NEW HORIZON COLLEGE-MARATHALLI

STUDY MATERIAL

BCA

VI SEMESTER

VISUAL PROGRAMMING

(BCA403T)

PREPARED BY
G.GNANESWARI
ASST. PROFESSOR
NHC, MARATHALLI.

Introduction to Visual Basic 6

1. The concept of computer programming

Programming means designing a set of instructions to instruct the computer to carry out certain jobs that are very much faster than human beings can do. The earliest programming language is called machine language that uses binary codes comprises 0 and 1 to communicate with the computer. Machine language is extremely difficult to learn . Fortunately , scientists have invented high level programming languges that are much easier to master. Some of the high level programming languages are Java, Javascript, C, C++, c# and Visual Basic.

1.2 What is Visual Basic?

VISUAL BASIC is a high level programming language that evolved from the earlier DOS version called BASIC. **BASIC** means **B**eginners' **A**ll-purpose **S**ymbolic **I**nstruction **C**ode. The code looks a lot like English Language. Now, there are many versions of Visual Basic available in the market, the lastest being Visual Basic 2015 that is bundled with other programming languages such as C#. However, the most popular one and still widely used by many VB programmers is none other than Visual Basic 6. 0.

VISUAL BASIC is a VISUAL Programming Language because programming is done in a graphical environment. In VB6 , you just need to drag and drop any graphical object anywhere on the form and click on the object to enter the code window and start programming.

In addition, Visual Basic 6 is **Event-driven** because we need to write code that performs some tasks to response to certain events. The events usually comprises but not limited to the user's inputs. Some of the events are load, click, double click, drag and drop, pressing the keys and more. We will learn more about events in later lessons. Besides that, a VB6 Program is made up of many subprograms or modules, each has its own program code, and each can be executed independently; they can also be linked together in one way or another.

1.3 What programs can you create with Visual Basic 6?

In VB 6, you can create any program depending on your objective. For math teachers, you can create mathematical programs such as Geometric Progression, Quadratic Equation Solver, Simultaneous Equation Solver ,Prime Number, Factors

Finder, Quadratic Function Graph Plotter and so on. For science teachers, you can create simulation programs such as Projectile, Simple Harmonic Motion, Star War etc. If you are in business, you can also create business applications such as inventory management system , Amortization Calculator , investments calculator, point-of-sale system, payroll system, accounting program and more to help manage your business and increase productivity. For those of you who like games , you can create programs such as slot machine, reversi, tic tac toe and more. Besides, you can create multimedia programs such as Smart Audio Player, Multimedia Player and more. Indeed, there is no limit to what program you can create ! We offer many sample codes in our tutorial.

1.4 The Visual Basic 6 Integrated Development Environment

Before you can write programs in VB 6, you need to install Visual Basic 6 compiler in your computer. You can purchase a copy of Microsoft Visual Basic 6.0 Learning Edition or Microsoft Visual Basic Professional Edition from Amazon.com, both are vb6 compilers. If you have already installed Microsoft Office in your PC or laptop, you can also use the built-in Visual Basic Application in Excel to start creating Visual Basic programs without having to spend extra cash to buy the VB6 compiler.

You can also install VB6 on Windows 10 but you need to follow certain steps otherwise installation will fail. First, you need to run setup as administrator. Next, you need to use custom installation. Clear the checkbox for Data Access. If you don't, set up will hang at the end of the installation. click next and wait for installation to complete. For complete instructions, please follow this link Install VB6 on Windows 10

After installing vb6 compiler, the icon with appear on your desktop or in your programs menu. Click on the icon to launch the VB6 compiler. On start up, Visual Basic 6.0 will display the following dialog box as shown in Figure 1.1.

Figure 1.1: New Project Dialog

You can choose to either start a new project, open an existing project or select a list of recently opened programs. A project is a collection of files that make up your application. There are various types of applications that we could create, however, we shall concentrate on creating Standard EXE programs (EXE means executable). Before you begin, you must think of an application that might be useful, have commercial values . educational or recreational. click on the Standard EXE icon to go into the actual Visual Basic 6 programming environment.

When you start a new Visual Basic 6 Standard EXE project, you will be presented with the Visual Basic 6 Integrated Development Environment (IDE). The Visual Basic 6 Integrated Programming Environment is show in Figure 1.2. It consists of the toolbox, the form, the project explorer and the properties window.

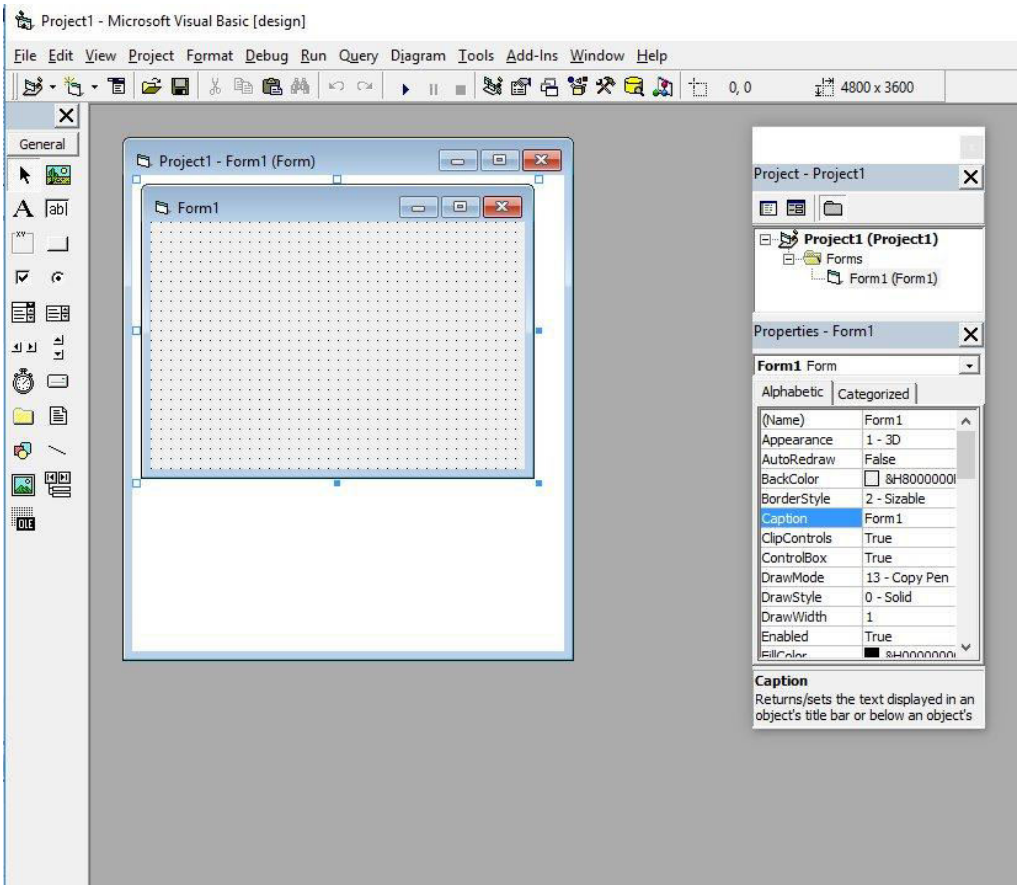


Figure 1.2: VB6 Programming Environment

Form is the primary building block of a Visual Basic 6 application. A Visual Basic 6 application can actually comprises many forms; but we shall focus on developing an application with one form first. We will learn how to develop applications with multiple forms later. Before you proceed to build the application, it is a good practice to save the project first. You can save the project by selecting **Save** Project from the File menu, assign a name to your project and save it in a certain folder.

2.1 Creating Your First Application

In this lesson, we will not delve into the technical aspects of Visual Basic programming yet, we just want you to try out the examples below to see how does a Visual Basic program behave.

First of all, launch Microsoft Visual Basic 6 compiler that you have installed earlier. In the New Project Dailog , choose Standard EXE to enter Visual Basic 6 integrated development environment. In the VB6 IDE, a default form with the name **Form1** will be presented to you. Now, double click on Form1 to bring up the source code window for Form1 as shown in Figure 2.1 . The top of

the source code window consists of a list of objects and their associated events or procedures. In the source code window, the object displayed is **Form1** and the associated procedure is **Load**.

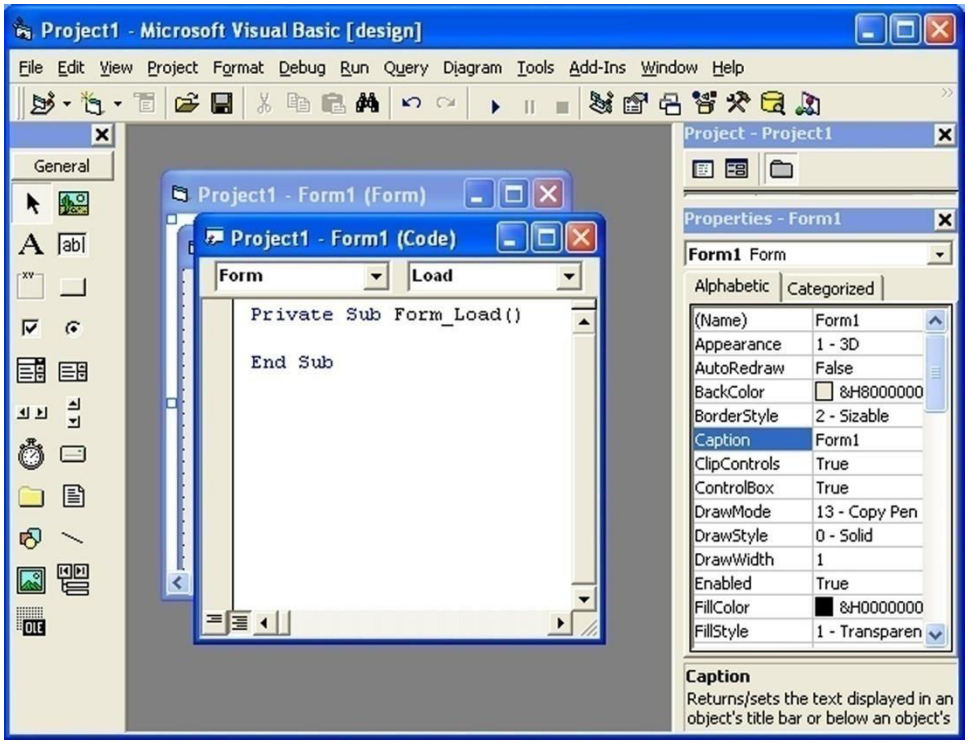


Figure 2.1 Source Code Window

When you click on the object box, the drop-down list will display a list of objects you have inserted into your form as shown in figure 2.2. Here, you can see a form with the name Form1, a command button with the name Command1, a Label with the name Label1 and a Picture Box with the name Picture1. Similarly, when you click on the procedure box, a list of procedures associated with the object will be displayed as shown in Figure 2.3. Some of the procedures associated with the object Form1 are Activate, Click, DblClick (which means Double-Click) , DragDrop, keyPress and more. Each object has its own set of procedures. You can always select an object and write codes for any of its procedure in order to perform certain tasks.

You do not have to worry about the beginning and the end statements (i.e. **Private Sub Form_Load…….End Sub**.); Just key

in the lines in between the above two statements exactly as are shown here. When you press **F5** to run the program, you will be surprised that nothing shown up .In order to display the output of the program, you have to add the **Form1.show** statement like in Example 2.1.1 or you can just use **Form_Activate ( )** event procedure as shown in example 2.1.2. The command **Print** does not mean printing using a printer but it means displaying the output on the computer screen. Now, press F5 or click on the run button to run the program and you will get the output as shown in Figure 2.4.

You can also perform arithmetic calculations as shown in Example 2.1.2. VB uses ***** to denote the multiplication operator and **/** to denote the division operator. The output is shown in Figure 2.5, where the results are arranged vertically.

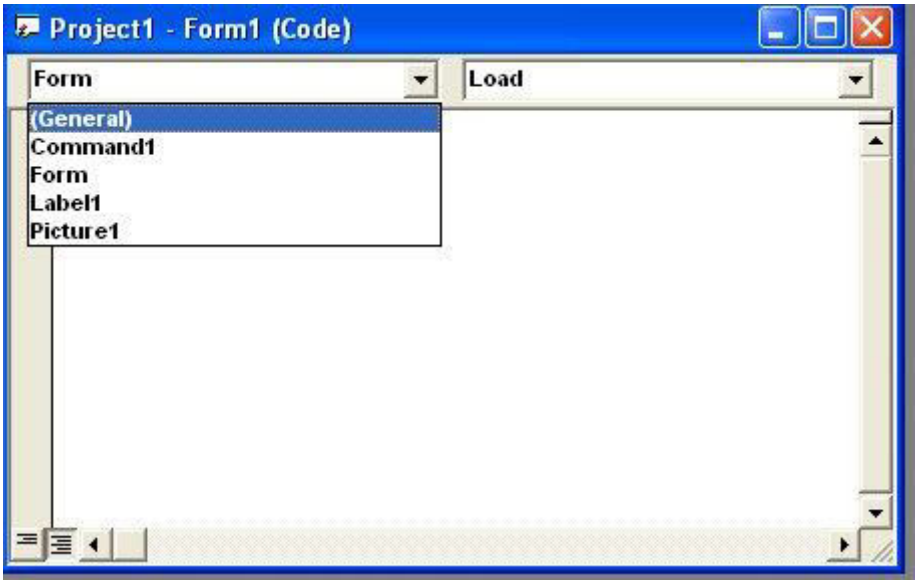


Figure 2.2: List of Objects

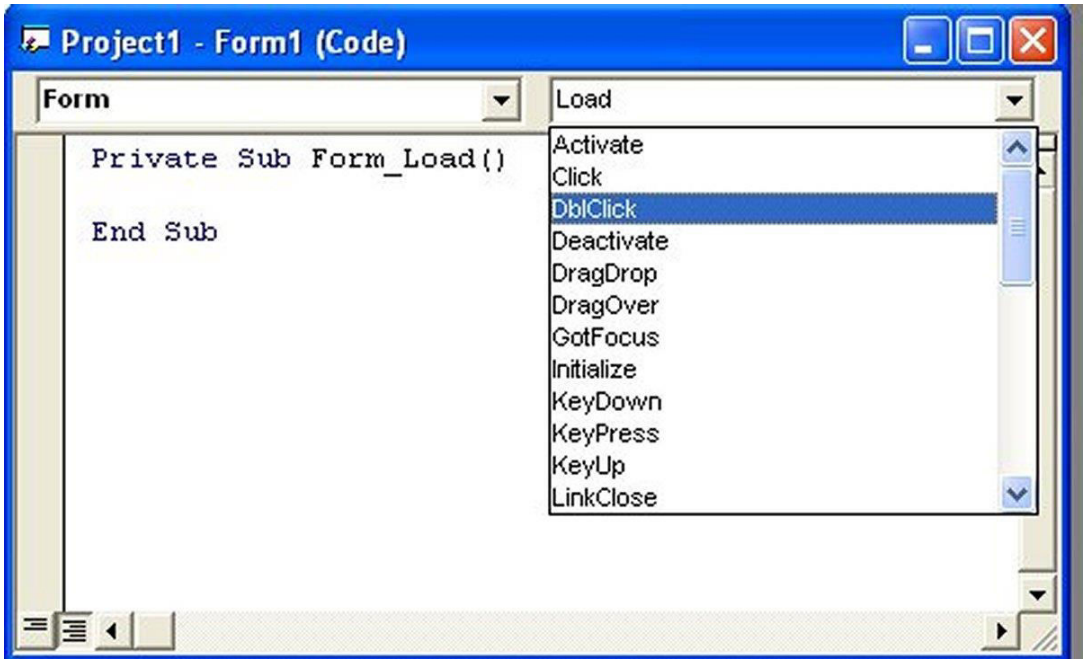


Figure 2.3: List of Procedures

Example 2.1.1

Private Sub Form_Load ( )

Form1.show

Print "Welcome to Visual Basic tutorial"

End Sub

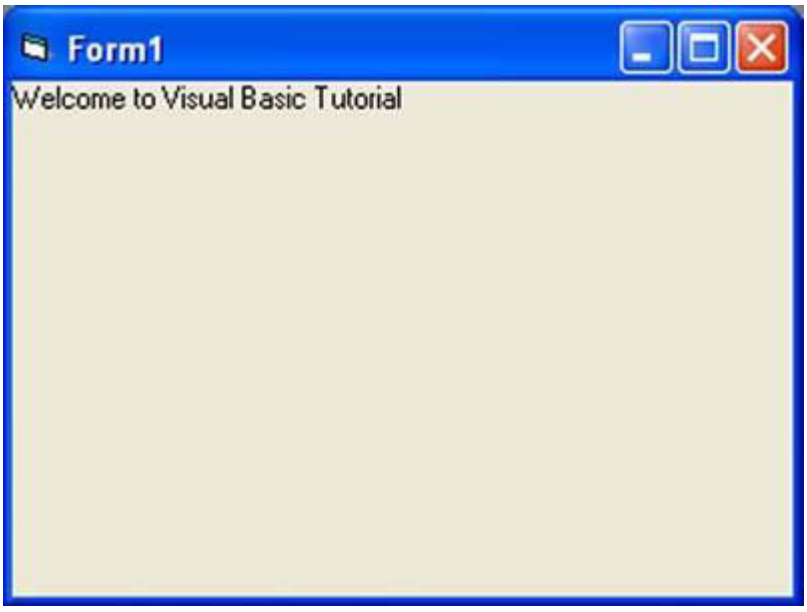


Figure 2.4 : The output of Example 2.1.1

Example 2.1.2

```
Private Sub Form_Activate ( )

Print          20          +          10
Print          20          -          10
Print          20          *          10
Print 20 / 10

End Sub
```

Figure 2.5: The output of Example 2.1.2

You can also use the **+** or the **&** operator to join two or more texts (string) together like in example 2.1.4 (a) and (b)

Example 2.1.4(a)

```
Private Sub

A = "Tom"
B = “likes"
```

```
C = “to"
D = “eat"
E = “burger"
Print A + B + C + D + E

End Sub
```

Example 2.1.4(b)

```
Private Sub

A = "Tom"
B = “likes"
C = “to"
D = “eat"
E = “burger"
Print A & B & C & D & E

End Sub
```

The Output of Example 2.1.4(a) &(b) is as shown in Figure 2.7.

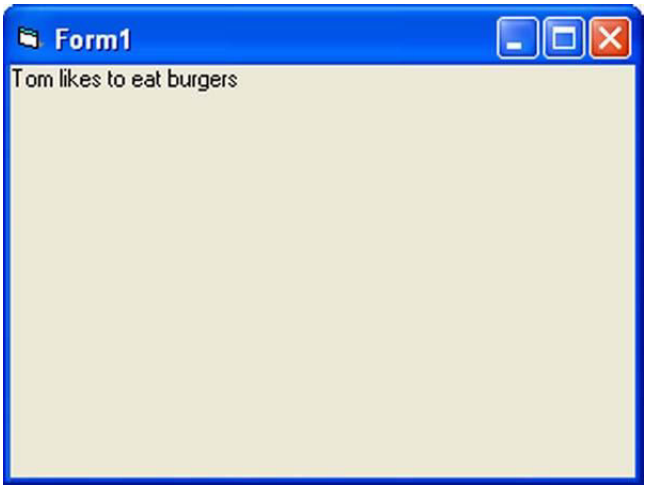


Figure 2.7

2.2 Steps in Building a Visual Basic Application

Step 1 : Design the interface by adding controls to the form and set their properties

Step 2 : Write code for the event procedures

3.1 The Control Properties

Before writing an event procedure for the control to response to an event, you have to set certain properties for the control to determine its appearance and how will it work with the event procedure. You can set the properties of the controls in the properties window or at runtime.

Figure 3.1 on the right is a typical properties window for a form. You can rename the form caption to any name that you like best. In the properties window, the item appears at the top part is the object currently selected (in Figure 3.1, the object selected is Form1). At the bottom part, the items listed in the left column represent the names of various properties associated with the selected object while the items listed in the right column represent the states of the properties. Properties can be set by highlighting the items in the right column then change them by typing or selecting the options available.

For example, in order to change the caption, just highlight Form1 under the name Caption and change it to other names. You may also try to alter the appearance of the form by setting it to 3D or flat. Other things you can do are to change its foreground and background color, change the font type and font size, enable or disable, minimize and maximize buttons and more.

You can also change the properties at runtime to give special effects such as change of color, shape, animation effect and so on. For example the following code will change the form color to red every time the form is loaded. VB uses hexadecimal system to represent the color. You can check the color codes in the properties windows which are showed up under ForeColor and BackColor .

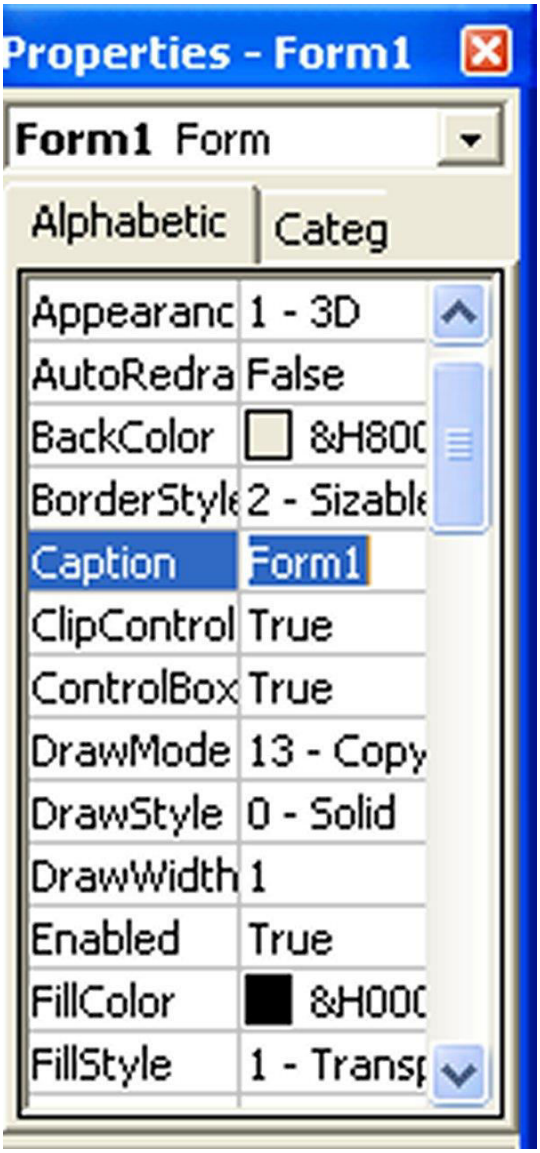


Figure 3.1

Example 3.1: Program to change background color

This example changes the background colour of the form using the **BackColor property**.

```
Private Sub Form_Load()

Form1.Show
   Form1.BackColor = &H000000FF&

End Sub
```

Example 3.2: Program to change shape

This example is to change the control's Shape using the **Shape property**. This code will change the shape to a circle at runtime.

```
Private Sub Form_Load()

Shape1.Shape = 3

End Sub
```

We are not going into the details on how to set the properties yet. However, we would like to stress a few important points about setting up the properties.

