application. Tool box consisting of list of tools which can be added in the form and the properties window is used to update the properties of the tool box controls based on the need. Solution explorer is used to list the files that make up the solution. This figure is also pointing two other toolbars that are available on the IDE. Tool bar used to change the environment based on where you want to work. Of course menu options help you to perform any other operations available at the top of the IDE. You also can perform some operations through context-sensitive shortcut menu that are displayed when you right-click anywhere in the IDE.

Fig. 2.5: Working with the IDE

At the top of the Visual Studio window has several toolbars. The Standard toolbar includes standard Windows toolbar buttons such as Open, Save, Cut, Copy, and Paste. On the right side of the Standard toolbar, you'll find several buttons that summon other windows in the IDE. As you work with Visual Studio, you'll find that additional toolbars are occasionally displayed, depending on the function you're performing.

The Code Editor Window

When you develop the application, you need to write the code to develop the business logic. The code editor window is used to write and edit the codes that are used to develop the visual basic application. The code editor window is much similar to other text editor which helps to create or update your codes easily. From the form designer window you can reach this code editor by double clicking anywhere in the form or otherwise solution explorer has the option called view code button to reach the coding window. Vice versa to come back to the form window from code editor, either by selecting the design tab in the code editor or by clicking the designer button in the solution explorer. You can also navigate between these two windows by Ctrl+Tab key or by pressing the Shift+Ctrl+Tab key. Deep support for remote development is implemented in code editor . Connecting to a container with a separate OS enables the usage of any plugins, linting, or debugging support in code editor window

By this we understand the visual basic environment has two different windows to represent the same content but for a different purpose. In other terms we can say the two windows provide us the two different perspective of the application development. The designer window helps the application developer to design an interface in a much friendly way and feel and appeal are good. Whereas the code window concentrates on the logic design or the business logics of an application. You can see the form designer window in the figure 2.5 having different tool box controls on the form like radio button, text box label and the command button. The fig 2.6 show the code editor window, also you can see two drag down box with the list of controls and its appropriate events. We will discuss about this event in the later units.

Fig. 2.6: Using the Code Editor

The Solution Explorer

Solution explorer shown in figure 2.7 is used to display the group of projects and files used to make an application. It functions as a file manager and is part of the solution (web site). Each and every file that makes up the website is displayed in this window. Via the solution explorer, you may do actions on selected files such as viewing their properties, renaming, deleting, or moving them to new locations. You can observe in the figure the contents are in the tree structure with the hierarchy of solution container followed by the project container in turn consists of list of files belong to that application. We refer the container here denotes the folder which contains a group of files or folders. Each container has option of + or -, indicates the content beneath the folder. Sign + indicates there are contents to display further similarly sign – used to hide the content inside the container. The solution explorer has the following buttons.

- View code button
- View Designer button
- View properties button

These buttons helps to open the Code Editor and Form Designer windows, and also to open the Properties window. Icon in the left of the file tells us whether the file makes a project or it is a form file. You can observe in the figure 2.7 that all the files has the extension of .vb immaterial of files type. So it is better to have the type in the naming convention like prefixing from while naming the form files. This naming convention helps the viewer to understand the types of file in the solution explorer. Four files which are in last are the custom files to support the project whereas the assembly files are generated automatically while the project is created. These files gets updated when the projects compiles in to an assembly. You can also see the explorer consist of reference folders, contains the assembly references that are used in the project. Basically the namespaces consist of classes that are required for the project here the whenever the project is created the assemblies will be added automatically.

This project also includes a folder named References. This folder contains references to the assemblies that contain the namespaces that are available to the project. Remember that the namespaces contain the classes consist of building visual basic function that the application requires. In this case, all of the assemblies were added to the project automatically when the project was created.