You should set the Caption Property of a control clearly so that a user knows what to do with that command.

Use a meaningful name for the Name Property because it is easier to write and read the event procedure and easier to debug or modify the programs later.

One more important property is whether to make the control enabled or not.

Finally, you must also considering making the control visible or invisible at runtime, or when should it become visible or invisible.

3.2 Handling some of the common controls

Figure 3.2 below is the VB6 toolbox that shows the basic controls.

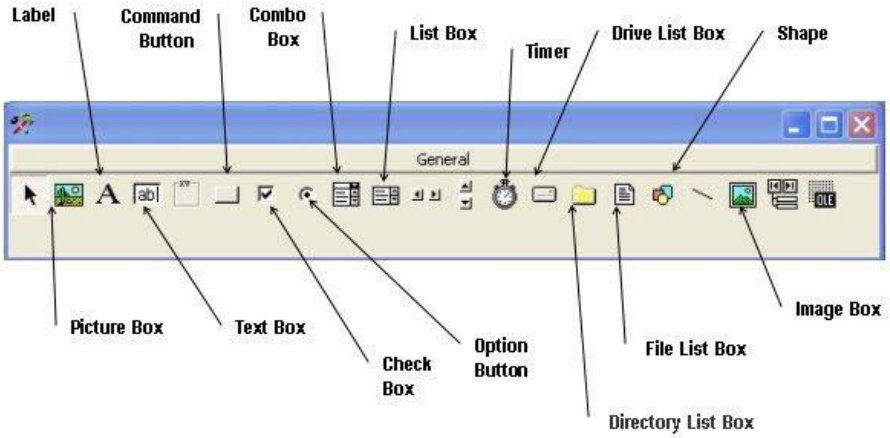


Figure 3.2: Toolbox

3.2.1 The Text Box

The text box is the standard control for accepting input from the user as well as to display the output. It can handle string (text) and numeric data but not images or pictures. Just like text fields in websites, powered not by Windows, but typically linux web hosting platforms like iPage, these fields collect user input.String in a text box can be converted to a numeric data by using the function Val(text). The following example illustrates a simple program that processes the input from the user.

Example 3.3

In this program, two text boxes are inserted into the form together with a few labels. The two text boxes are used to accept inputs from the user and one of the labels will be used to display the sum of two numbers that are entered into the two text boxes. Besides, a command button is also programmed to calculate the sum of the two numbers using the plus operator. The program use creates a variable sum to accept the summation of values from text box 1 and text box 2.The procedure to calculate and to display the output on the label is shown below. The output is shown in Figure 3.3

```
Private Sub Command1_Click()

'To add the values in text box 1 and text box 2

Sum = Val(Text1.Text) + Val(Text2.Text)

'To display the answer on label 1

Label1.Caption = Sum

End Sub
```

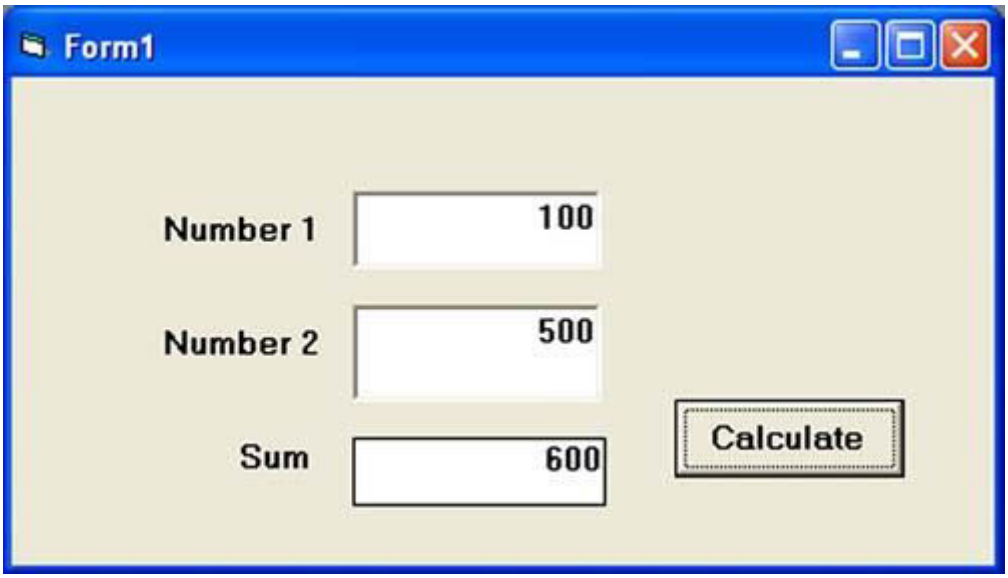


Figure 3.3

3.2.2 The Label

The label is a very useful control for Visual Basic, as it is not only used to provide instructions and guides to the users, it can also be used to display outputs. One of its most important properties is **Caption**. Using the syntax **label.Caption**, it can display text and numeric data . You can change its caption in the properties window and also at runtime. Please refer to Example 3.1 and Figure 3.1 for the usage of label.

3.2.3 The Command Button

The command button is one of the most important controls as it is used to execute commands. It displays an illusion that the button is pressed when the user click on it. The most common event associated with the command button is the Click event, and the syntax for the procedure is

```
Private Sub Command1_Click ()

Statements

End Sub
```

3.2.4 The Picture Box

The Picture Box is one of the controls that is used to handle graphics. You can load a picture at design phase by clicking on the picture item in the properties window and select the picture from the selected folder. You can also load the picture at runtime using the **LoadPicture** method. For example, the statement will load the picture grape.gif into the picture box.

```
Picture1.Picture=LoadPicture ("C:\VB program\Images\grape.gif")
```

You will learn more about the picture box in future lessons. The image in the picture box is not resizable.

3.2.5 The Image Box

The Image Box is another control that handles images and pictures. It functions almost identically to the picture box. However, there is one major difference, the image in an Image Box is stretchable, which means it can be resized. This feature is not available in the Picture Box. Similar to the Picture Box, it can also

use the LoadPicture method to load the picture. For example, the statement loads the picture grape.gif into the image box.

Image1.Picture=LoadPicture ("C:\VB program\Images\grape.gif")

3.2.6 The List Box

The function of the List Box is to present a list of items where the user can click and select the items from the list. In order to add items to the list, we can use the **AddItem method**. For example, if you wish to add a number of items to list box 1, you can key in the following statements

Example 3.4

Private Sub Form_Load ( )

List1.AddItem “Lesson1”

List1.AddItem “Lesson2”

List1.AddItem “Lesson3”

List1.AddItem “Lesson4”

End Sub

The items in the list box can be identified by
the **ListIndex** property, the value of the ListIndex for the first item is 0, the second item has a ListIndex 1, and the third item has a ListIndex 2 and so on

3.2.7 The Combo Box

The function of the Combo Box is also to present a list of items where the user can click and select the items from the list. However, the user needs to click on the small arrowhead on the right of the combo box to see the items which are presented in a drop-down list. In order to add items to the list, you can also use the **AddItem method**. For example, if you wish to add a number of items to Combo box 1, you can key in the following statements

Example 3.5

Private Sub Form_Load ( )

Combo1.AddItem “Item1”

Combo1.AddItem “Item2”

```
Combo1.AddItem “Item3”

Combo1.AddItem “Item4”

End Sub
```

3.2.8 The Check Box

The Check Box control lets the user selects or unselects an option. When the Check Box is checked, its value is set to 1 and when it is unchecked, the value is set to 0. You can include the statements Check1.Value=1 to mark the Check Box and Check1.Value=0 to unmark the Check Box, as well as use them to initiate certain actions. For example, the program will change the background color of the form to red when the check box is unchecked and it will change to blue when the check box is checked. You will learn about the conditional statement If….Then….Elesif in later lesson. VbRed and vbBlue are color constants and BackColor is the background color property of the form.

Example 3.6

```
Private Sub Command1_Click()

If Check1.Value = 1 And Check2.Value = 0 Then
MsgBox "Apple is selected"
ElseIf Check2.Value = 1 And Check1.Value = 0 Then
MsgBox "Orange is selected"
Else
MsgBox "All are selected"
End If

End Sub
```

3.2.9 The Option Box

The Option Box control also lets the user selects one of the choices. However, two or more Option Boxes must work together because as one of the Option Boxes is selected, the other Option Boxes will be unselected. In fact, only one Option Box can be selected at one time. When an option box is selected, its value is set to “True” and when it is unselected; its value is set to “False”. In the following example, the shape control is placed in the form together with six Option Boxes. When the user clicks on different option boxes, different shapes will appear. The values of the shape control are 0, 1, and 2,3,4,5 which will make it appear as a

rectangle, a square, an oval shape, a rounded rectangle and a rounded square respectively.

Example 3.7

```
Private Sub Option1_Click ( )

Shape1.Shape = 0

End Sub

Private Sub Option2_Click()

Shape1.Shape = 1

End Sub

Private Sub Option3_Click()

Shape1.Shape = 2

End Sub

Private Sub Option4_Click()

Shape1.Shape = 3

End Sub

Private Sub Option5_Click()

Shape1.Shape = 4

End Sub

Private Sub Option6_Click()

Shape1.Shape = 5

End Sub
```

3.2.10 The Drive List Box

The Drive ListBox is for displaying a list of drives available in your computer. When you place this control into the form and run the program, you will be able to select different drives from your computer as shown in Figure 3.4

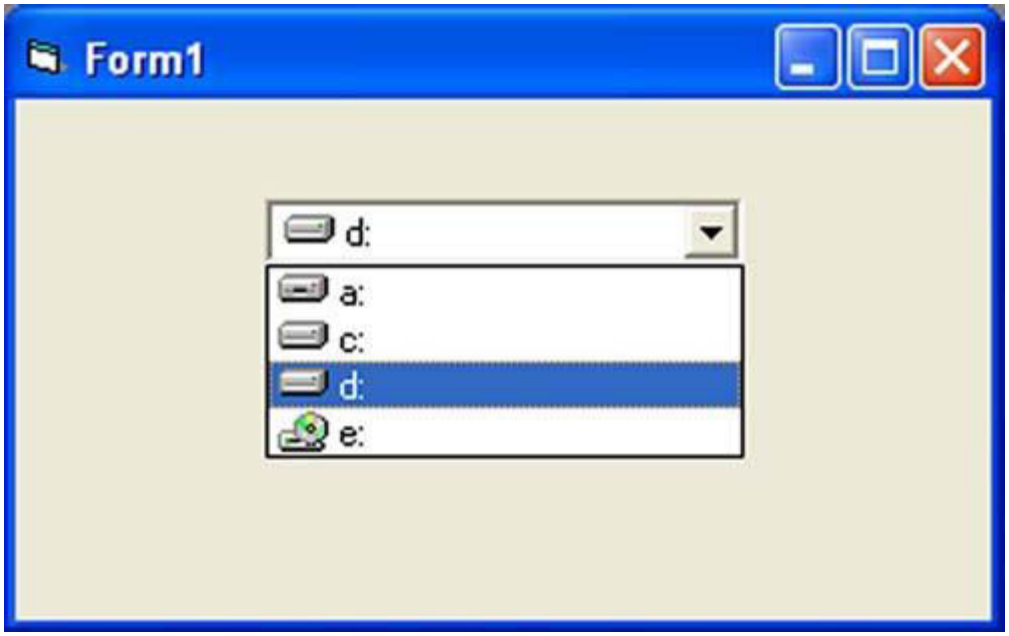


Figure 3.4 The Drive List Box

3.2.11 The Directory List Box

The Directory List Box is for displaying the list of directories or folders in a selected drive. When you place this control into the form and run the program, you will be able to select different directories from a selected drive in your computer as shown in Figure 3.5

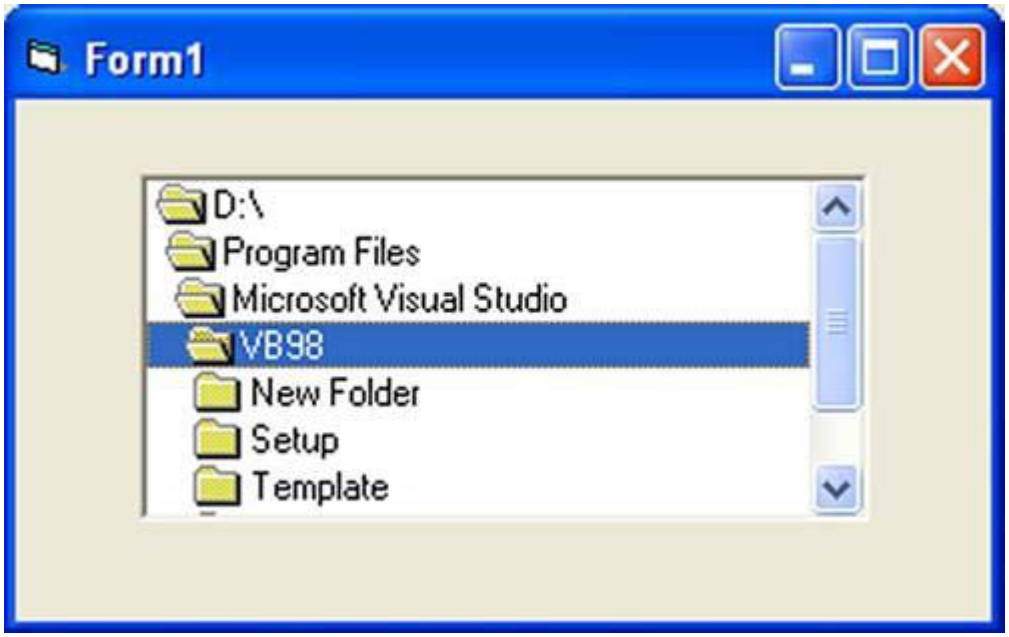


Figure 3.5 The Directory List Box

3.2.12 The File List Box

The File List Box is for displaying the list of files in a selected directory or folder. When you place this control into the form and run the program, you will be able to shown the list of files in a selected directory as shown in Figure 3.6

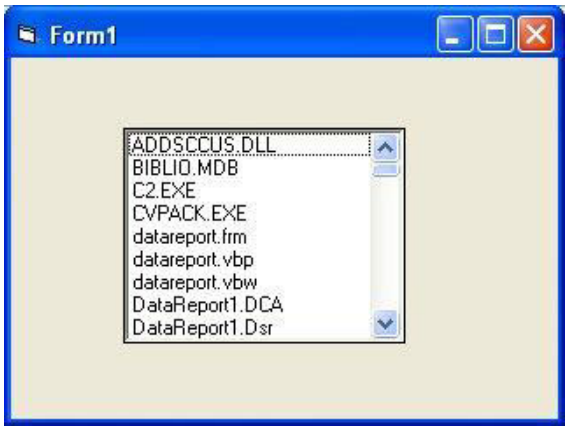


Figure 3.6 The File List Box

You can coordinate the Drive List Box, the Directory List Box and the File List Box to search for the files you want. The procedure will be discussed in later lessons.

3.1 The Control Properties

Before writing an event procedure for the control to response to an event, you have to set certain properties for the control to determine its appearance and how will it work with the event procedure. You can set the properties of the controls in the properties window or at runtime.

Figure 3.1 on the right is a typical properties window for a form. You can rename the form caption to any name that you like best. In the properties window, the item appears at the top part is the object currently selected (in Figure 3.1, the object selected is Form1). At the bottom part, the items listed in the left column represent the names of various properties associated with the selected object while the items listed in the right column represent the states of the properties. Properties can be set by highlighting the items in the right column then change them by typing or selecting the options available.

For example, in order to change the caption, just highlight Form1 under the name Caption and change it to other names. You may also try to alter the appearance of the form by setting it to 3D or

flat. Other things you can do are to change its foreground and background color, change the font type and font size, enable or disable, minimize and maximize buttons and more.

You can also change the properties at runtime to give special effects such as change of color, shape, animation effect and so on. For example the following code will change the form color to red every time the form is loaded. VB uses hexadecimal system to represent the color. You can check the color codes in the properties windows which are showed up under ForeColor and BackColor .

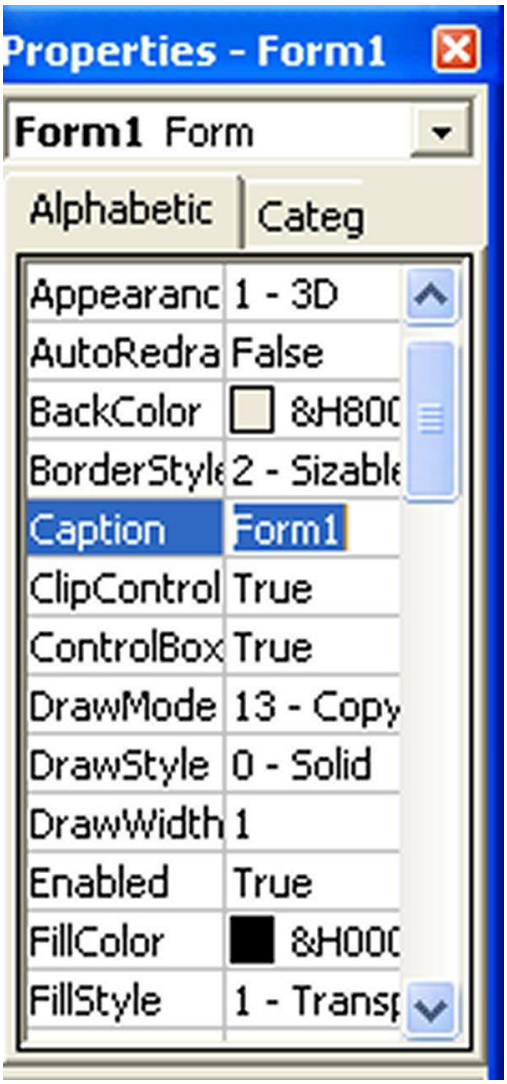


Figure 3.1

Example 3.1: Program to change background color

This example changes the background colour of the form using the **BackColor property**.

Private Sub Form_Load()

```
Form1.Show
   Form1.BackColor = &H000000FF&

End Sub
```

Example 3.2: Program to change shape

This example is to change the control's Shape using the **Shape property**. This code will change the shape to a circle at runtime.

```
Private Sub Form_Load()

Shape1.Shape = 3

End Sub
```

We are not going into the details on how to set the properties yet. However, we would like to stress a few important points about setting up the properties.

You should set the Caption Property of a control clearly so that a user knows what to do with that command.

Use a meaningful name for the Name Property because it is easier to write and read the event procedure and easier to debug or modify the programs later.

One more important property is whether to make the control enabled or not.

Finally, you must also considering making the control visible or invisible at runtime, or when should it become visible or invisible.

3.2 Handling some of the common controls

Figure 3.2 below is the VB6 toolbox that shows the basic controls.

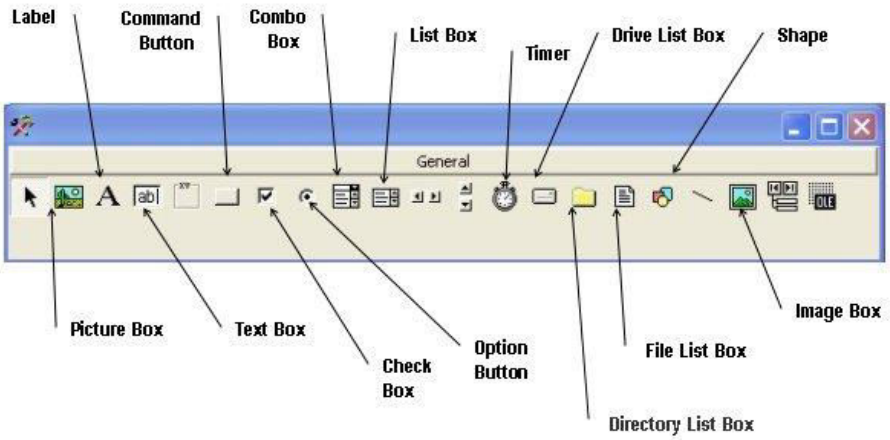


Figure 3.2: Toolbox

3.2.1 The Text Box

The text box is the standard control for accepting input from the user as well as to display the output. It can handle string (text) and numeric data but not images or pictures. Just like text fields in websites, powered not by Windows, but typically linux web hosting platforms like iPage, these fields collect user input.String in a text box can be converted to a numeric data by using the function Val(text). The following example illustrates a simple program that processes the input from the user.

Example 3.3

In this program, two text boxes are inserted into the form together with a few labels. The two text boxes are used to accept inputs from the user and one of the labels will be used to display the sum of two numbers that are entered into the two text boxes. Besides, a command button is also programmed to calculate the sum of the two numbers using the plus operator. The program use creates a variable sum to accept the summation of values from text box 1 and text box 2.The procedure to calculate and to display the output on the label is shown below. The output is shown in Figure 3.3

```
Private Sub Command1_Click()

'To add the values in text box 1 and text box 2

Sum = Val(Text1.Text) + Val(Text2.Text)
```

'To display the answer on label 1

Label1.Caption = Sum

End Sub

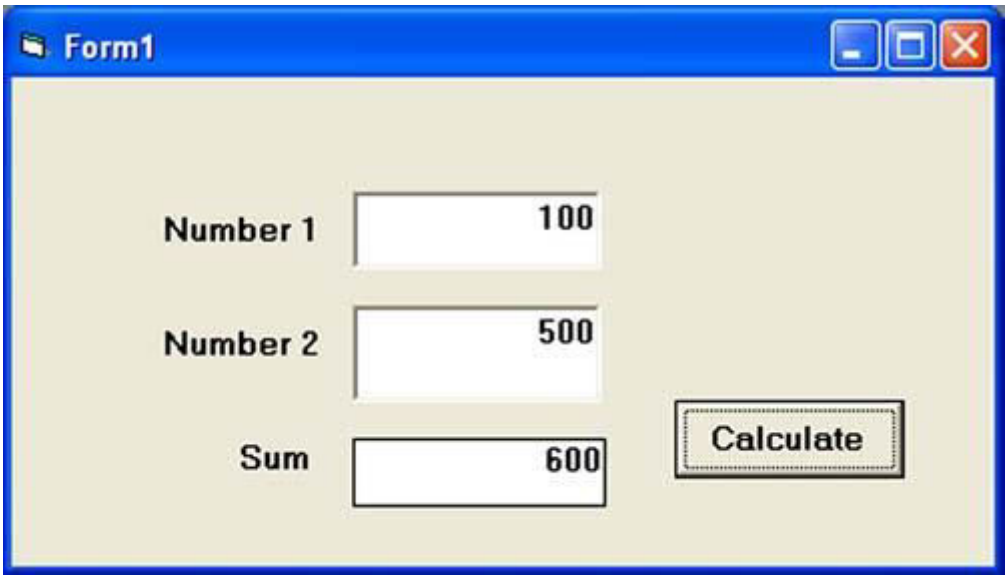


Figure 3.3

3.2.2 The Label

The label is a very useful control for Visual Basic, as it is not only used to provide instructions and guides to the users, it can also be used to display outputs. One of its most important properties is **Caption**. Using the syntax **label.Caption**, it can display text and numeric data . You can change its caption in the properties window and also at runtime. Please refer to Example 3.1 and Figure 3.1 for the usage of label.

3.2.3 The Command Button

The command button is one of the most important controls as it is used to execute commands. It displays an illusion that the button is pressed when the user click on it. The most common event associated with the command button is the Click event, and the syntax for the procedure is

Private Sub Command1_Click ()

Statements

End Sub

3.2.4 The Picture Box

The Picture Box is one of the controls that is used to handle graphics. You can load a picture at design phase by clicking on the picture item in the properties window and select the picture from the selected folder. You can also load the picture at runtime using the **LoadPicture** method. For example, the statement will load the picture grape.gif into the picture box.

Picture1.Picture=LoadPicture ("C:\VB program\Images\grape.gif")

You will learn more about the picture box in future lessons. The image in the picture box is not resizable.

3.2.5 The Image Box

The Image Box is another control that handles images and pictures. It functions almost identically to the picture box. However, there is one major difference, the image in an Image Box is stretchable, which means it can be resized. This feature is not available in the Picture Box. Similar to the Picture Box, it can also use the LoadPicture method to load the picture. For example, the statement loads the picture grape.gif into the image box.

Image1.Picture=LoadPicture ("C:\VB program\Images\grape.gif")

3.2.6 The List Box

The function of the List Box is to present a list of items where the user can click and select the items from the list. In order to add items to the list, we can use the **AddItem method**. For example, if you wish to add a number of items to list box 1, you can key in the following statements

Example 3.4

Private Sub Form_Load ( )

List1.AddItem “Lesson1”

List1.AddItem “Lesson2”

List1.AddItem “Lesson3”

List1.AddItem “Lesson4”

End Sub

The items in the list box can be identified by
the **ListIndex** property, the value of the ListIndex for the first item is 0, the second item has a ListIndex 1, and the third item has a ListIndex 2 and so on

3.2.7 The Combo Box

The function of the Combo Box is also to present a list of items where the user can click and select the items from the list. However, the user needs to click on the small arrowhead on the right of the combo box to see the items which are presented in a drop-down list. In order to add items to the list, you can also use the **AddItem method**. For example, if you wish to add a number of items to Combo box 1, you can key in the following statements

Example 3.5

Private Sub Form_Load ( )

Combo1.AddItem “Item1”

Combo1.AddItem “Item2”

Combo1.AddItem “Item3”

Combo1.AddItem “Item4”

End Sub

3.2.8 The Check Box

The Check Box control lets the user selects or unselects an option. When the Check Box is checked, its value is set to 1 and when it is unchecked, the value is set to 0. You can include the statements Check1.Value=1 to mark the Check Box and Check1.Value=0 to unmark the Check Box, as well as use them to initiate certain actions. For example, the program will change the background color of the form to red when the check box is unchecked and it will change to blue when the check box is checked. You will learn about the conditional statement If….Then….Elesif in later lesson. VbRed and vbBlue are color constants and BackColor is the background color property of the form.

Example 3.6

```
Private Sub Command1_Click()

If Check1.Value = 1 And Check2.Value = 0 Then
MsgBox "Apple is selected"
ElseIf Check2.Value = 1 And Check1.Value = 0 Then
MsgBox "Orange is selected"
Else
MsgBox "All are selected"
End If

End Sub
```

3.2.9 The Option Box

The Option Box control also lets the user selects one of the choices. However, two or more Option Boxes must work together because as one of the Option Boxes is selected, the other Option Boxes will be unselected. In fact, only one Option Box can be selected at one time. When an option box is selected, its value is set to “True” and when it is unselected; its value is set to “False”. In the following example, the shape control is placed in the form together with six Option Boxes. When the user clicks on different option boxes, different shapes will appear. The values of the shape control are 0, 1, and 2,3,4,5 which will make it appear as a rectangle, a square, an oval shape, a rounded rectangle and a rounded square respectively.

Example 3.7

```
Private Sub Option1_Click ( )

Shape1.Shape = 0

End Sub

Private Sub Option2_Click()

Shape1.Shape = 1

End Sub

Private Sub Option3_Click()

Shape1.Shape = 2

End Sub

Private Sub Option4_Click()
```

```
Shape1.Shape = 3

End Sub

Private Sub Option5_Click()

Shape1.Shape = 4

End Sub

Private Sub Option6_Click()

Shape1.Shape = 5

End Sub
```

3.2.10 The Drive List Box

The Drive ListBox is for displaying a list of drives available in your computer. When you place this control into the form and run the program, you will be able to select different drives from your computer as shown in Figure 3.4

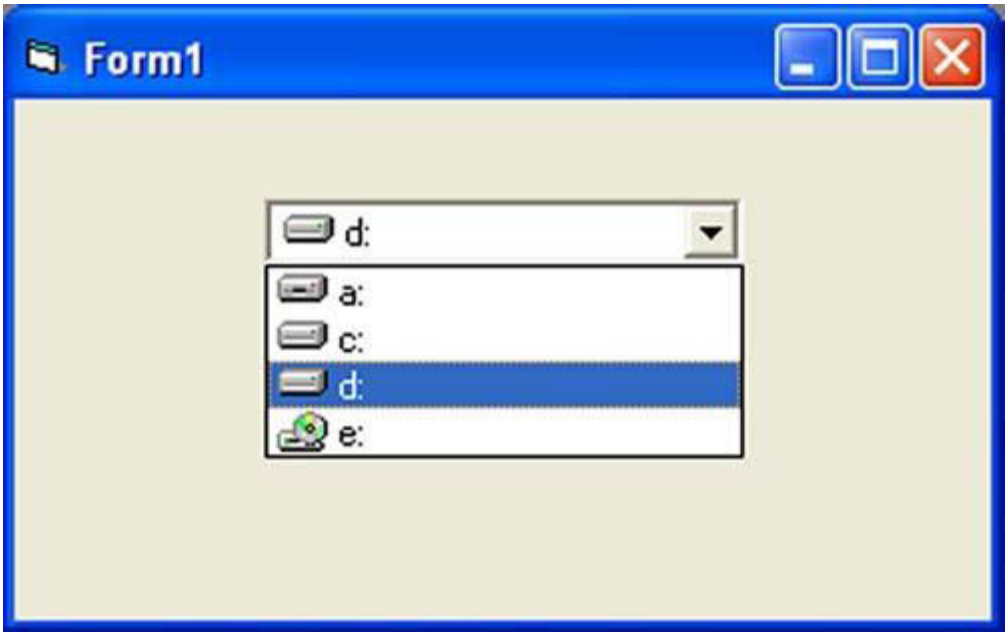


Figure 3.4 The Drive List Box

3.2.11 The Directory List Box

The Directory List Box is for displaying the list of directories or folders in a selected drive. When you place this control into the

form and run the program, you will be able to select different directories from a selected drive in your computer as shown in Figure 3.5

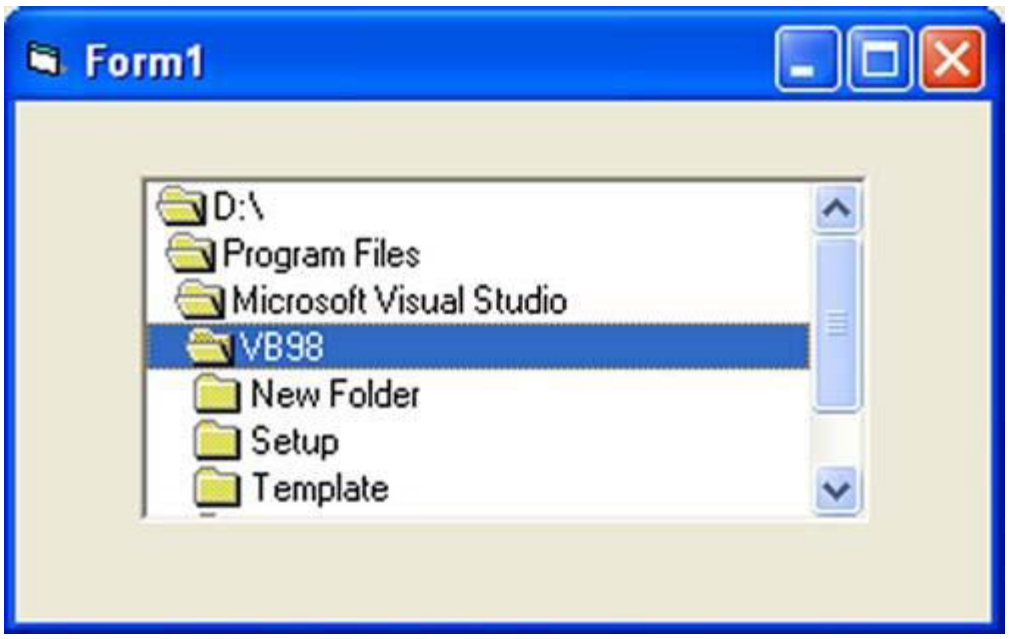


Figure 3.5 The Directory List Box

3.2.12 The File List Box

The File List Box is for displaying the list of files in a selected directory or folder. When you place this control into the form and run the program, you will be able to shown the list of files in a selected directory as shown in Figure 3.6

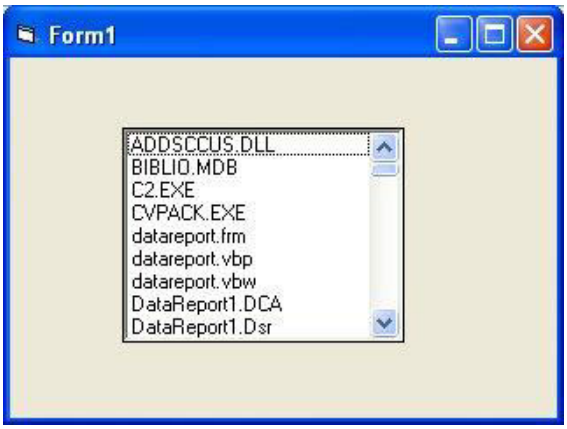


Figure 3.6 The File List Box

You can coordinate the Drive List Box, the Directory List Box and the File List Box to search for the files you want. The procedure will be discussed in later lessons.

Lesson 4 : Writing the Code

In this lesson, we shall learn some basic rules about writing the VB program code. Each control or object in VB can run many kinds of events; these events are listed in the dropdown list in the code window that is displayed when you double-click on an object and click on the procedures' box(refer to Figure 2.3). Among the events are loading a form, clicking on a command button, pressing a key on the keyboard or dragging an object and more. For each event, you need to write an event procedure so that it can perform an action or a series of actions.

To start writing an event procedure, you need to double-click an object. For example, if you want to write an event procedure for clicking a command button, you double-click the command button and an event procedure will appear in the code window, as shown in Figure 2.1. The structure is as follows:

Private Sub Command1_Click

(Key in your program code here)

End Sub

You then need to key-in the procedure in the space between **Private Sub Command1_Click..... End Sub**. **Sub** actually stands for sub procedure that made up a part of all the procedures in a program. The program code is made up of a number of statements that set certain properties or trigger some actions. The syntax of Visual Basic's program code is almost like the normal English language though not exactly the same, so it is very easy to learn.

The syntax to set the property of an object or to pass certain value to it is :

Object.Property

where **Object** and **Property** is separated by a period (or dot). For example, the statement **Form1.Show** means to show the form with the name Form1, **Iabel1.Visible=true** means label1 is set to be visible, **Text1.text="VB"** is to assign the text VB to the text box with the name Text1, Text2.text=100 is to pass a value of 100 to the text box with the name text2, **Timer1.Enabled=False** is to

disable the timer with the name Timer1 and so on. Let's examine a few examples below:

Example 4.1

```
Private Sub Command1_click

Label1.Visible=false

Label2.Visible=True

Text1.Text="You are correct!"

End sub
```

Example 4.2

```
Private Sub Command1_click

Label1.Caption=" Welcome"

Image1.visible=true

End sub
```

Example 4.3

```
Private Sub Command1_click

Pictuire1.Show=true

Timer1.Enabled=True

Lable1.Caption="Start Counting

End sub
```

In Example 4.1, clicking on the command button will make label1 become invisible and label2 become visible; and the text" You are correct" will appear in TextBox1. In Example 4.2, clicking on the command button will make the caption label1 change to "Welcome" and Image1 will become visible. In Example 4.3 , clicking on the command button will make Picture1 show up, timer starts running and the caption of label1 change to "Start Counting".This type of operation could be particularly useful in applications such as a website stat counter (most web hosting plans include some analytics or stat package).

Syntaxes that do not involve setting of properties are also English-like, some of the commands are **Print, If...Then....Else....End If, For...Next, Select Case.....End Select , End** and **Exit Sub.** For example, **Print " Visual Basic"** is to display the text Visual Basic on screen and **End** is to end the program. Other commands will be explained in details in the coming lessons.

Program code that involves calculations is fairly easy to write,just like what you do in mathematics. However, in order to write an event procedure that involves calculations, you need to know the basic arithmetic operators in VB as they are not exactly the same as the normal operators , except for **+** and **- .** For multiplication, we use *****, for division we use **/**, for raising a number x to the power of n, we use **x ^n** and for square root, we use **Sqr(x).** VB offers many more advanced mathematical functions such as **Sin,** Cos, Tan and **Log,** they will be discussed in lesson 10. There are also two important functions that are related to arithmetic operations, i.e. the functions **Val** and **Str$**where Val is to convert text to numerical value and Str$ is to convert numerical to a string (text). While the function Str$ is as important as VB can display a numeric values as string implicitly, failure to use Val will results in wrong calculation. Let's examine Example 4.4 and example 4.5.

Example 4.4

```
Private Sub Form_Activate()

Text3.text=text1.text+text2.text

End Sub
```

Example 4.5

```
Private Sub Form_Activate()

Text3.text=val(text1.text)+val(text2.text)

End Sub
```

When you run the program in example 4.4 and enter 12 in textbox1 and 3 in textbox2 will give you a result of 123, which is wrong. It is because VB treat the numbers as string and so it just joins up the two strings. On the other hand, running exampled 4.5 will give you the correct result, i.e., 15.

Lesson 5: Managing Visual Basic Data

5.1 Visual Basic Data Types

There are many types of data that we come across in our daily life. For example, we need to handle data such as names, addresses, money, date, stock quotes, statistics and more everyday. Similarly in Visual Basic, we have to deal with all sorts of of data, some can be mathematically calculated while some are in the form of text or other forms. VB divides data into different types so that they are easier to manage when we need to write the code involving those data.

Visual Basic classifies the information mentioned above into two major data types, they are the numeric data types and the non-numeric data types.

5.1.1 Numeric Data Types

Numeric data types are types of data that consist of numbers that can be computed mathematically with standard operators. Examples of numeric data types are height, weight, share values, price of goods, monthly bills, fees and others. In Visual Basic, numeric data are divided into 7 types, depending on the range of values they can store. Calculations that only involve round figures can use Integer or Long integer in the computation. Programs that require high precision calculation need to use Single and Double decision data types, they are also called floating point numbers. For currency calculation , you can use the currency data types. Lastly, if even more precision is required to perform calculations that involve a many decimal points, we can use the decimal data types. These data types summarized in Table 5.1

Table 5.1: Numeric Data Types

Type	Storage	Range of Values
Byte	1 byte	0 to 255
Integer	2 bytes	-32,768 to 32,767
Long	4 bytes	-2,147,483,648 to 2,147,483,648
Single	4 bytes	-3.402823E+38 to -1.401298E-45 for negative values 1.401298E-45 to 3.402823E+38 for positive values.
Double	8 bytes	-1.79769313486232e+308 to -4.94065645841247E-324 for negative values 4.94065645841247E-324 to 1.79769313486232e+308 for positive values.
Currency	8 bytes	-922,337,203,685,477.5808 to 922,337,203,685,477.5807
Decimal	12 bytes	+/- 79,228,162,514,264,337,593,543,950,335 if no decimal is use +/- 7.9228162514264337593543950335 (28 decimal places).

5.1.2 Non-numeric Data Types

Nonnumeric data types are data that cannot be manipulated mathematically. Non-numeric data comprises string data types, date data types, boolean data types that store only two values (true or false), object data type and Variant data type .They are summarized in Table 5.2

Table 5.2: Nonnumeric Data Types

Data Type	Storage	Range
String(fixed length)	Length of string	1 to 65,400 characters
String(variable length)	Length + 10 bytes	0 to 2 billion characters
Date	8 bytes	January 1, 100 to December 31, 9999
Boolean	2 bytes	True or False
Object	4 bytes	Any embedded object
Variant(numeric)	16 bytes	Any value as large as Double
Variant(text)	Length+22 bytes	Same as variable-length string

5.1.3 Suffixes for Literals

Literals are values that you assign to data. In some cases, we need to add a suffix behind a literal so that VB can handle the calculation more accurately. For example, we can use num=1.3089# for a Double type data. Some of the suffixes are displayed in Table 5.3.

Table 5.3

Suffix	Data Type

&	Long
!	Single
#	Double
@	Currency

In addition, we need to enclose string literals within two quotations and date and time literals within two # sign. Strings can contain any characters, including numbers. The following are few examples:

memberName="Turban, John."
TelNumber="1800-900-888-777"
LastDay=#31-Dec-00#
ExpTime=#12:00 am#

5.2 Managing Variables

Variables are like mail boxes in the post office. The contents of the variables changes every now and then, just like the mail boxes. In term of VB, variables are areas allocated by the computer memory to hold data. Like the mail boxes, each variable must be given a name. To name a variable in Visual Basic, you have to follow a set of rules. All modern programming languages such as PHP (PHP runs on hosts like iPage - see hosting review) allow us developers to use variables to store and retrieve data. Each language has its own special syntax to learn.

5.2.1 Variable Names

The following are the rules when naming the variables in Visual Basic

It must be less than 255 characters

No spacing is allowed

It must not begin with a number

Period is not permitted

Cannot use exclamation mark (!), or the characters @, &, $, #

Cannot repeat names within the same level of scope.

Examples of valid and invalid variable names are displayed in Table 5.4

Table 5.4: Examples of Valid and Invalid Variable Names

Valid Name	Invalid Name
My_Car	My.Car
this year	1NewBoy
Long_Name_Can_beUSE	He&HisFather *& is not acceptable

5.2.2 Declaring Variables Explicitly

In Visual Basic, it is a good practice to declare the variables before using them by assigning names and data types. They are normally declared in the general section of the codes' windows using the **Dim** statement. You can use any variable to hold any data , but different types of variables are designed to work efficiently with different data types .
The syantax is as follows:

Dim *VariableName* As *DataType*

If you want to declare more variables, you can declare them in separate lines or you may also combine more in one line , separating each variable with a comma, as follows:

Dim *VariableName1* As *DataType*1, *VariableName2* As *DataType*2, *VariableName3* As *DataType*3

Example 5.1

Dim password As String
Dim yourName As String
Dim firstnum As Integer
Dim secondnum As Integer
Dim total As Integer
Dim doDate As Date
Dim password As String, yourName As String, firstnum As Integer

Unlike other programming languages, Visual Basic actually doesn't require you to specifically declare a variable before it's used. If a variable isn't declared, VB willautomatically declare the variable as a Variant. A variant is data type that can hold any type of data.

For string declaration, there are two possible types, one for the variable-length string and another for the fixed-length string. For the variable-length string, just use the same format as example 5.1 above. However, for the fixed-length string, you have to use the format as shown below:

Dim VariableName as String * n, where n defines the number of characters the string can hold.

Example 5.2:

Dim yourName as String * 10

yourName can holds no more than 10 Characters.