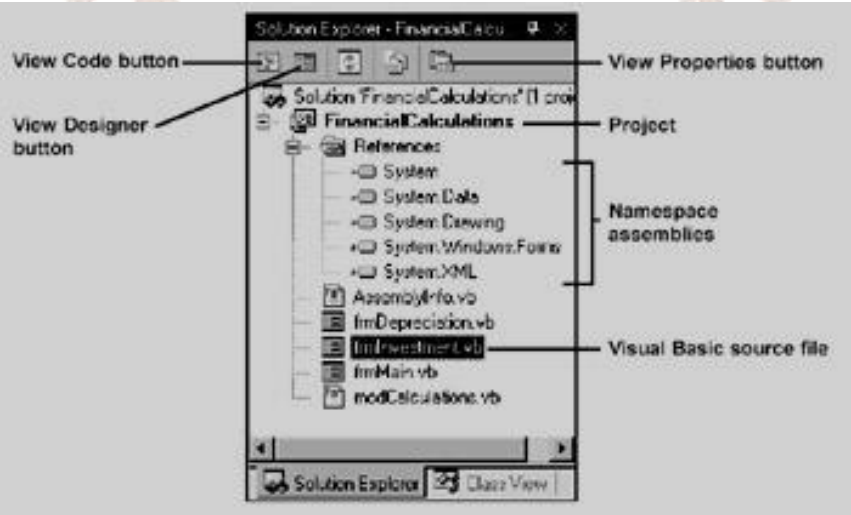

Fig. 2.7: Solution Explorer

To brief description of solution explorer are as follows:

- Visual Basic source files are stored with the file extension .vb. Each form you create for a project will have its own form of file. You can also create code files that contain Visual Basic code but do not define a form. Solution Explorer uses different icons to distinguish between form files and code files.
- The Assembly Info.vb file is created automatically when the project is created. It contains information about the assembly that's created when you compile the project.
- The References folder contains references to the assemblies for the namespaces that the application can use. These namespaces contain the classes that the project requires. In most cases, all the assemblies that you need are included when the project is created.
- In addition to the assemblies in the References folder, every Visual Basic application you develop has access to the Microsoft. Visual Basic assembly.

Working with Windows in the IDE

The figure 2.8 explores how to work with the windows in IDE, here the Toolbox is not visible, hidden in the left side of the window. One of the techniques to get the Toolbox here is to move the mouse pointer over the respective button to display it. But by default it should be available in the docked window towards the left side of the application window. We need to click on its Auto Hide button to hide this. The upper right corner of the Properties window shows the auto hide button. It appears as tab towards the edge of application window whenever the docked window is hidden.

. In the Development Environment, the docked window can be undocked and moved to a central position. In order to do this either you have to double-click on the title bar or drag it using title bar that are away from the edge of the IDE. For example, you can see that the Solution Explorer window that was docked at the right side of the IDE is now floating in the middle of the IDE. In addition, the Class View window, which was grouped with the Solution Explorer window as a tabbed window, has been separated from the Solution Explorer window. Although we don't recommend this arrangement of windows, it should give you a good idea of the many ways you can arrange them. Ultimately with these discussions you can come to the conclusion that you cannot hide, undock or separate the windows from the main area of the IDE. You may navigate between these windows by selecting the tabs or using

some other techniques. If you are keen about this for a period of time you can be much familiar and comfortable to work with the windows in the integrated development environment.

The figure 2.8 is exhibiting the IDE hidden window with two floating windows.