5.2.2 Scope of Declaration

Other than using the Dim keyword to declare the data, you can also use other keywords to declare the data. Three other keywords are private ,static and public. The forms are as shown below:

Private *VariableName as* Datatype
Static *VariableName as* Datatype
Public *VariableName as* Datatype

The above keywords indicate the scope of declaration. Private declares a local variable, or a variable that is local to a procedure or module. However, Private is rarely used, we normally use Dim to declare a local variable. The Static keyword declares a variable that is being used multiple times, even after a procedure has been terminated. Most variables created inside a procedure are discarded by Visual Basic when the procedure is finished, static keyword preserve the value of a variable even after the procedure is terminated. Public is the keyword that declares a global variable, which means it can be used by all the procedures and modules of the whole program.

5.3 Constants

Constants are different from variables in the sense that their values do not change during the running of the program.

5.3.1 Declaring a Constant

The format to declare a constant is

Constant Name As *Data Type* = *Value*

Example 5.3

Const Pi As Single=3.142

Const Temp As Single=37

Const Score As Single=100

Lesson 6: Working with Variables

6.1 Assigning Values to Variables

After declaring various variables using the Dim statements, we can assign values to those variables. The syntax of an assignment is

Variable=Expression

The variable can be a declared variable or a control property value. The expression could be a mathematical expression, a number, a string, a Boolean value (true or false) and more.

The following are some examples variable assignment:

```
firstNumber=100
secondNumber=firstNumber-99
userName="John Lyan"
userpass.Text = password
Label1.Visible = True
Command1.Visible = false
Label4.Caption = textbox1.Text
ThirdNumber = Val(usernum1.Text)
X = (3.14159 / 180) * A
```

6.2 Operators in Visual Basic

To compute inputs from users and to generate results, we need to use various mathematical operators. In Visual Basic, except for + and -, the symbols for the operators are different from normal mathematical operators, as shown in Table 6.1.

Table 6.1: Arithmetic Operators

Operator	Mathematical function	Example
^	Exponential	2^4=16
*	Multiplication	4*3=12,
/	Division	12/4=3
Mod	Modulus (returns the remainder from an integer division)	15 Mod 4=3
\	Integer Division(discards the decimal places)	19\4=4
+ or &	String concatenation	"Visual"&"Basic"="Visual Basic"

Example 6.1

```
Private Sub Command1_Click()

Dim firstName As String
Dim secondName As String
Dim yourName As String
firstName = Text1.Text
secondName = Text2.Text
yourName = secondName + "  " + firstName
Label1.Caption = yourName

End Sub
```

In Example 6.1, three variables are declared as string. For variables firstName and secondName will receive their data from the user's input into textbox1 and textbox2, and the variable yourName will be assigned the data by combining the first two variables. Finally, yourName is displayed on Label1.

Example 6.2

```
Dim number1, number2, number3 as Integer

Dim total, average as variant

Private sub Form_Click

number1=val(Text1.Text)
number2=val(Text2.Text)
number3= val(Text3.Text)

Total=number1+number2+number3

Average=Total/5

Label1.Caption=Total

Label2.Caption=Average

End Sub
```

In the Example 6.2, three variables are declared as integer and two variables are declared as variant. Variant means the variable can hold any data type. The program computes the total and average of the three numbers that are entered into three text boxes.

Lesson 7 : Controlling Program Flow

In previous lessons, we have learned how to create Visual Basic code that can accept input from the user and display the output without controlling the program flow. In this chapter, you will learn how to crreate VB code that can make decision when it process input from the user, and control the program flow in the process. Decision making process is an important part of programming because it can help to solve practical problems intelligently so that it can provide useful output or feedback to the user. For example, we can write a program that can ask the computer to perform certain task until a certain condition is met.

7.1 Conditional Operators

To control the VB program flow, we can use various conditional operators. Basically, they resemble mathematical operators. Conditional operators are very powerful tools, they let the VB program compare data values and then decide what action to

take, whether to execute a program or terminate the program and more. These operators are shown in Table 7.1.

Table 7.1: Conditional Operators

Operator	Meaning
=	Equal to
>	More than
<	Less Than
>=	More than or equal
<=	Less than or equal
<>	Not Equal to

7.2 Logical Operators

In addition to conditional operators, there are a few logical operators that offer added power to the VB programs. They are shown in Table 7.2.

Table 7.2:Logical Operators

Operator	Meaning
And	Both sides must be true
or	One side or other must be true

Xor	One side or other must be true but not both
Not	Negates truth

You can also compare strings with the operators. However, there are certain rules to follow where upper case letters are less than lowercase letters, and number are less than letters.

7.3 Using If.....Then.....Else Statements with Operators

To effectively control the VB program flow, we shall use **If...Then...Else** statement together with the conditional operators and logical operators.

If conditions **Then**

VB expressions

Else

VB expressions

End If

Example 7.1:

```
Private Sub OK_Click()

firstnum=Val(usernum1.Text)
secondnum=Val(usernum2.Text)
If total=firstnum+secondnum And Val(sum.Text)<>0 Then
correct.Visible = True
wrong.Visible = False
correct.Visible = False
wrong.Visible = True
End If

End Sub
```

LESSON 8 : SELECT CASE CONTROL STRUCTURE

In previous lesson, we have learned how to control the program flow using **If...Then...ElseIf** control structure. In this lesson, you shall examine another way to control the program flow, that is,

the **Select Case** control structure. The Select Case control structure is slightly different from the If....ElseIf control structure .The difference is that the **Select Case** control structure can handle conditions with multiple outcomes in an easier manner than the **If...Then...ElseIf** control structure. The syntax of the Select Case control structure is show below:

```
Select Case expression

Case value1
        Block of one or more VB statements
  Case value2
        Block of one or more VB Statements

                                                                .
  Case Else
     Block of one or more VB Statements

End Select
```

Example 8.1

```
Dim grade As String

Private Sub Compute_Click( )

grade=txtgrade.Text

Select Case grade

Case  "A"
      result.Caption="High  Distinction"

Case "A-"
     result.Caption="Distinction"

Case "B"
       result.Caption="Credit"

Case "C"
       result.Caption="Pass"

Case Else
       result.Caption="Fail"

End Select

End Sub
```

Example 8.2

```
Dim mark As Single


Private Sub Compute_Click()
'Examination Marks

mark = mrk.Text

Select Case mark

Case Is >= 85

     comment.Caption = "Excellence"

Case Is >= 70

    comment.Caption = "Good"


Case Is >= 60

comment.Caption = "Above Average"

Case Is >= 50

comment.Caption = "Average"

Case Else

comment.Caption = "Need to work harder"

End Select

End Sub
```

Example 8.3

Example 8.2 can be rewritten as follows:

```
Dim mark As Single
```

```
Private Sub Compute_Click()

'Examination Marks

mark = mrk.Text



Select Case mark

Case 0 to 49

comment.Caption =" Need to work harder"

Case 50 to 59>/p>

comment.Caption = "Average"

Case 60 to 69

comment.Caption = "Above Average"

Case 70 to 84

comment.Caption = "Good"

Case Else

comment.Caption = "Excellence"

End Select

End Sub
```

LESSON 9: LOOPING

In lesson 7 and lesson 8, we have learned how to handle decisions making process using If...Then...Else and also Select Case program structures in Visual Basic. Another procedure that involves decisions making is looping. Visual Basic allows a procedure to be repeated many times until a condition or a set of conditions is fulfilled. This is generally called looping . Looping is a very useful feature of Visual Basic because it makes repetitive works easier. There are two kinds of loops in Visual Basic, the **Do...Loop** and the **For.....Next loop**.

9.1 Do Loop

The Do Loop statements have three different forms, as shown below:

Do While condition

Block of one or more VB statements

Loop

b) Do
Block of one or more VB statements
Loop While condition

c) Do Until condition
Block of one or more VB statements
Loop

d) Do
Block of one or more VB statements

Loop Until condition

Example 9.1

Do while counter <=1000

num.Text=counter

counter =counter+1

Loop

The above example will keep on adding until counter >1000.

The above example can be rewritten as

Do

```
num.Text=counter
      counter=counter+1

Loop until counter>1000
```

9.2 Exiting the Loop

Sometime we need exit to exit a loop earlier when a certain condition is fulfilled. The keyword to use is **Exit Do**. You can examine Example 9.2 for its usage.

Example 9.2

```
Dim sum, n As Integer

Private Sub Form_Activate()

List1.AddItem "n" & vbTab & "sum"

Do

n = n + 1

Sum = Sum + n

List1.AddItem n & vbTab& Sum

If n = 100 Then

Exit Do

End If

Loop

End Sub
```

Explanation

In the above example, we compute the summation of 1+2+3+4+……+100. In the design stage, you need to insert a ListBox into the form for displaying the output, named List1. The program uses the AddItem method to populate the ListBox. The statement List1.AddItem "n" & vbTab & "sum" will display the headings in the ListBox, where it uses the vbTab function to create a space between the headings n and sum.

9.3 For....Next Loop

The For....Next Loop event procedure is written as follows:

For counter=startNumber to endNumber (Step increment)

One or more VB statements

Next

Example 9.3 a

For counter=1 to 10

display.Text=counter

Next

Example 9.3 b

For counter=1 to 1000 step 10

counter=counter+1

Next

Example 9.3 c

For counter=1000 to 5 step -5

counter=counter-10

Next

Sometimes the user might want to get out from the loop before the whole repetitive process is executed, the command to use is **Exit For**. To exit a For....Next Loop, you can place the **Exit For** statement within the loop; and it is normally used together with the If.....Then... statement. Its usages is shown in Example 9.3 d.

Example 9.3 d

Private Sub Form_Activate( )

For n=1 to 10
If n>6 then
Exit For

```
End If
Else
Print n
End If

End Sub
```

9.4 Nested For...Next Loop

When you have a loop within a loop, then you have created a nested loop. You can actually have as many loops as you want in a nested loop provided the loops are not the never-ending type. For a nested loop that consists of two loops, the first cycle of the outer loop will be processed first, then it will process the whole repetitive process of the inner loop, then the second cycle of the outer loop will be processed and again the whole repetitive process of the inner loop will be processed. The program will end when the whole cycle of the outer loop is processed.

The Structure of a nested loop is :

```
For counter1=startNumber to endNumber (Step increment)

For counter2=startNumber to endNumber (Step increment)

One or more VB statements

Next counter2

Next  counter1
```

Example 9.4

```
Private Sub Form_Activate ( )

For  firstCounter= 1to 5

Print “Hello”

For   secondCounter=1 to 4

Print “Welcome to the VB tutorial”

Next secondCounter

Next firstCounter
```

Print” Thank you”

End Sub

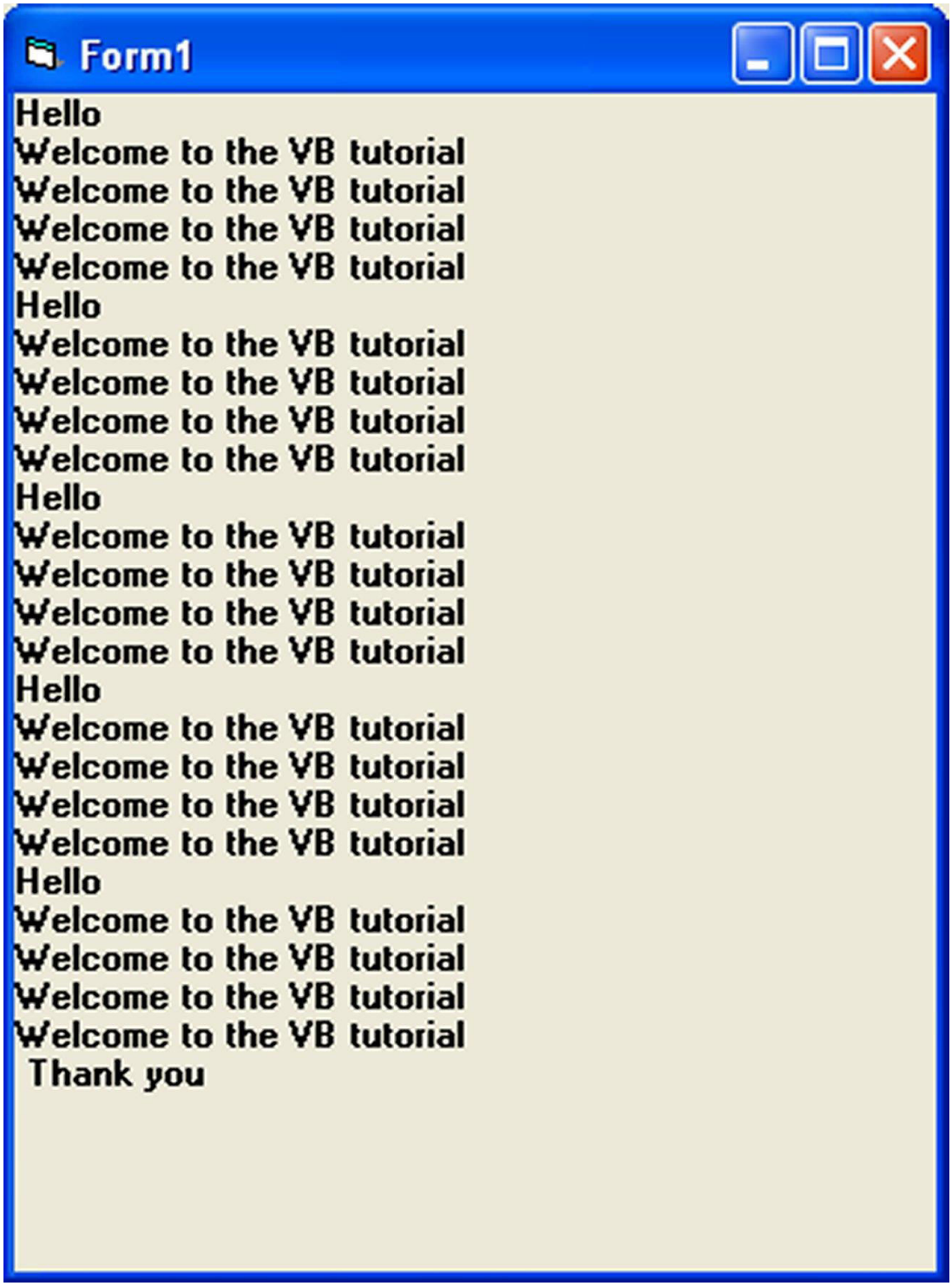


Figure 9.1

The output of the above program is shown in Figure 9.1. As the outer loop has five repetitions, it will print the word “Hello” five

times. Each time after it prints the word “Hello”, it will print four lines of the “Welcome to the VB tutorial” sentences as the inner loop has four repetitions.

9.5 The While….Wend Loop

The structure of a While….Wend Loop is very similar to the Do Loop. it takes the following form:

While condition

Statements

Wend

The above loop means that while the condition is not met, the loop will go on. The loop will end when the condition is met. Let’s examine the program listed in example 9.4.

Example 9.5

```
Dim sum, n  As Integer

Private Sub Form_Activate()

List1.AddItem "n" & vbTab & "sum"

While n <> 100

n = n + 1

Sum = Sum + n

List1.AddItem n & vbTab & Sum

Wend

End Sub
```

LESSON 10: VB BUILT-IN FUNCTIONS

A function is similar to a procedure but the main purpose of the function is to accept a certain input from the user and return a value which is passed on to the main program to finish the execution.

There are two types of functions in VB6, the built-in functions (or internal functions) and the functions created by the programmers.

The syntax of a function is:

FunctionName (arguments)

The arguments are values that are passed on to the function.

In this lesson, you will learn two very basic but useful internal functions of Visual basic , i.e. the **MsgBox( )** and **InputBox ( )** functions. We shall learn about other built-in functions in coming lessons.

10.1 MSGBOX ( ) FUNCTION

The objective of MsgBox is to produce a pop-up message box that prompt the user to click on a command button before he /she can continues. This format is as follows:

yourMsg=MsgBox(Prompt, Style Value, Title)

The first argument, Prompt, will display the message in the message box. The Style Value will determine what type of command buttons appear on the message box, please refer Table 10.1 for types of command button displayed. The Title argument will display the title of the message board.

Table 10.1: Style Values

Style Value	***Named Constant***	***Buttons Displayed***
0	vbOkOnly	Ok button
1	vbOkCancel	Ok and Cancel buttons
2	vbAbortRetryIgnore	Abort, Retry and Ignore buttons.
3	vbYesNoCancel	Yes, No and Cancel buttons

4	vbYesNo	Yes and No buttons
5	vbRetryCancel	Retry and Cancel buttons

We can use named constant in place of integers for the second argument to make the programs more readable. In fact, VB6 will automatically shows up a list of names constant where you can select one of them.

Example: yourMsg=MsgBox("Click OK to Proceed", 1, "Startup Menu")

and yourMsg=Msg("Click OK to Proceed". vbOkCancel,"Startup Menu")

are the same.

yourMsg is a variable that holds values that are returned by the MsgBox ( ) function. The values are determined by the type of buttons being clicked by the users. It has to be declared as Integer data type in the procedure or in the general declaration section. **Table 10.2** shows the values, the corresponding named constant and buttons.

Table 10.2 : Return Values and Command Buttons

Value	***Named Constant***	***Button Clicked***
1	vbOk	Ok button
2	vbCancel>	Cancel button
3	vbAbort	Abort button
4	vbRetry	Retry button
5	vbIgnore	Ignore button
6	vbYes	Yes button

7	vbNo	No button

Example 10.1

The Interface:

You draw three command buttons and a label as shown in Figure 10.1

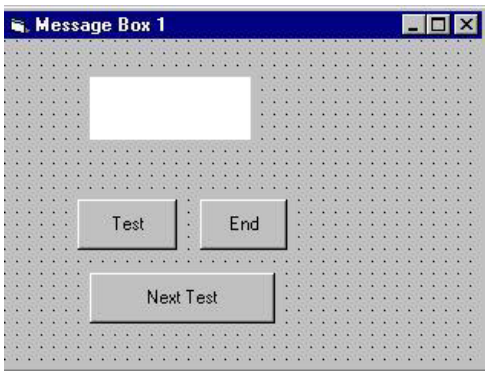


Figure 10.1

The procedure for the test button:

```
Private Sub Test_Click()
Dim testmsg As Integer
testmsg = MsgBox("Click to test", 1, "Test message")
If testmsg = 1 Then
Display.Caption = "Testing Successful"
Else
Display.Caption = "Testing fail"
End If

End Sub
```

When the user click on the test button, the image like the one shown in Figure 10.2 will appear. As the user click on the OK button, the message "Testing successful" will be displayed and when he/she clicks on the Cancel button, the message "Testing fail" will be displayed.

Figure 10.2

To make the message box looks more sophisticated, you can add an icon besides the message. There are four types of icons available in VB as shown in Table 10.3

Table 10.3

16	vbCritical	
32	vbQuestion	
48	vbExclamation	
64	vbInformation	

Example 10.2

You draw the same Interface as in example 10.1 but modify the codes as follows:

```
Private Sub test2_Click()

Dim testMsg2 As Integer
testMsg2 = MsgBox("Click to Test", vbYesNoCancel +
vbExclamation, "Test Message")
If testMsg2 = 6 Then
display2.Caption = "Testing successful"
ElseIf testMsg2 = 7 Then
display2.Caption = "Are you sure?"
Else
display2.Caption = "Testing fail"
End If

End Sub
```

In this example, the following message box will be displayed:

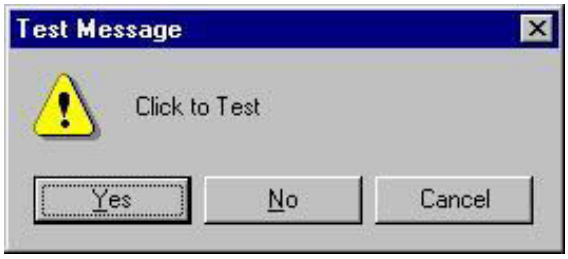


Figure 10.3

10.2 THE INPUTBOX( ) FUNCTION

An InputBox( ) function will display a message box where the user can enter a value or a message in the form of text. The format is

myMessage=InputBox(Prompt, Title, default_text, x-position, y-position)

myMessage is a variant data type but typically it is declared as string, which accept the message input by the users. The arguments are explained as follows:

Prompt - The message displayed normally as a question asked.

Title - The title of the Input Box.

default-text - The default text that appears in the input field where users can use it as his intended input or he may change to the message he wish to key in.

x-position and y-position - the position or the coordinate of the input box.

Example 10.3

The Interface

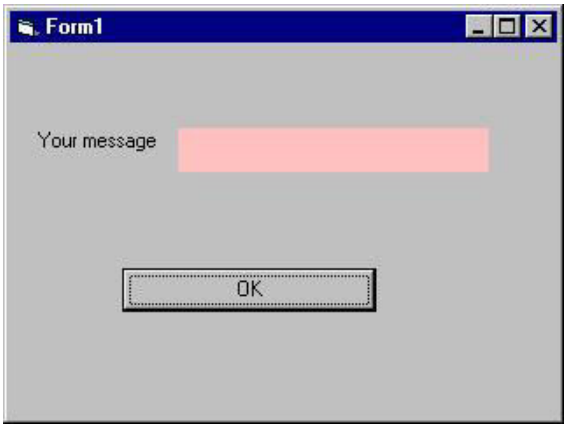


Figure 10.4

The procedure for the OK button

```
Private Sub OK_Click()

Dim userMsg As String
userMsg = InputBox("What is your message?", "Message Entry
Form", "Enter your messge here", 500, 700)
If userMsg <> "" Then
message.Caption = userMsg
Else
message.Caption = "No Message"
End If

End Sub
```

When the user clicks the OK button, the input box as shown in Figure 10.5 will appear. Upon entering the message and click OK, the message will be displayed on the caption, if the Cancel button is clicked, "No message" will be displayed.

Figure 10.5

LESSON 11: MATHEMATICAL FUNCTIONS

The mathematical functions are very useful and important in programming because very often we need to deal with mathematical concepts in programming such as chance and probability, variables, mathematical logics, calculations, coordinates, time intervals and etc. The common mathematical functions in Visual Basic are **Rnd, Sqr, Int, Abs, Exp, Log, Sin, Cos, Tan , Atn, Fix** and **Round.**

11.1 THE RND FUNCTION

Rnd is is very useful function for dealing with the concept of chance and probability. The Rnd function returns a random value between 0 and 1. In Example 11.1. When you run the program, you will get an output of 10 random numbers between 0 and 1. Randomize Timer is to randomize the process.

Example 11.1 Random Number Generation:

```
Private Sub Form_Activate

Randomize Timer

For x=1 to 10

Print  Rnd

Next x

End Sub
```

Figure 11.1: Runtime Interface of Example 11.1

Random numbers in their original forms are not very useful in programming until we convert them to integers. For example, if we need to obtain a random output of 6 random integers ranging

from 1 to 6, which make the program behaves as a virtual die, we need to convert the random numbers using the format **Int(Rnd*6)+1**. Let's study the following example:

In this example, Int(Rnd*6) will generate a random integer between 0 and 5 because the function **Int** truncates the decimal part of the random number and returns an integer. After adding 1, you will get a random number between 1 and 6 every time you click the command button. For example, let say the random number generated is 0.98, after multiplying it by 6, it becomes 5.88, and using the integer function Int(5.88) will convert the number to 5; and after adding 1 you will get 6.

In this example, you place a command button and change its caption to 'roll die'. You also need to insert a label into the form and clear its caption at the designing phase and make its font bigger and bold. Then set the border value to 1 so that it displays a border; and after that set the alignment to center. The statement Label1.Caption=Num means the integer generated will be displayed as the caption of the label.

Example 11.2:

```
Dim num as integer

Private Sub Command1_Click ( )

Randomize Timer

Num=Int(Rnd*6)+1

Label1.Caption=Num

End Sub
```

Now, run the program and then click on the roll die button, you will get an output like the Figure 11.2 below:

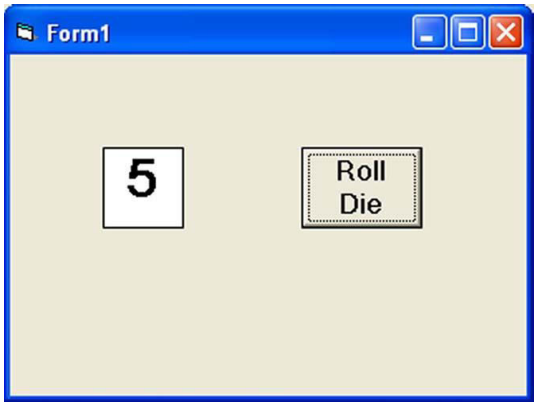


Figure 11.2

11.2 The Numeric Functions

The numeric functions are **Int**, **Sqr**, **Abs**, **Exp**, **Fix**, **Round** and Log.

Int is the function that converts a number into an integer by truncating its decimal part and the resulting integer is the largest integer that is smaller than the number. For example, Int(2.4)=2, Int(4.8)=4, Int(-4.6)= -5, Int(0.032)=0 and so on.

Sqr is the function that computes the square root of a number. For example, Sqr(4)=2, Sqr(9)=2 and etc.

Abs is the function that returns the absolute value of a number. So Abs(-8) = 8 and Abs(8)= 8.

Exp of a number x is the value of e^x. For example, Exp(1)=e^1 = 2.7182818284590

Fix and **Int** are the same if the number is a positive number as both truncate the decimal part of the number and return an integer. However, when the number is negative, it will return the smallest integer that is larger than the number. For example, Fix(-6.34)= -6 while Int(-6.34)=-7.

Round is the function that rounds up a number to a certain number of decimal places. The Format is Round (n, m) which means to round a number n to m decimal places. For example, Round (7.2567, 2) =7.26

Log is the function that returns the natural Logarithm of a number. For example,

Log 10= 2.302585

Example 11.3

This example computes the values of Int(x), Fix(x) and Round(x,n) in a table form. It uses the Do Loop statement and the Rnd function to generate 10 numbers. The statement x = Round (Rnd * 7, 7) rounds a random number between 0 and 7 to 7 decimal places. Using commas in between items will create spaces between them and hence a table of values can be created. The program and output are shown below

```
Private Sub Form_Activate ()

n = 1

Print " n", "      x", "Int(x)", "Fix(x)", "Round(x, 4)"

Do While n < 11

Randomize Timer

x = Round (Rnd * 7, 7)

Print n, x, Int(x), Fix(x), Round(x, 4)

n = n + 1

Loop

End Sub
```

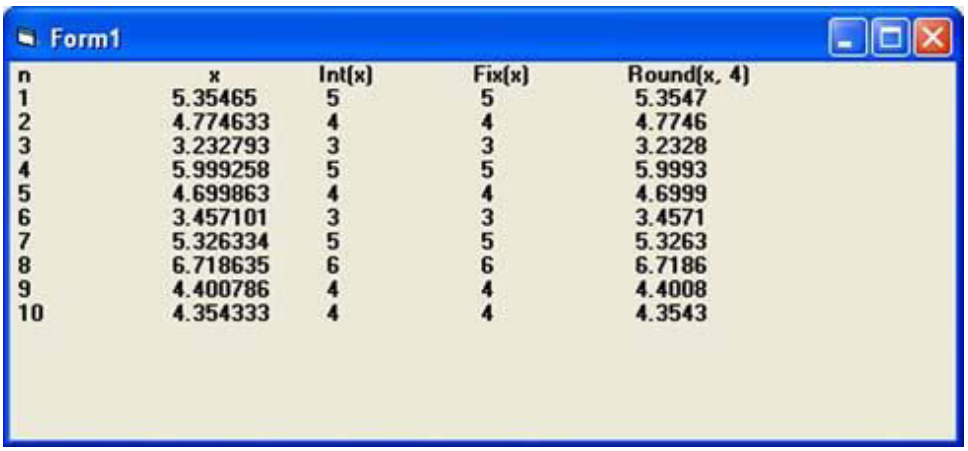


Figure 11.3: The Output Interface

LESSON 12: FORMATTING FUNCTIONS

Formatting output is an important part of programming so that the visual interface can be presented clearly to the users. Data in the previous lesson were presented fairly systematically through the use of commas and some of the functions like Int, Fix and Round. However, to better present the output, we can use a number of formatting functions in Visual basic.

The three most common formatting functions in VB are **Tab**, **Space**, and **Format**

12.1 THE TAB FUNCTION

The syntax of a Tab function is **Tab (n); x**

The item x will be displayed at a position that is n spaces from the left border of the output form. There must be a semicolon in between Tab and the items you intend to display (VB will actually do it for you automatically).

Example 12.1

```
.Private Sub Form_Activate

Print "I"; Tab(5); "like"; Tab(10); "to"; Tab(15); "learn"; Tab(20); "VB"

Print

Print Tab(10); "I"; Tab(15); "like"; Tab(20); "to"; Tab(25); "learn"; Tab(20); "VB"

Print

Print Tab(15); "I"; Tab(20); ; "like"; Tab(25); "to"; Tab(30); "learn"; Tab(35); “VB"

End sub
```

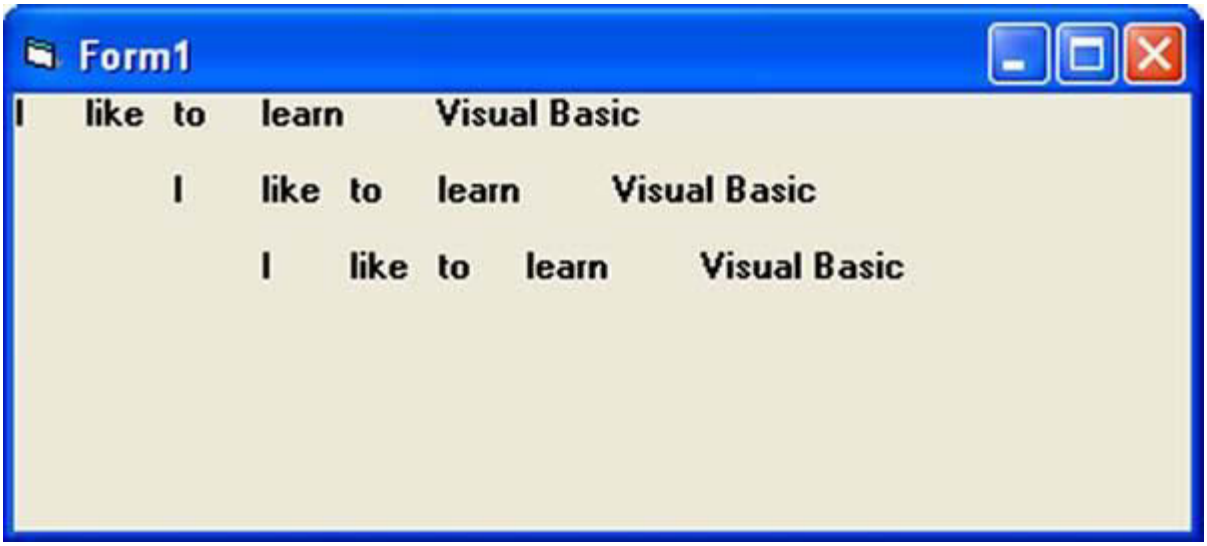


Figure 12.1: Output of Example 12.1

12.2 THE SPACE FUNCTION

The **Space** function is very closely linked to the Tab function. However, there is a minor difference. While Tab (n) means the item is placed n spaces from the left border of the screen, the Space function specifies the number of spaces between two consecutive items. For example, the procedure

Example 12.2

```
Private Sub Form_Activate()

Print "Visual"; Space(10); "Basic"

End Sub
```

Means that the words Visual and Basic will be separated by 10 spaces

12.3 THE FORMAT FUNCTION

The **Format** function is a very powerful formatting function which can display the numeric values in various forms. There are two types of Format function, one of them is the built-in or predefined format while another one can be defined by the users.

The syntax of the predefined Format function is

Format (n, “style argument”)

where n is a number and the list of style arguments is given in Table 12.1

Table 12.1: List of Style Arguments

General Number	To display the number without having separators between thousands.	Format(8972.234, "General Number")=8972.234
Fixed	To display the number without having separators between thousands and rounds it up to two decimal places.	Format(8972.2, "Fixed")=8972.23
Standard	To display the number with separators or separators between thousands and rounds it up to two decimal places.	Format(6648972.265, "Standard")= 6,648,972.27
Currency	To display the number with the dollar sign in front, has separators between thousands as well as rounding it up to two decimal places.	Format(6648972.265, "Currency")= $6,648,972.27
Percent	Converts the number to the percentage form and displays a % sign and rounds it up to two decimal places.	Format(0.56324, "Percent")=56.32 %

Example 12.3

```
Private Sub Form_Activate()

Print Format (8972.234, "General Number")

Print Format (8972.2, "Fixed")

Print Format (6648972.265, "Standard")

Print Format (6648972.265, "Currency")

Print Format (0.56324, "Percent")

End Sub
```

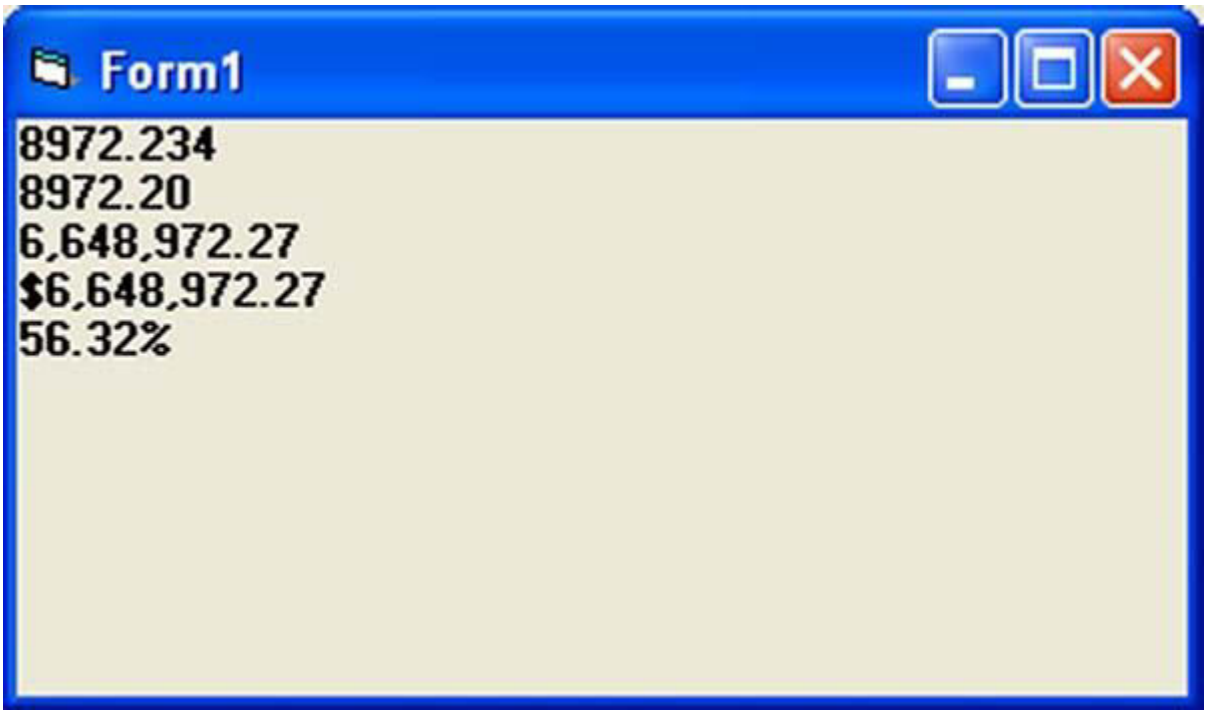


Figure 12.2: Output of Example 12.3

The syntax of the user-defined Format function is

Format (n, "user's format")

Although it is known as user-defined format, we still need to follows certain formatting styles. Examples of user-defined formatting style are listed in Table 12.2

Table 12.2: User-Defined Formatting Functions

Format(781234.57,"0")	Rounds to whole number without	781235

	separators between thousands.	
Format(781234.57,”0.0”)	Rounds to 1 decimal place without separators between thousands.	781234.6
Format(781234.576,”0.00”)	Rounds to 2 decimal places without separators between thousands.	781234.58
Format(781234.576,”#,##0.00”)	Rounds to 2 decimal places with separators between thousands.	781,234.58
Format(781234.576,”$#,##0.00”)	Shows dollar sign and rounds to 2 decimal places with separators between thousands.	$781,234.58
Format(0.576,”0%”)	Converts to percentage form without decimal	58%

	places.	
Format(0.5768,”0.00%”)	Converts to percentage form with 2 decimal places.	57.68%

Example 12.4

```
Private Sub Form_Activate()

Print Format(781234.57, "0")
Print Format(781234.57, "0.0")
Print Format(781234.576, "0.00")
Print Format(781234.576, "#,##0.00")
Print Format(781234.576, "$#,##0.00")
Print Format(0.576, "0%")
Print Format(0.5768, "0.00%")

End Sub
```

LESSON 13: STRING MANIPULATION FUNCTIONS

In this lesson, we will learn how to use some of the string manipulation function such as Len, Right, Left, Mid, Trim, Ltrim, Rtrim, Ucase, Lcase, Instr, Val, Str ,Chr and Asc.

13.1 The Len Function

The length function returns an integer value which is the length of a phrase or a sentence, including the empty spaces. The syntax is

Len (“Phrase”)

For example,

Len (VisualBasic) = 11 and Len (welcome to VB tutorial) = 22

The Len function can also return the number of digits or memory locations of a number that is stored in the computer. For example,

X=sqr (16)

Y=1234

Z#=10#

Then Len(x)=1, Len(y)=4, and Len (z)=8

The reason why Len(z)=8 is because z# is a double precision number and so it is allocated more memory spaces.

13.2 The Right Function

The Right function extracts the right portion of a phrase. The syntax is

Right ("Phrase", n)

Where n is the starting position from the right of the phrase where the portion of the phrase is going to be extracted. For example,

Right("Visual Basic", 4) = asic

13.3 The Left Function

The Left$ function extract the left portion of a phrase. The syntax is

Left("Phrase", n)

Where n is the starting position from the left of the phase where the portion of the phrase is going to be extracted. For example,

Left ("Visual Basic", 4) = Visu

12.4 The Ltrim Function

The Ltrim function trims the empty spaces of the left portion of the phrase. The syntax is

Ltrim("Phrase")

.For example,

Ltrim (" Visual Basic", 4)= Visual basic

13.5 The Rtrim Function

The Rtrim function trims the empty spaces of the right portion of the phrase. The syntax is

Rtrim("Phrase")

.For example,

Rtrim (“Visual Basic ”, 4) = Visual basic

13.6 The Trim function

The Trim function trims the empty spaces on both side of the phrase. The syntax is

Trim(“Phrase”)

.For example,

Trim (“ Visual Basic ”) = Visual basic

13.7 The Mid Function

The **Mid** function extracts a substring from the original phrase or string. It takes the following format:

Mid(phrase, position, n)

Where position is the starting position of the phrase from which the extraction process will start and n is the number of characters to be extracted. For example,

Mid(“Visual Basic”, 3, 6) = ual Bas

13.8 The InStr function

The **InStr** function looks for a phrase that is embedded within the original phrase and returns the starting position of the embedded phrase. The syntax is

Instr (n, original phase, embedded phrase)

Where n is the position where the Instr function will begin to look for the embedded phrase. For example

Instr(1, “Visual Basic”,” Basic”)=8

13.9 The Ucase and the Lcase functions

The **Ucase** function converts all the characters of a string to capital letters. On the other hand, the **Lcase** function converts all the characters of a string to small letters. For example,

Ucase(“Visual Basic”) =VISUAL BASIC

Lcase("Visual Basic") =visual basic

13.10 The Str and Val functions

The **Str** is the function that converts a number to a string while the **Val** function converts a string to a number. The two functions are important when we need to perform mathematical operations.

13.11 The Chr and the Asc functions

The **Chr** function returns the string that corresponds to an ASCII code while the **Asc** function converts an ASCII character or symbol to the corresponding ASCII code. ASCII stands for "American Standard Code for Information Interchange". Altogether there are 255 ASCII codes and as many ASCII characters. Some of the characters may not be displayed as they may represent some actions such as the pressing of a key or produce a beep sound. The syntax of the Chr function is

Chr(charcode)

and the syntax of the Asc function is

Asc(Character)

The following are some examples:

Chr(65)=A, Chr(122)=z, Chr(37)=% , Asc("B")=66, Asc("&")=38

LESSON 14: CREATING USER-DEFINED FUNCTIONS

<Previous Lesson> <<Home>> < Next Lesson>

14.1 CREATING YOUR OWN FUNCTION

The structure of a function is as follows:

Public Function functionName (Arg As dataType,…….) As dataType

or

Private Function functionName (Arg As dataType,…….) As dataType

Public indicates that the function is applicable to the whole project and

Example 14.1

In this example, a user can calculate the future value of a certain amount of money he has today based on the interest rate and the number of years from now, supposing he will invest this amount of money somewhere .The calculation is based on the compound interest rate.

The code

```
Public Function FV(PV As Variant, i As Variant, n As Variant) As
Variant

'Formula to calculate Future Value(FV)
'PV denotes Present Value
FV = PV * (1 + i / 100) ^ n

End Function

Private Sub compute_Click()

'This procedure will calculate Future Value
Dim FutureVal As Variant
Dim PresentVal As Variant
Dim interest As Variant
Dim period As Variant
PresentVal = PV.Text
interest = rate.Text
period = years.Text

'calling the funciton

FutureVal = FV(PresentVal, interest, period)
MsgBox ("The Future Value is " & FutureVal)

End Sub
```

Figure 14.1 The Output Interface

Example 14.2

The following program will automatically compute examination grades based on the marks that a student obtained. The code is shown below:

The Code

```
Public Function grade(mark As Variant) As String

Select Case mark
Case Is >= 80
grade = "A"
Case Is >= 70
grade = "B"
Case Is >= 60
grade = "C"
Case Is >= 50
grade = "D"
Case Is >= 40
grade = "E"
```

```
Case Else
grade = "F"
End Select

End Function

Private Sub compute_Click()

grading.Caption = grade(mark)

End Sub
```

Figure 14.2 The Output Interface

LESSON 16: ARRAYS

<Previous Lesson> <<Home>> < Next Lesson>

16.1 INTRODUCTION TO ARRAYS

By definition, an array is a list of variables with the same data type and name. When we work with a single item, we only need to use one variable. However, if we have a list of items which are of similar type to deal with, we need to declare an array of variables instead of using a variable for each item

For example, if we need to enter one hundred names, it is difficulty to declare 100 different names, this is a waste of time and efforts. So, instead of declaring one hundred different variables, we need to declare only one array. We differentiate each item in the array by using subscript, the index value of each item, for example name(1), name(2),name(3) .....etc. , makes declaring variables more streamline.

16.2 DIMENSION OF AN ARRAY

An array can be one dimensional or multidimensional. One dimensional array is like a list of items or a table that consists of one row of items or one column of items.

A two dimensional array is a table of items that make up of rows and columns. The format for a one dimensional array is ArrayName(x), the format for a two dimensional array is ArrayName(x,y) and a three dimensional array is ArrayName(x,y,z) . Normally it is sufficient to use one dimensional and two dimensional array ,you only need to use higher dimensional arrays if you need to deal with more complex problems. Let me illustrate the the arrays with tables.

Table 16.1. One dimensional Array

Student Name	Name(1)	Name(2)	Name(3)	Name(4)

Table 16.2 Two Dimensional Array

Name(1,1)	Name(1,2)	Name(1,3)	Name(1,4)
Name(2,1)	Name(2,2)	Name(2,3)	Name(2,4)
Name(3,1)	Name(3,2)	Name(3,3)	Name(3,4)

16.2 DECLARING ARRAYS

We can use Public or Dim statement to declare an array just as the way we declare a single variable. The Public statement declares an array that can be used throughout an application while the Dim statement declare an array that could be used only in a local procedure.

The general format to declare a one dimensional array is as follow:

Dim arrayName(subs) as dataType

where subs indicates the last subscript in the array.