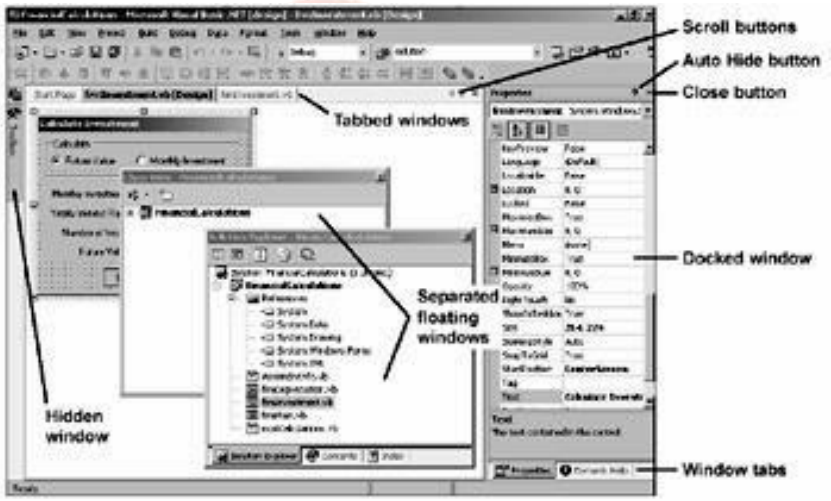

Fig. 2.8: work with the windows in the IDE

Rearranging Windows

- To close a window, click on its Close button. To redisplay it, click on its button in the Standard toolbar (if one is available) or select it from the View menu.
- To undock a *docked window* so it floats on the screen, drag it by its title bar away from the edge of the application window or double-click on its title bar. To dock a floating window, drag it by its title bar to the edge of the application window or double-click on its title bar to return it to its default location.
- To hide a docked window, click on its Auto Hide button. Then, the window is displayed as a tab at the edge of the screen, and you can display it by placing the mouse pointer over the tab. To change it back, display it and then click on the Auto Hide button again.
- To size a window, place the mouse pointer over an edge or a corner of the window, and then drag it.

- If two or more windows are grouped into tabbed windows, you can display any window in the group by clicking on its tab. If you dock, undock, hide, or unhide a tabbed window, all the windows in the group are docked, undocked, hidden, or unhidden.
- To reset the windows to their default arrangement, you can use the Environment/General settings of the Tools, Options command.

SELF-ASSESSMENT QUESTIONS - 2

4. _____ and _____are the windows used to design the forms and develop business logic respectively.
5. _____ consisting of list of controls which can be added in the form.
6. Shift+Ctrl+Tab key used to Navigate between code and designer windows. State [True/False].
7. Solution explorer is list the files and folders in _____structure.
8. The namespaces consist of _____ that the project requires.

4. CREATING AND RUNNING A SIMPLE APPLICATION

As we discussed already the IDE panes consists of three areas, project pan provides details about the project which was recently used or opened. Getting started pane gives tips for quick application development. VB Express headlines pane provides the recent updates and releases about the VB versions.

To start with the new application development you need to click on file from the menu bar and select the new project. The new project dialog box will appear as depicted in figure 2.9.

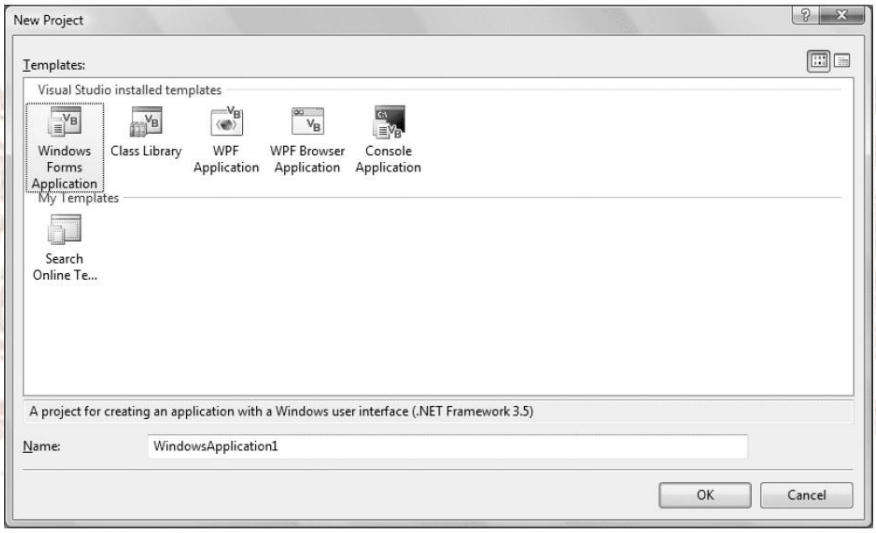

Fig. 2.9: new project dialog window

You can see five templates before you; here we are going to select the Windows Forms application since we are developing windows application. By default you get the name as windowsApplication1 you can also change the name according to your application nature and select ok to continue. As we discussed already the solution explorer will list all the forms and project of the current application. Now you will get the window with the new form as appear in the figure 2.10. Here the application title is specified as My First Program and the project name is given as My project1. Under that you can see a form1 is listed through which we are going to develop our application you can rename this form by changing the name of the form through the property window say “Multiplication”.

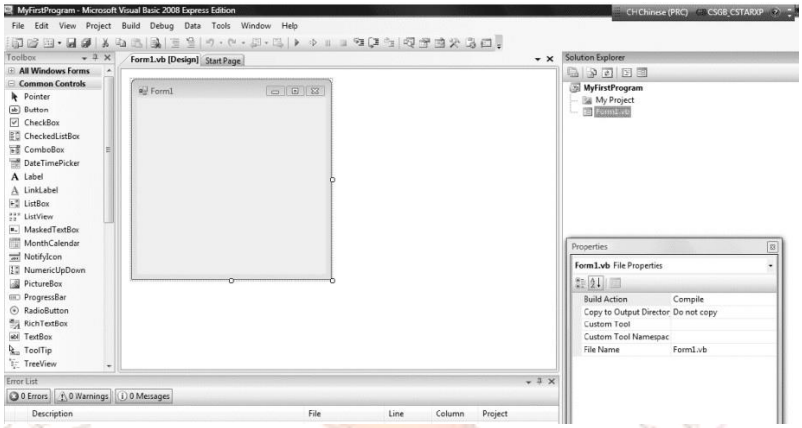

Fig. 2.10: IDE with new form

Now we can design our first application to multiply two numbers when you click on the button which is available on the form. First we will see how to add a button in the form, towards the left hand side in the new form window, the Toolbox window appears under the common control you can see the control called Button. To add this button to the form either you can drag and drop the control to the form or select and double click on the form to put the control in the form change its default name to multiply using the property window. These dragged and dropped controls can be resized later and can located anywhere in the form according to developer wish. For this application we also need three more TextBox controls, the same you can bring these TexBox controls to the form. Two TextBox controls are to accept input and one more to display the calculated result.

Now we will see how to add the coding portion in the application. Here the event decided for calculating or multiplying two numbers are “Click on button”. To go to the code window either we can do double click on the button control or through solution explorer you can reach the code window. If you double click you can see the below procedure appears automatically.

Private Sub Button1_Click (ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click

End Sub

Within this block we need to type the coding or the business logic to do the calculation.

```
Private Sub Button1_Click (ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Button1.Click
Dim a, b, c as single
a= TextBox1.Text
b=TextBox2.Text
c=a*b
 TextBox3.Text=c

End Sub
```

Running VB .NET application

Once the coding part is over we need to execute or run the program to see the output. We can run the VB. NET application in two ways either by pressing the F5 button or by selecting the run option from the toolbar. For the above specified coding the result will appear as shown in figure 2.11.