Example 16.1

Dim CusName(10) as String

will declare an array that consists of 10 elements if the statement Option Base 1 appear in the declaration area, starting

from CusName(1) to CusName(10). Otherwise, there will be 11 elements in the array starting from CusName(0) through to CusName(10)

CusName(1)	CusName(2)	CusName(3)	CusName(4)	CusName(5)
CusName(6)	CusName(7)	CusName(8)	CusName(9)	CusName(10)

Example 16.2

Dim Count(100 to 500) as Integer

declares an array that consists of the first element starting from Count(100) and ends at Count(500)

The general format to declare a two dimensional array is as follow:

Dim ArrayName(Sub1,Sub2) as dataType

Example 16.3

Dim StudentName(10,10) will declare a 10x10 table make up of 100 students' Names, starting with StudentName(1,1) and end with StudentName(10,10).

Example 16.3

```
Dim studentName(10) As String
Dim num As Integer

Private Sub addName()
For num = 1 To 10
studentName(num) = InputBox("Enter the student name", "Enter
Name", "", 1500, 4500)
If studentName(num) <> "" Then
Form1.Print studentName(num)
Else
End
End If

Next
End Sub
```

**The program accepts data entry through an input box and displays the entries in the form itself.

Example 16.4

```
Dim studentName(10) As String
Dim num As Integer

Private Sub addName( )
For num = 1 To 10
studentName(num) = InputBox("Enter the student name")
List1.AddItem studentName(num)
Next
End Sub
Private Sub Start_Click()
addName

End Sub
```

**The program accepts data entries through an InputBox and displays the items in a list box.

LESSON 17: WORKING WITH FILES

17.1 INTRODUCTION

Up until lesson 13 we are only create programs that accepts data at runtime, the data disappears when the program terminates . In this lesson, we shall learn how to create and save files by writing them into a storage device and then retrieve the data by reading the contents of the files using a customized VB program.

17.2 CREATING A FILE

To create a file , we use the following command

Open "fileName" For Output As #fileNumber

Each file created must have a file name and a file number for identification. As for the file name, you must also specify the path where the file will reside. For example:

Open "c:\My Documents\sample.txt" For Output As #1

will create a text file by the name of sample.txt in My Document folder in C drive. The accompanied file number is 1. If you wish to create a HTML file , simply change the extension to .html

Open "c:\My Documents\sample.html" For Output As # 2

17.2.1 Sample Program : Creating a text file

```
Private Sub create_Click()
```

```
Dim intMsg As String
Dim StudentName As String

Open "c:\My Documents\sample.txt" For Output As #1
intMsg = MsgBox("File sample.txt opened")
StudentName = InputBox("Enter the student Name")
Print #1, StudentName
intMsg = MsgBox("Writing a" & StudentName & " to sample.txt ")

Close #1

intMsg = MsgBox("File sample.txt closed")

End Sub
```

The above program will create a file sample.txt in the My Documents folder and ready to receive input from users. Any data input by the user will be saved in this text file.

17.3 READING A FILE

To read a file created in section 17.2, you can use the input # statement. However, we can only read the file according to the format when it was written. You have to open the file according to its file number and the variable that hold the data. We also need to declare the variable using the DIM command.

17.3.1 Sample Program: Reading file

```
Private Sub Reading_Click()

Dim variable1 As String
Open "c:\My Documents\sample.txt" For Input As #1
Input #1, variable1
Text1.Text = variable1
Close #1

End Sub
```

This program will open the sample.txt file and display its contents in the Text1 textbox.

Example 17.3.2 Creating and Reading files using Common Dialog Box

This example uses the common dialog box to create and read the text file, which is much easier than the previous examples.Many

operations are handled by the common dialog box. The following is the program:<

```
Dim linetext As String
Private Sub open_Click()

CommonDialog1.Filter = "Text files{*.txt)|*.txt"
CommonDialog1.ShowOpen

If CommonDialog1.FileName <> "" Then
Open CommonDialog1.FileName For Input As #1
Do
Input #1, linetext
Text1.Text = Text1.Text & linetext
Loop Until EOF(1)
End If
Close #1

End Sub

Private Sub save_Click()

CommonDialog1.Filter = "Text files{*.txt)|*.txt"
CommonDialog1.ShowSave
If CommonDialog1.FileName <> "" Then
Open CommonDialog1.FileName For Output As #1
Print #1, Text1.Text
Close #1
End If

End Sub
```

*The syntax **CommonDialog1.Filter = "Text files{*.txt)|*.txt"** ensures that only the textfile is read or saved .The statement CommonDialog1.ShowOpen is to display the open file dialog box and the statement **CommonDialog1.ShowSave** is to display the save file dialog box. Text1.Text = Text1.Text & linetext is to read the data and display them in the Text1 textbox

---

The Output window is shown below:

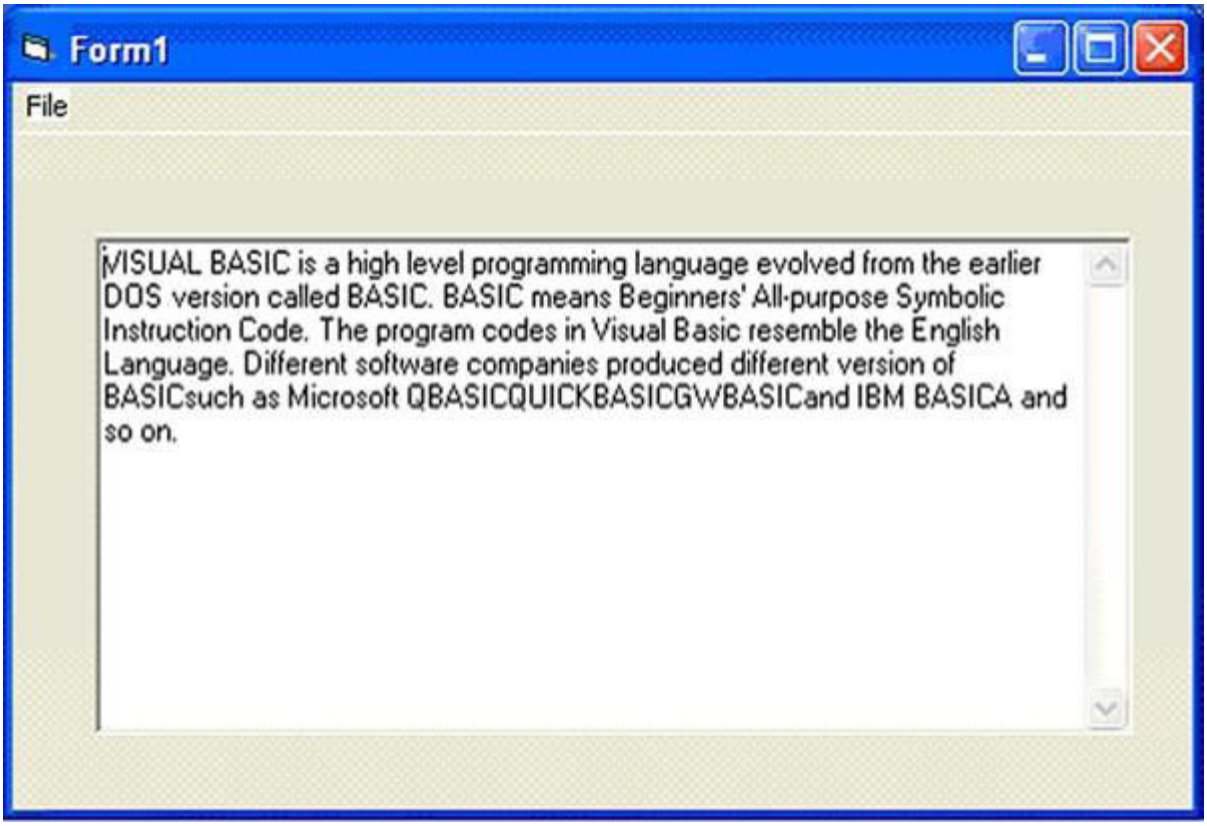


Figure 17.1

LESSON 23: CREATING DATABASE APPLICATIONS IN VB-PART I

<Previous Lesson><<Home>>< Next Lesson>

23.1 Creating Simple Database Application

Visual basic allows us to manage databases created with different database programs such as MS Access, oracle, MySQL and more. In this lesson, we are not dealing with how to create database files but we will see how we can access database files in the VB environment. In the following example, we will create a simple database application which enables one to browse customers' names. To create this application, select the **data control** on the toolbox(as shown in Figure 23.1) and insert it into the new form. Place the data control somewhere at the bottom of the form. Name the data control as **data_navigator**. To be able to use the data control, we need to connect it to any database. We can create a database file using any database application but I suggest we use the database files that come with VB6. Let's select NWIND.MDB as our database file.

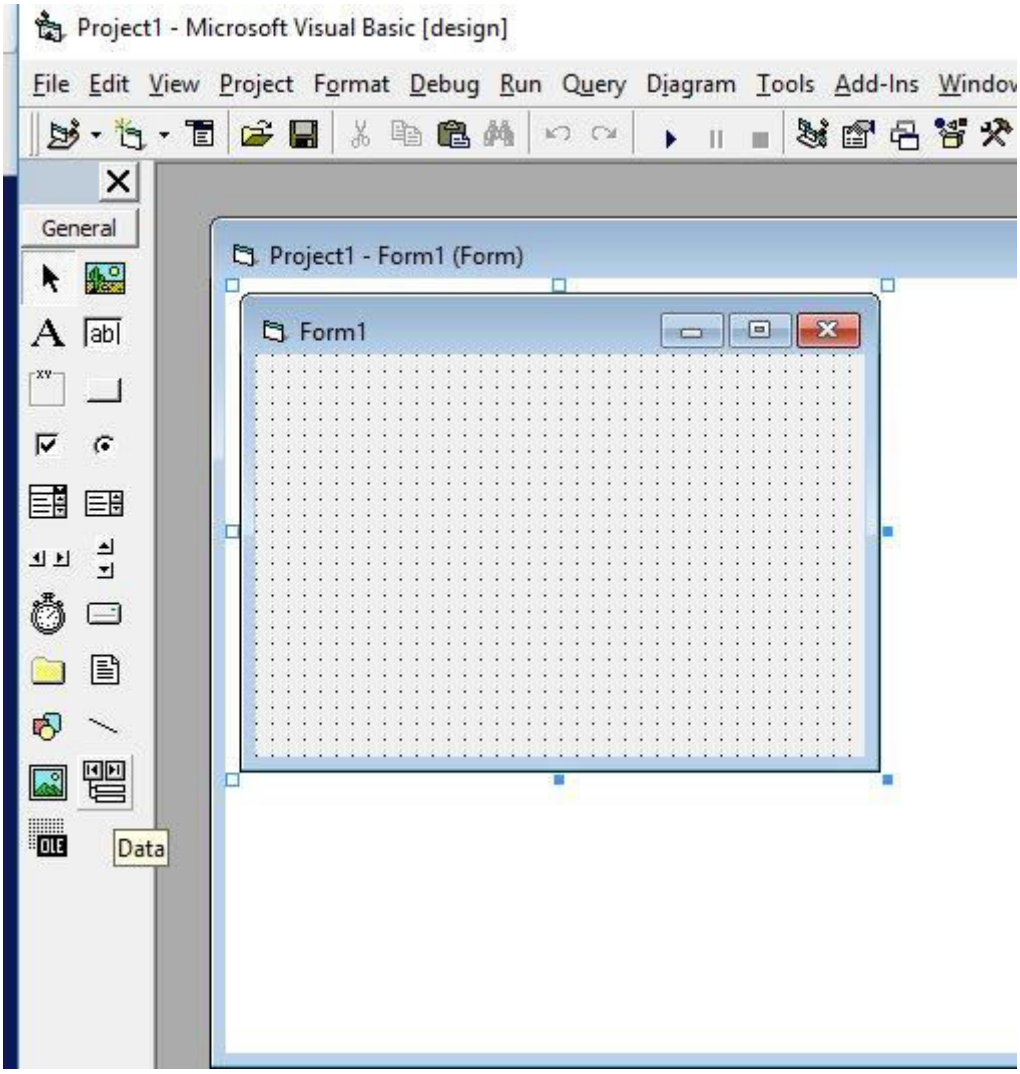
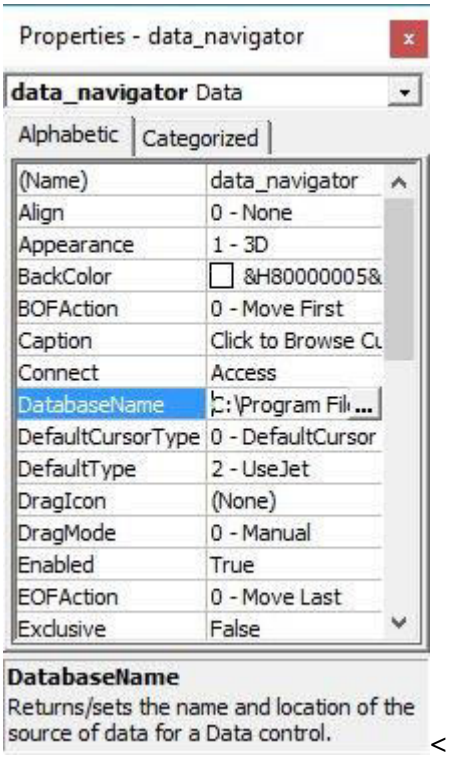


Figure 23.1

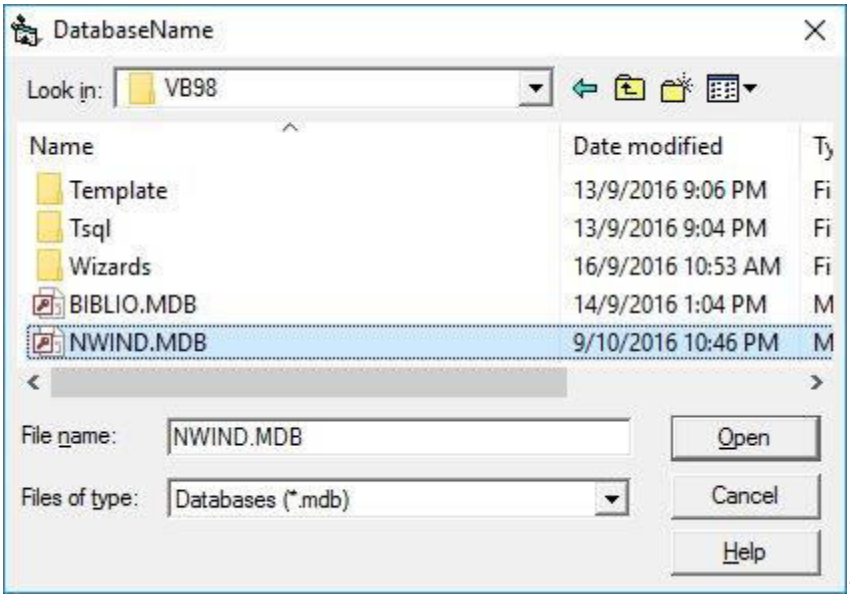
23.2 Connecting Data Control to Database

To connect the data control to this database, double-click the DatabaseName property in the properties window and then click on the button with three dots on the right(as shown in Figure 23.2) to open a file selection dialog as shown in Figure 23.3. From the dialog, search the folders of your hard drive to locate the databse file NWIND.MDB. It is usually placed under Microsoft Visual Studio\VB98\ folder, Select the aforementioned file and now your data control is connected to this database file.



<=”” p=”” style="max-width: 80%; height: auto;">

Figure 23.2



<=”” p=”” style="max-width: 80%; height: auto;">

Figure 23.3

The next step is to double-click on the RecordSource property to select the customers table from the database file NWIND.MDB, as shown in Figure 23.4. You can also change the caption of the data control to anything, we use Click to browse Customers. After that, we will place a label and change its caption to Customer Name. In

addition, insert another label and name it as cus_name and leave the label empty as customers' names will appear here when we click the arrows on the data control. We need to bind this label to the data control for the application to work. To do this, open the label's DataSource and select data_navigator that will appear automatically. One more thing that we need to do is to bind the label to the correct field so that data in this field will appear on this label. To do this, open the DataField property and select ContactName, as shown in Figure 23.5.

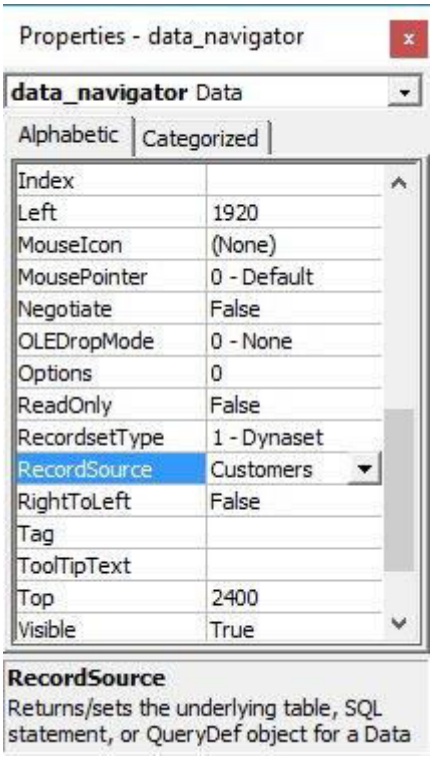


Figure 23.4

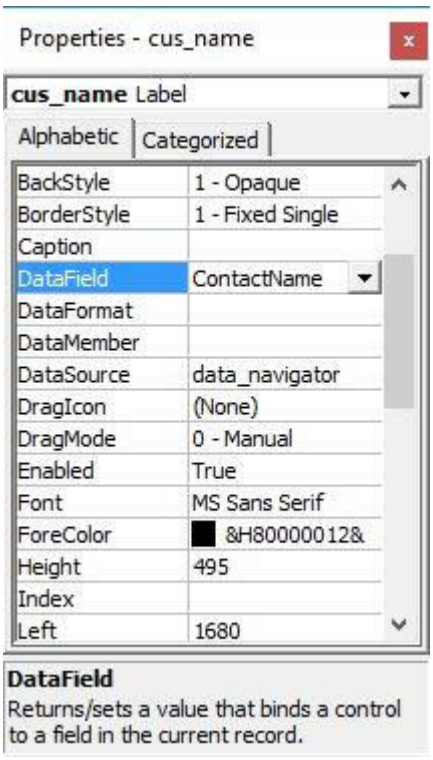


Figure 23.5

Now, press F5 and run the program. You should be able to browse all the customers' names by clicking the arrows on the data control, as hown in Figure 23.7.

The Design Interface.

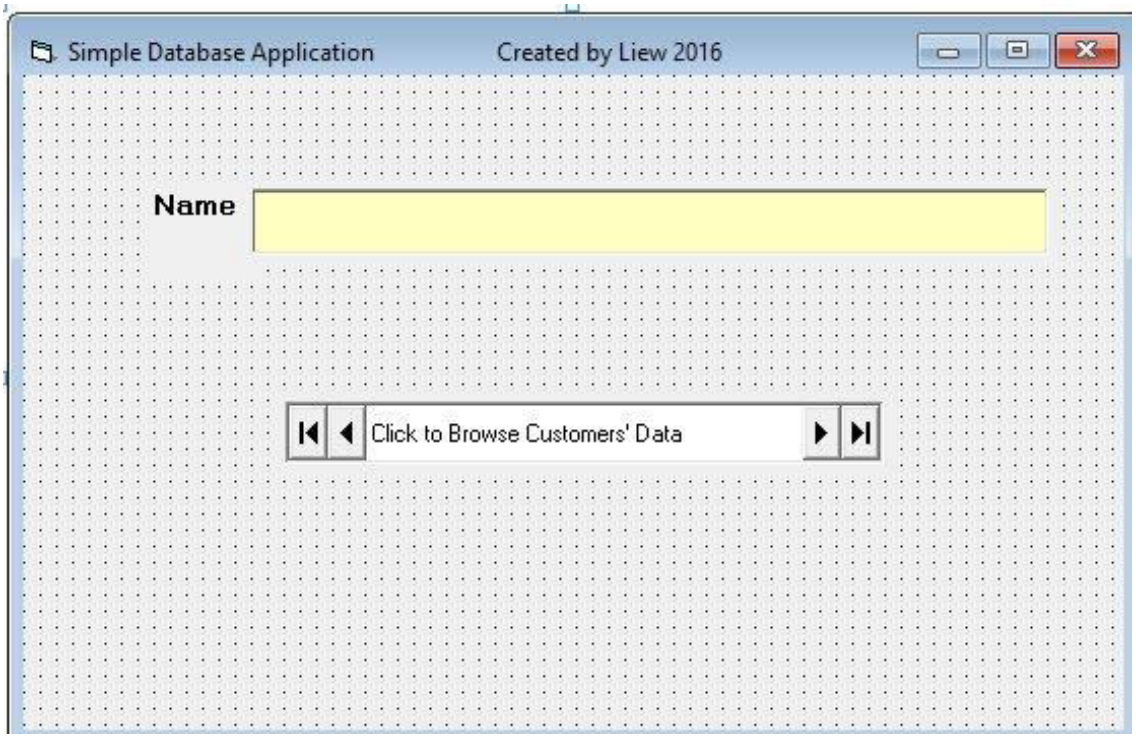


Figure 23.6

The Runtime Interface

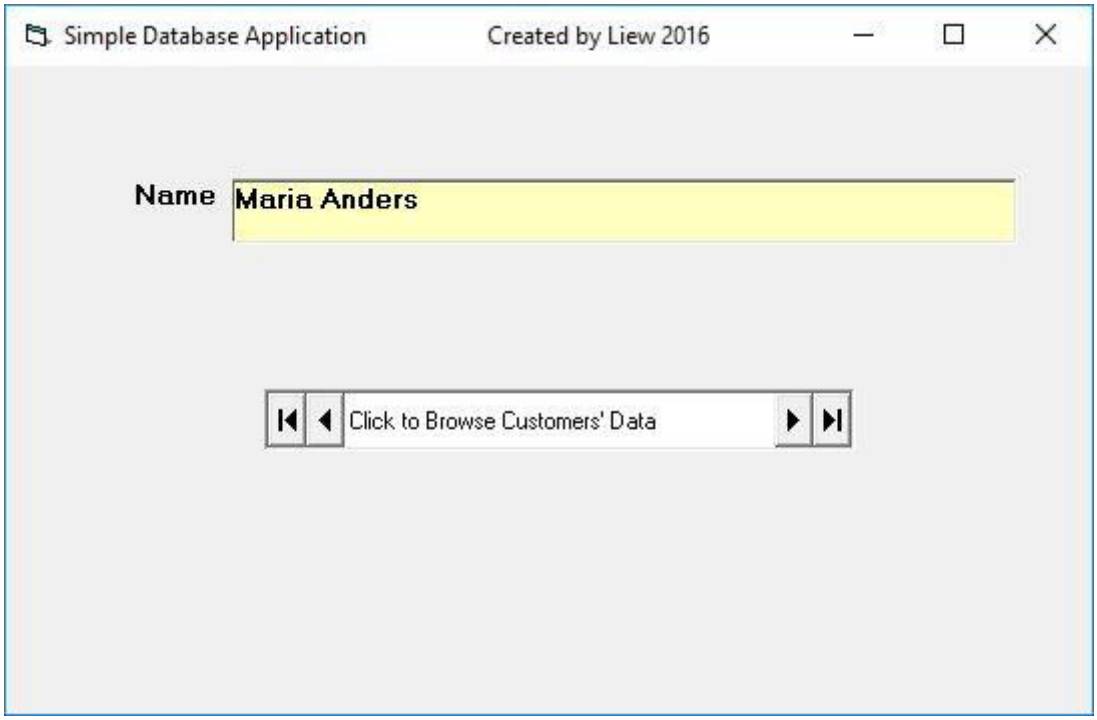


Figure 23.7

You can also add other fields using exactly the same method. For example, you can add title, company, adress, City, postcode ,telephone number and more to the database browser. Besides, you can design a more professional interface, as shown in Figure 23.8.