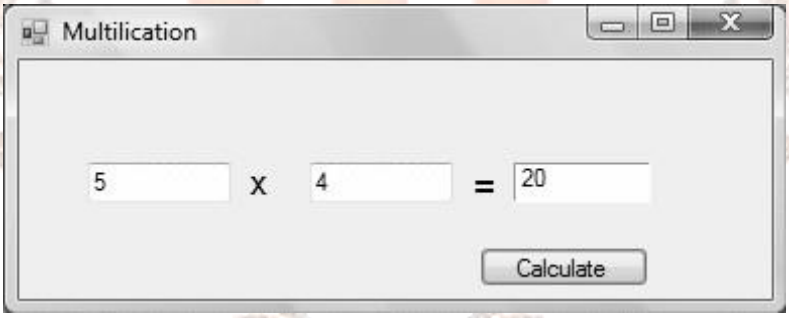

Fig. 2.11: Application output

Now we will see the coding part of this application here three variables are declared as single to accept numbers. The variable "a" is going to get the value which is received by the TextBox during the run time. TextBox1.Text is to take the value from the control will be assigned to the variable "a". Likewise the variable "b" will receive the value from the control TextBox2. The next statement "c=a*b" will multiply the values of a and b will be stored in c. Finally we are moving the calculated value that is "c" to the TextBox3 control. This application can be executed as we discussed earlier and assume in this example user has given two input as 5 and 4. The resultant value 20 is stored in the TextBox3 and displayed,

this happens when you click on the button multiply since the calculation part is written in the button click event.

Visual Basics 2010 Express:

Visual Basic 2010 is the latest version of Visual Basic launched by Microsoft in 2010. VB2010 is almost similar to Visual Basic 2008, but it has added many new features. Like Visual Basic 2008 , Visual Basic 2010 is also a full fledged Object-Oriented Programming(OOP) Language, so it has caught up with other OOP languages such as C++, Java,C# and others. You don't have to be familiar with OOP, though, to pick up VB2010. If you know Visual Basic 6, you'll have no trouble picking up VB2010, as the two languages have a very similar syntax and user interface. From the Microsoft website, you can get a free copy of Visual Basic 2010 Express Edition.

Base class library Function:

Lets know what is Base class library ,Base class libraries (core set) and framework class libraries are both terms for the extensive standard collection of class libraries included with NET (complete set). These libraries include code for a wide variety of data formats, algorithms, and supporting features, both common and unique to certain applications.

- The.NET framework's base class library provides a wealth of library features and functions that facilitate the execution of many programming languages.
- There are two pieces to this: a user-defined class library and a set of preset classes.

SELF-ASSESSMENT QUESTIONS - 3

9. _____ pane gives tips for quick application development in visual studio.
10. You can run the Visual basic application by pressing F6 button. State [True/False].

5. SUMMARY

- Using Visual Basic .NET environment we can create two types of application like Windows Form and Web Form applications.
- A Windows Forms application will execute on the Windows Desktop
- Web Form applications run on the web servers
- Start page is considered as home page on VB .NET environment
- Tool boxes, Tool bar, solution explorer are the various major supportive environments in IDE.
- To start with the new application development you need to click on file from the menu bar and select the new project.
- We can run the VB. NET application in two ways either by pressing the F5 button or by selecting the run option from the toolbar.

6. TERMINAL QUESTIONS

1. Discuss the use of VB .NET environment in application development.
2. How to customize visual studio for Visual basic environment.
3. What is IDE? List and explain its components.
4. Discuss the environment with windows IDE environment.
5. Discuss the steps involved in developing and running visual basic application using simple controls.

7. ANSWERS

Self Assessment Questions

1. Windows Forms, Web Forms
2. True
3. Start Page.
4. Form Designer and code editor.
5. Tool box
6. True
7. Tree
8. Classes
9. Started
10. False

Terminal Questions

1. Using Visual Basic .NET environment we can create two types of application like Windows Form and Web Form applications. For more details refer section 2.2.
2. There are procedures to customize your window to develop visual basic applications. For more details refer section 2.2.
3. IDE is the Integrated Development Environment it has the plenty of windows and explorer that supports in visual basic application development. For more details refer section 2.3.
4. You need to have pre knowledge to work with windows IDE for application development. For more details refer section 2.3.
5. To start with the new application development you need to click on file from the menu bar and select the new project. For more details refer section 2.4.

8. E-REFERENCE:

- http://howtostartprogramming.com/vb-net/
- http://www.vbtutor.net/VB2008Book/vb2008me_preview.pdf
- http://vb.net-informations.com
- http://www.homeandlearn.co.uk/net/nets1p10.html