Figure 23.8

LESSON 24: CREATING DATABASE APPLICATIONS IN VB-PART II

In Lesson 23, you have learned how to create a simple database application using data control. However, you could only browse the database using the data control. In this lesson, you shall learn how to create your own navigation buttons for browsing the database. Besides that, we shall also learn how to add, save and delete data.The data control support some methods that allows manipulation of database, for example, to move the pointer to a certain location.

The following are some of the commands that you can use to move the pointer around:

' Move to the first record

data_navigator.RecordSet.MoveFirst

' Move to the last record

data_navigator.RecordSet.MoveLast

' Move to the next record

data_navigator.RecordSet.MoveNext

' Move to the first record

data_navigator.RecordSet.Previous

You can also add, save and delete records using the following commands:

data_navigator.RecordSet.AddNew ' Adds a new record

data_navigator.RecordSet.Update ' Updates and saves the new record

data_navigator.RecordSet.Delete ' Deletes a current record

*note: data_navigator is the name of data control

In the following example, you shall insert four commands and label them as First Record, Next Record, Previous Record and Last Record . They will be used to navigator around the database without using the data control. You still need to retain the same data control (from example in lesson 19) but set the property Visible to no so that users will not see the data control but use the button to browse through the database instead. Now, double-click on the command button and key in the codes according to the labels.

```
Private Sub cmdFirst()
   data_navigator.Recordset.MoveFirst
End Sub


Private Sub cmdFirst_Click()
   data_navigator.Recordset.MoveNext
End Sub


Private Sub cmdPrevious_Click()
   data_navigator.Recordset.MovePrevious
End Sub

Private Sub cmdLast_Click()
   data_navigator.Recordset.MoveLast
End Sub
```

Run the application and you shall obtain the interface as shown in Figure 24.1 below and you will be able to browse the database using the four navigation buttons.

Figure 24.1

LESSON 25: CREATING VB DATABASE APPLICATIONS USING ADO CONTROL

<Previous Lesson><<Home>>< Next Lesson>

In Lesson 22 and Lesson 23, we have learned how to build VB database applications using data control. However, data control is not a very flexible tool as it could only work with limited kinds of data and must work strictly in the Visual Basic environment.

To overcome these limitations, we can use a much more powerful data control in Visual Basic, known as ADO control. ADO stands for ActiveX data objects. As ADO is ActiveX-based, it can work in different platforms and different programming languages. Besides, it can access many different kinds of data such as data displayed in the Internet browsers, email text and even graphics other than the usual relational and non relational database information.To

be able to use ADO data control, you need to insert it into the toolbox. To do this, simply press Ctrl+T to open the components dialog box and select **Microsoft ActiveX Data Control 6**. After this, you can proceed to build your ADO-based VB database applications.

The following example will illustrate how to build a relatively powerful database application using ADO data control. First of all, name the new form as **frmBookTitle** and change its caption to **Book Titles- ADO Application**. Secondly, insert the ADO data control and name it as **adoBooks** and change its caption to **book**. Next, insert the necessary labels, text boxes and command buttons. The runtime interface of this program is shown in Figure 25.1 below, it allows adding and deletion as well as updating and browsing of data.

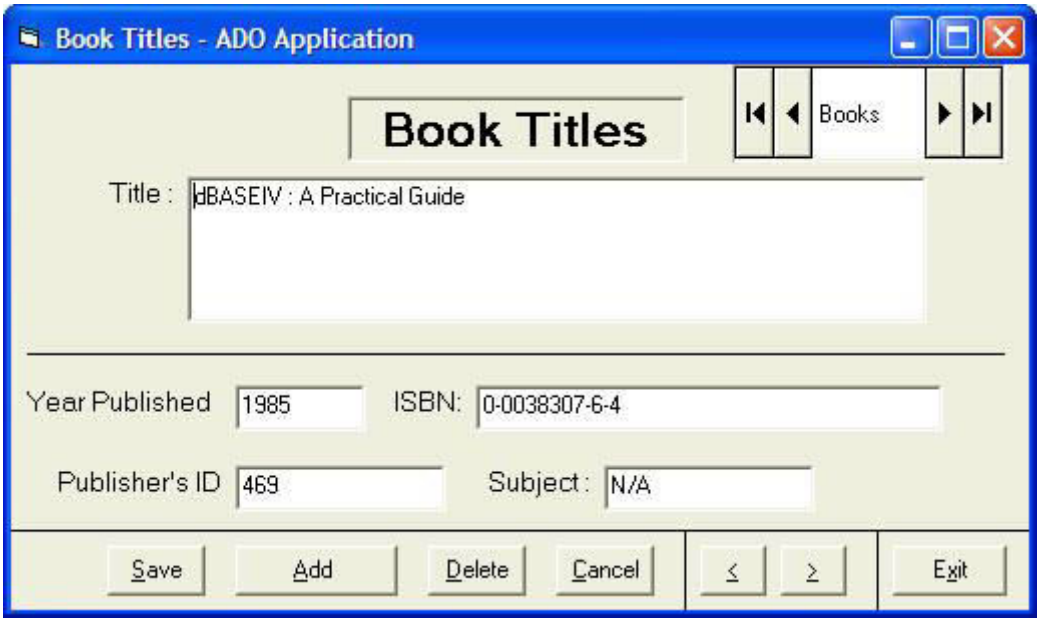


Figure 25.1: The Runtime Interface

The property settings of all the controls are listed as in Table 25.1 below:

Table 25.1: Property Settings

Control Property	Setting
Form Name	frmBookTitle

Form Caption	Book Titles - ADOApplication
ADO Name	adoBooks
Label1 Name	lblApp
Label1 Caption	Book Titles
Label 2 Name	lblTitle
Label2 Caption	Title :
Label3 Name	lblYear
Label3 Caption	Year Published:
Label4 Name	lblISBN
Label4 Caption	ISBN:
Labe5 Name	lblPubID
Label5 Caption	Publisher's ID:
Label6 Name	lblSubject
Label6 Caption	Subject :
TextBox1 Name	txtitle
TextBox1 DataField	Title
TextBox1	adoBooks

DataSource	
TextBox2 Name	txtPub
TextBox2 DataField	Year Published
TextBox2 DataSource	adoBooks
TextBox3 Name	txtISBN
TextBox3 DataField	ISBN
TextBox3 DataSource	adoBooks
TextBox4 Name	txtPubID
TextBox4 DataField	PubID
TextBox4 DataSource	adoBooks
TextBox5 Name	txtSubject
TextBox5 DataField	Subject
TextBox5 DataSource	adoBooks
Command Button1 Name	cmdSave
Command Button1	&Save

Caption	
Command Button2 Name	cmdAdd
Command Button2 Caption	&Add
Command Button3 Name	cmdDelete
Command Button3 Caption	&Delete
Command Button4 Name	cmdCancel
Command Button4 Caption	&Cancel
Command Button5 Name	cmdPrev
Command Button5 Caption	&<
Command Button6 Name	cmdNext
Command Button6 Caption	&>
Command Button7 Name	cmdExit

Command Button7 Caption		E&xit

To be able to access and manage a database, you need to connect the ADO data control to a database file. We are going to use**BIBLIO.MDB** that comes with VB6. To connect ADO to this database file , follow the steps below:

Click on the ADO control on the form and open up the properties window.

Click on the ConnectionString property, the Property Pages dialog box will appear, as shown in Figure 25.2.

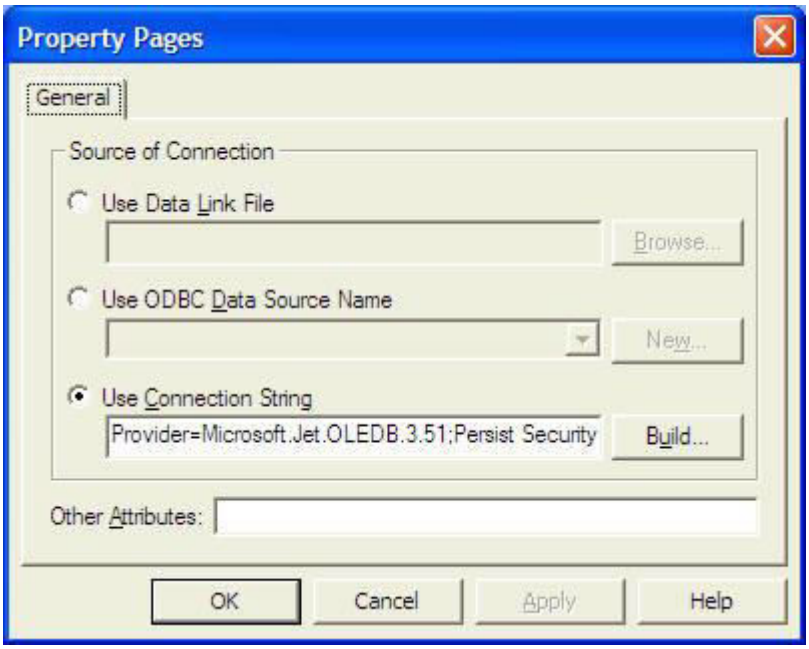


Figure 25.2: Property Pages

When the dialog box appear, select the Use **Connection String**'s Option. Next, click build and at the **Data Link dialog box**, double-Click the option labeled **Microsoft Jet 3.51 OLE DB provider.**

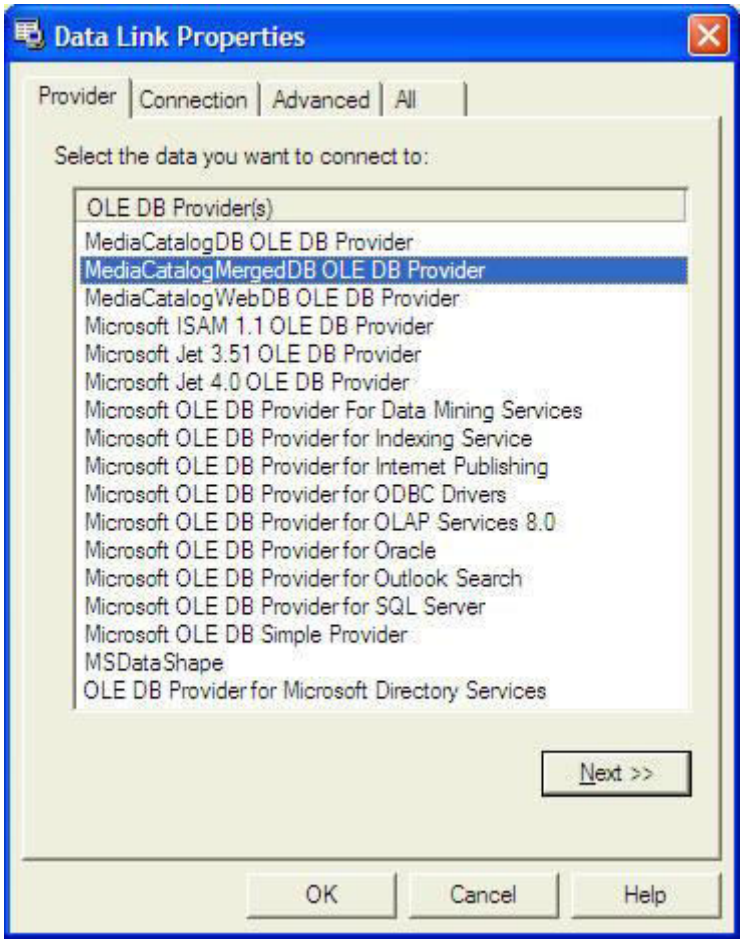


Figure 25.3: Data Link Properties

After that, click the Next button to select the file **BIBLO.MDB.** You can click on Text Connection to ensure proper connection of the database file. Click OK to finish the connection.

Finally, click on the RecordSource property and set the **command type** to **adCmd Table** and **Table name** to **Titles**. Now you are ready to use the database file.

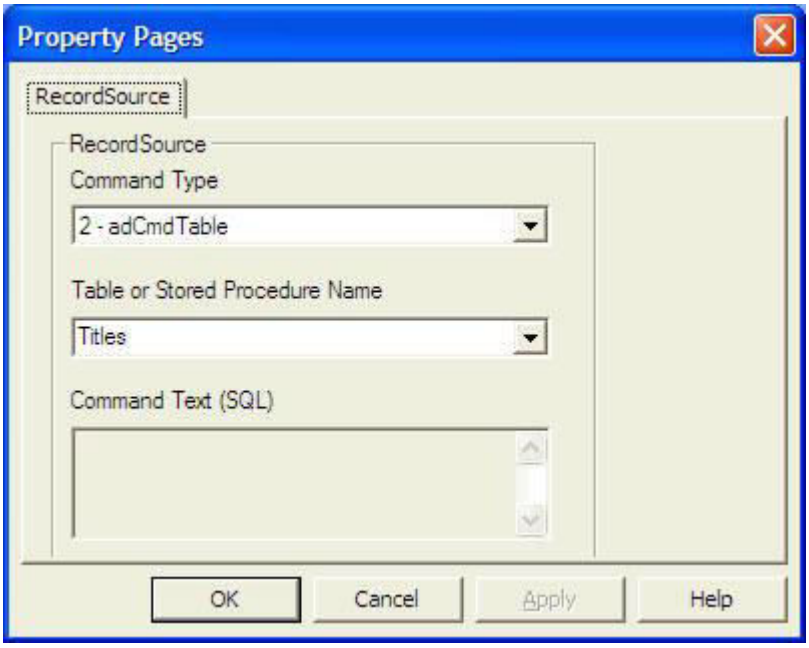


Figure 25.4

Now, you need to write code for all the command buttons. After which, you can make the ADO control invisible.

For the **Save** button, the program codes are as follow:

```
Private Sub cmdSave_Click()

adoBooks.Recordset.Fields("Title") = txtTitle.Text
adoBooks.Recordset.Fields("Year Published") = txtPub.Text
adoBooks.Recordset.Fields("ISBN") = txtISBN.Text
adoBooks.Recordset.Fields("PubID") = txtPubID.Text
adoBooks.Recordset.Fields("Subject") = txtSubject.Text
adoBooks.Recordset.Update

End Sub
```

For the **Add** button, the program codes are as follow:

```
Private Sub cmdAdd_Click()

adoBooks.Recordset.AddNew

End Sub
```

For the **Delete** button, the program codes are as follow:

```
Private Sub cmdDelete_Click()

Confirm = MsgBox("Are you sure you want to delete this record?",
vbYesNo, "Deletion Confirmation")
If Confirm = vbYes Then
adoBooks.Recordset.Delete
MsgBox "Record Deleted!", , "Message"
Else
MsgBox "Record Not Deleted!", , "Message"
End If

End Sub
```

For the **Cancel** button, the program codes are as follow:

```
Private Sub cmdCancel_Click()

txtTitle.Text = ""
txtPub.Text = ""
txtPubID.Text = ""
txtISBN.Text = ""
txtSubject.Text = ""

End Sub
```

For the Previous (<) button, the program codes are

```
Private Sub cmdPrev_Click()


If Not adoBooks.Recordset.BOF Then
adoBooks.Recordset.MovePrevious
If adoBooks.Recordset.BOF Then
adoBooks.Recordset.MoveNext
End If
End If



End Sub
```

For the Next(>) button, the program codes are

```
Private Sub cmdNext_Click()


If Not adoBooks.Recordset.EOF Then
adoBooks.Recordset.MoveNext
If adoBooks.Recordset.EOF Then
```

```
adoBooks.Recordset.MovePrevious
End If
End If

End Sub
```

LESSON 26: USING MICROSOFT DATAGRID CONTROL 6.0

<Previous Lesson> <<Home>>< Next Lesson>

In the previous lesson, we use textboxes or labels to display data by connecting them to a database via Microsoft ADO data Control 6.0. The textbox is not the only control that can display data from a database, many other controls in Visual Basic can display data. One of the them is the **DataGrid control**. DataGrid control can be used to display the entire table of a recordset of a database. It allows users to view and edit data.

DataGrid control is the not the default item in the Visual Basic control toolbox, you have to add it from the VB6 components. To add the DataGrid control, click on the project on the menu bar and select components to access the dialog box that displays all the available VB6 components, as shown in the diagram below. Select **Microsoft DataGrid Control 6.0** by clicking the checkbox beside this item. Before you exit the dialog box, you also need to select the **Microsoft ADO data control** so that you are able to access the database. Last, click on the OK button to exit the dialog box. Now you should be able to see that the DataGrid control and the ADO data control are added to the toolbox. The next step is to drag the DataGrid control and the ADO data control into the form.

The components dialog box is shown below:

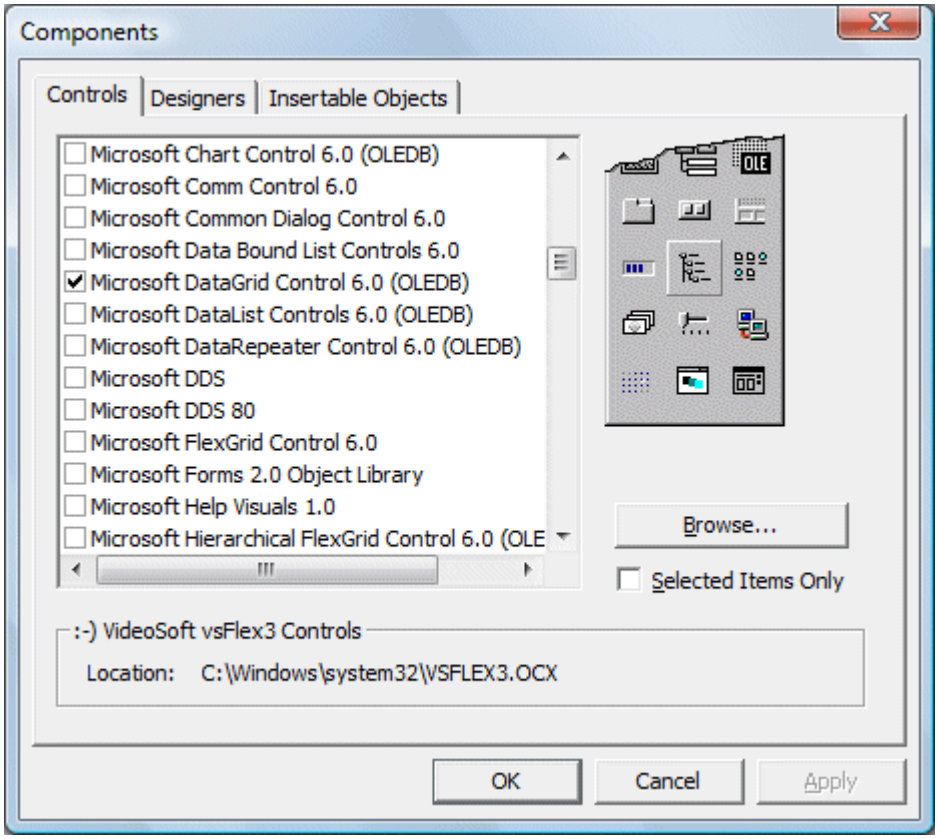


Figure 26.1: The Components Dialog Box

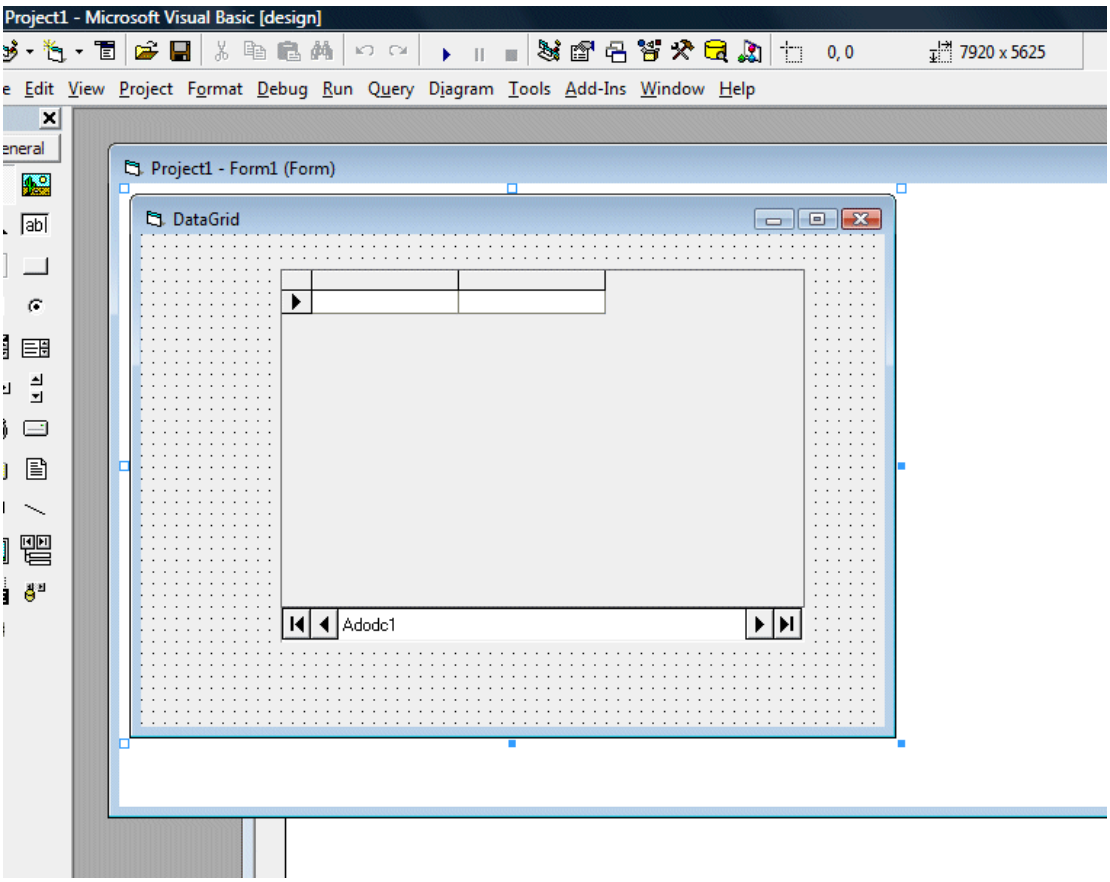


Figure 26.2: The Design Interface

Before you proceed , you need to create a database file using Microsoft Access. Here we create a file to store the information of my books and we namedthe table **book**. Having created the table, enter a few records, as shown in Figure 26.3 below:

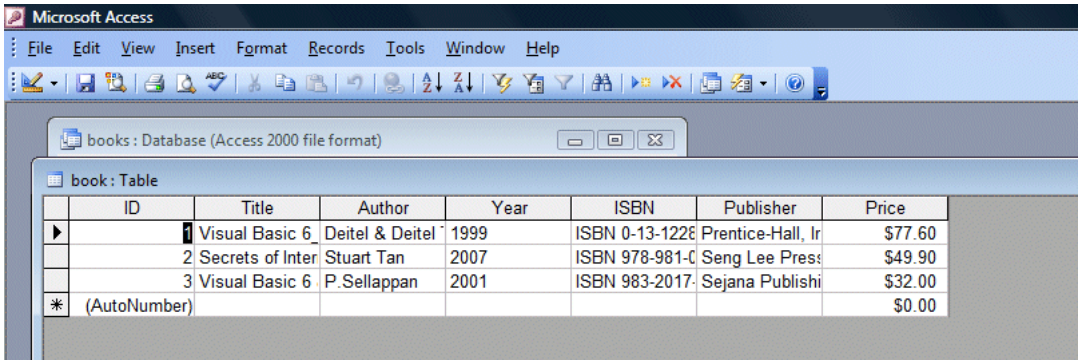
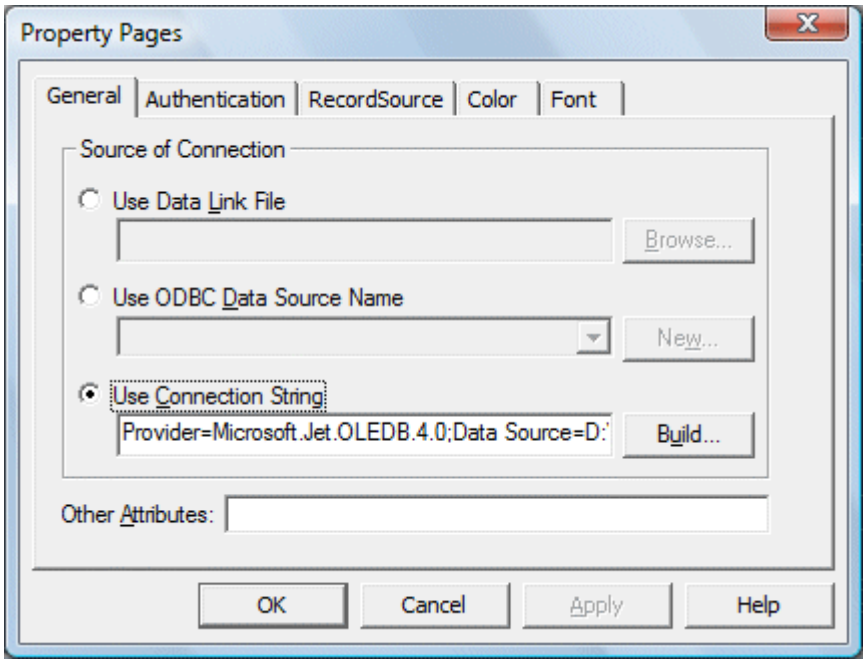


Figure 26.3

Next, you need to connect the database to the ADO data control. To do that, right click on the ADO data control and select the **ADODC** properties, the following dialog box will appear.



Next click on the Build button and the Data Link Properties dialog box will appear (as shown Figure 26.4). In this dialog box, select the database file you have created, in my case, the file name is **books.mdb**. Press test connection to see whether the connection is successful. If the connection is successful, click OK

to return to the ADODC property pages dialog box(as shown in Figure 26.4). At the ADODC property pages dialog box, click on the Recordsource tab and select 2-adCmdTable under command type and select book as the table name, then click OK.

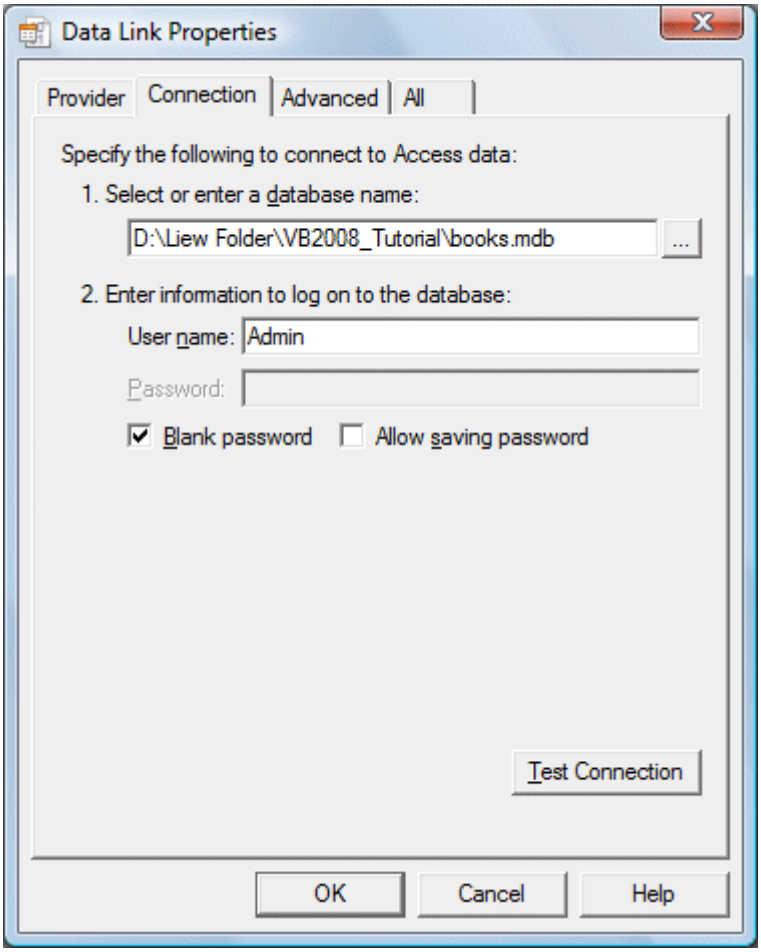


Figure 26.4: Data Link Properties

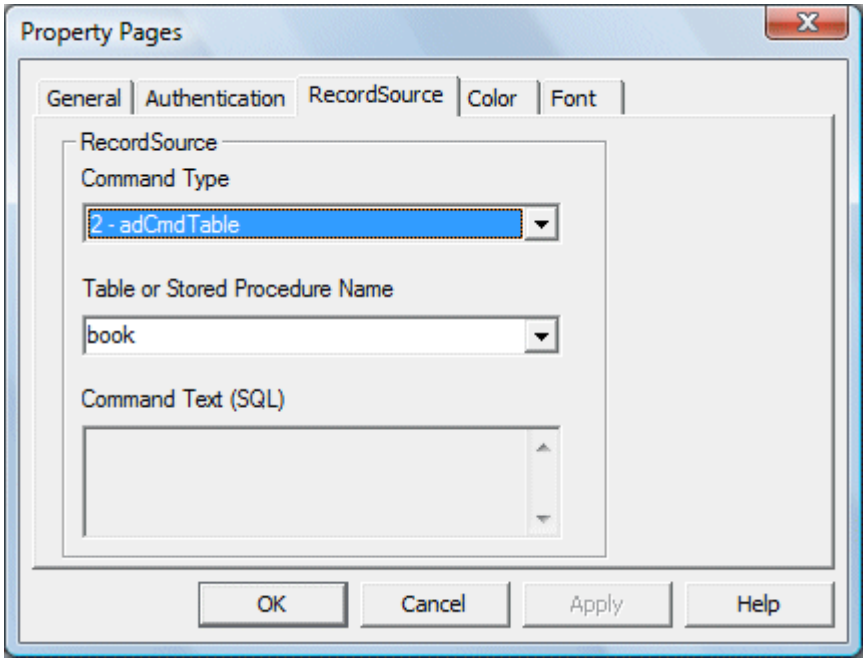
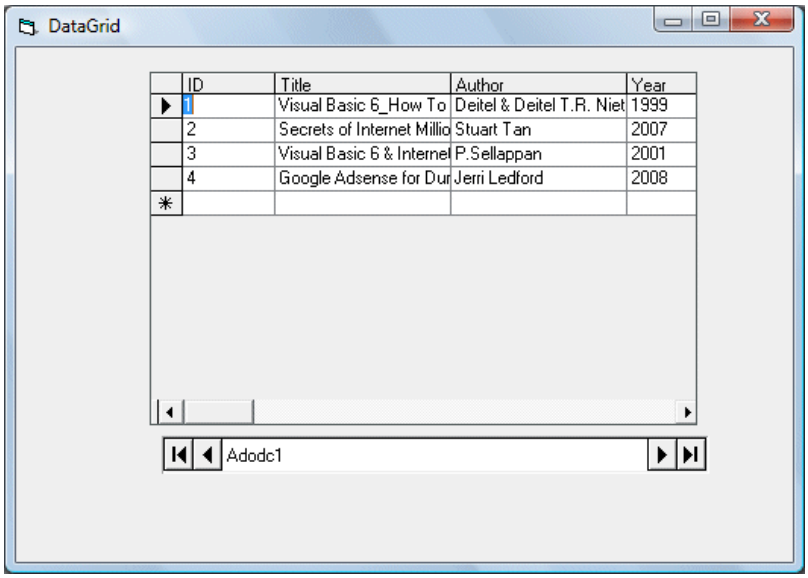


Figure 26.5: Property Pages

Finally you need to display the data in the DataGrid control. To accomplish this, go to the properties window and set the DataSource property of the DataGrid to Adodc1. You can also permit the user to add and edit your records by setting the AllowUpdate property to True. If you set this property to false, the user cannot edit the records. Now run the program and the runtime interface is shown in Figure 26.5 below:



In the previous lesson, we have learned to use the DataGrid Control to display data from a database in Visual Basic 6 environment. However, it does not allow users to search for and select the information they want to see. In order to search for a certain information, we need to use SQL query. SQL stands for **S**tructures **Q**uery **L**anguage. Using SQL keywords, we are able to select specific information to be displayed based on certain criteria.

The most basic SQL keyword is SELECT, it is used together with the keyword FROM to select information from one or more tables from a database. The syntax is:

SELECT fieldname1,fieldname2,.....,fieldnameN FROM TableName

fieldname1, fieldname2,.....fieldnameN are headings of the columns from a table of a database. You can select any number of fieldname in the query. If you wish to select all the information, you can use the following syntax:

SELECT * FROM TableNam

In order to illustrate the usage of SQL queries, lets create a new database in Microsoft Access with the following fields**ID, Title, Author, Year, ISBN, Publisher, Price** and save the table as **book** and the database as **books.mdb** in a designated folder.

Next, we will start Visual Basic and insert an ADO control, a DataGrid and three command buttons. Name the three command buttons as **cmdAuthor, cmdTitle** and **cmdAll**. Change their captions to **Display Author** ,**Display Book Title** and **Display All**respectively. You can also change the caption of the form to My Books. The design interface is shown below:

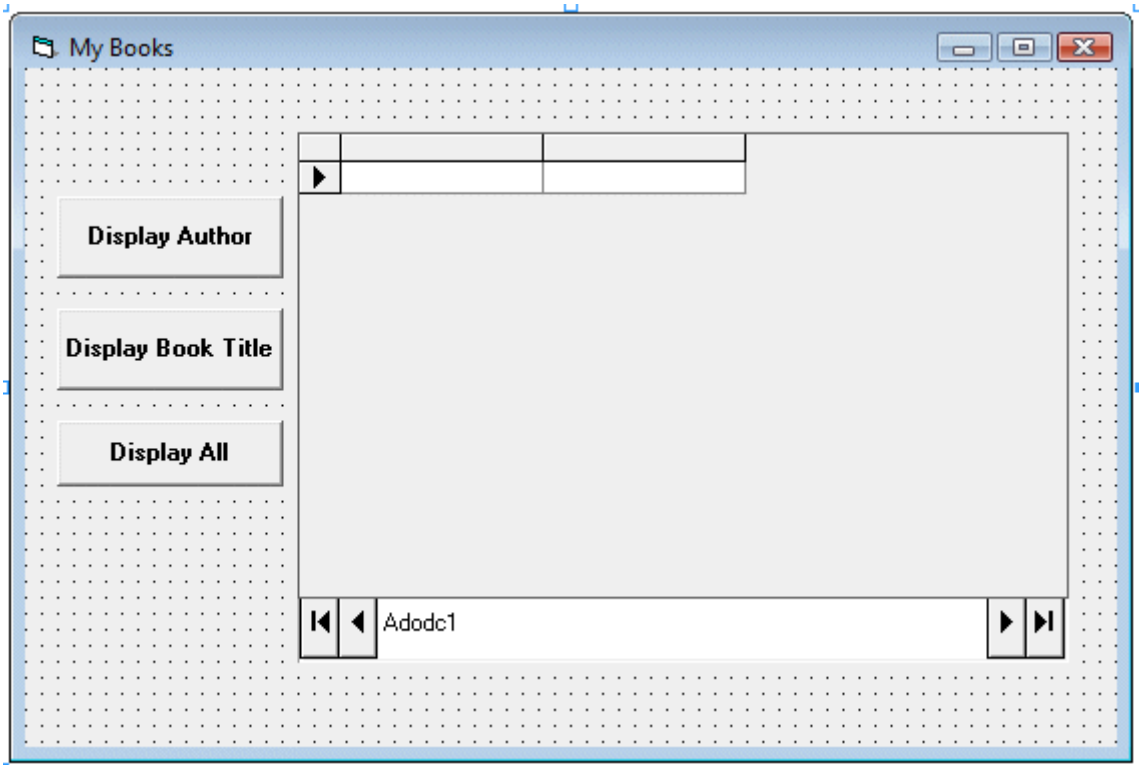


Figure 27.1: The Design Interface

Now you need to connect the database to the ADO data control. Please refer to lesson 25 for the details. However, you need to make one change. At the ADODC property pages dialog box, click on the Recordsource tab and select **1-adCmdText** under command type and under Command Text(SQL) key in **SELECT * FROM book.**

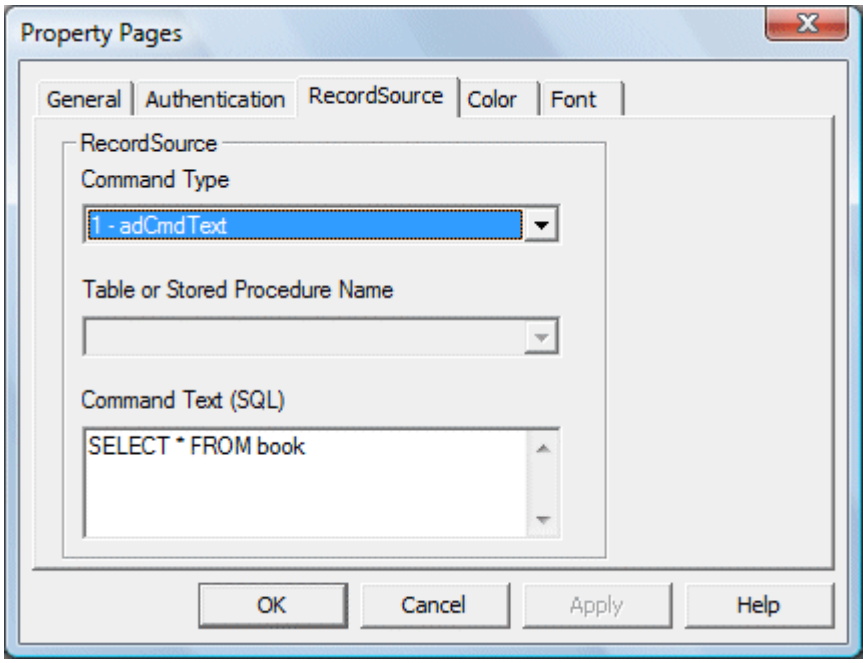


Figure 27.2: ADODC Property Pages

The Code

Now, click on the command button cmdAuthor and key in the following statements:

```
Private Sub cmdAuthor_Click()

Adodc1.RecordSource = "SELECT Author FROM book"
Adodc1.Refresh
Adodc1.Caption = Adodc1.RecordSource

End Sub
```

For the command button cmdTitle, key in

```
Private Sub cmdTitle_Click()

Adodc1.RecordSource = "SELECT Title FROM book"
Adodc1.Refresh
Adodc1.Caption = Adodc1.RecordSource

End Sub
```

Finally for the command button cmdAll, key in

```
Private Sub cmdAll_Click()

Adodc1.RecordSource = "SELECT * FROM book"
Adodc1.Refresh
Adodc1.Caption = Adodc1.RecordSource


End Sub
```

Now, run the program and when you click on the Display Author button, only the names of authors will be displayed, as shown in Figure 27.3 below:

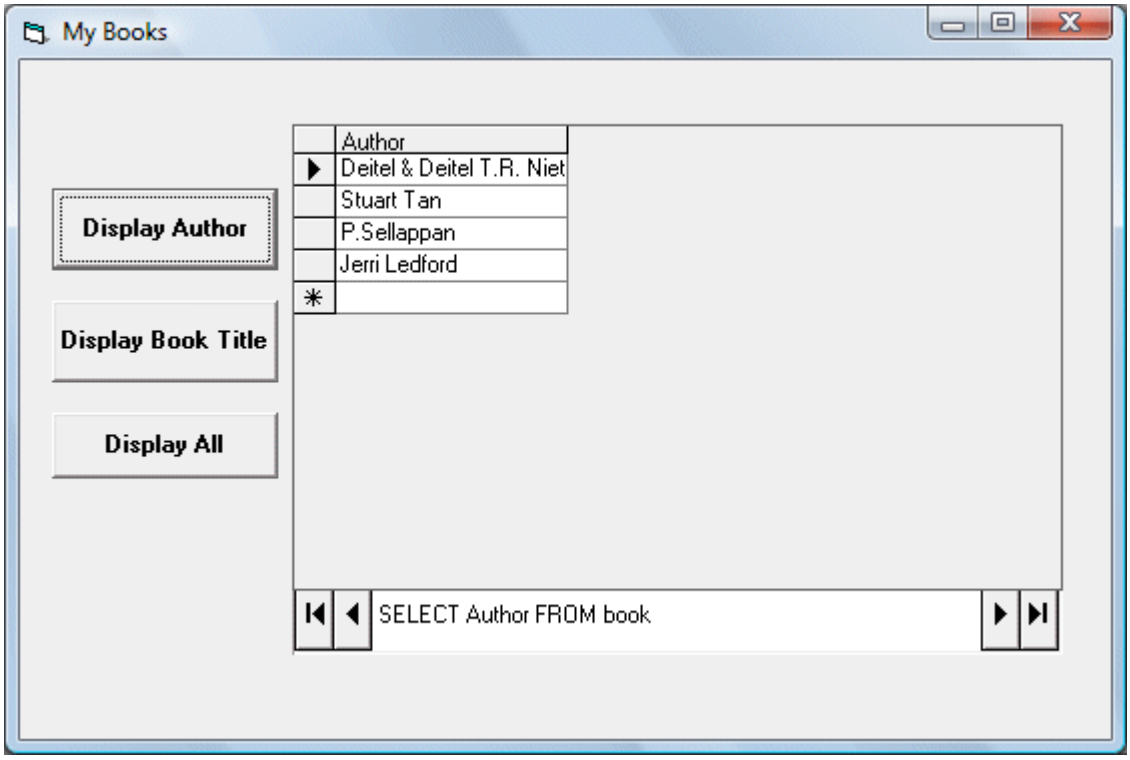


Figure 27.3

and when you click on the Display Book Title button, only the book titles will be displayed, as shown in Figure 27.4 below:

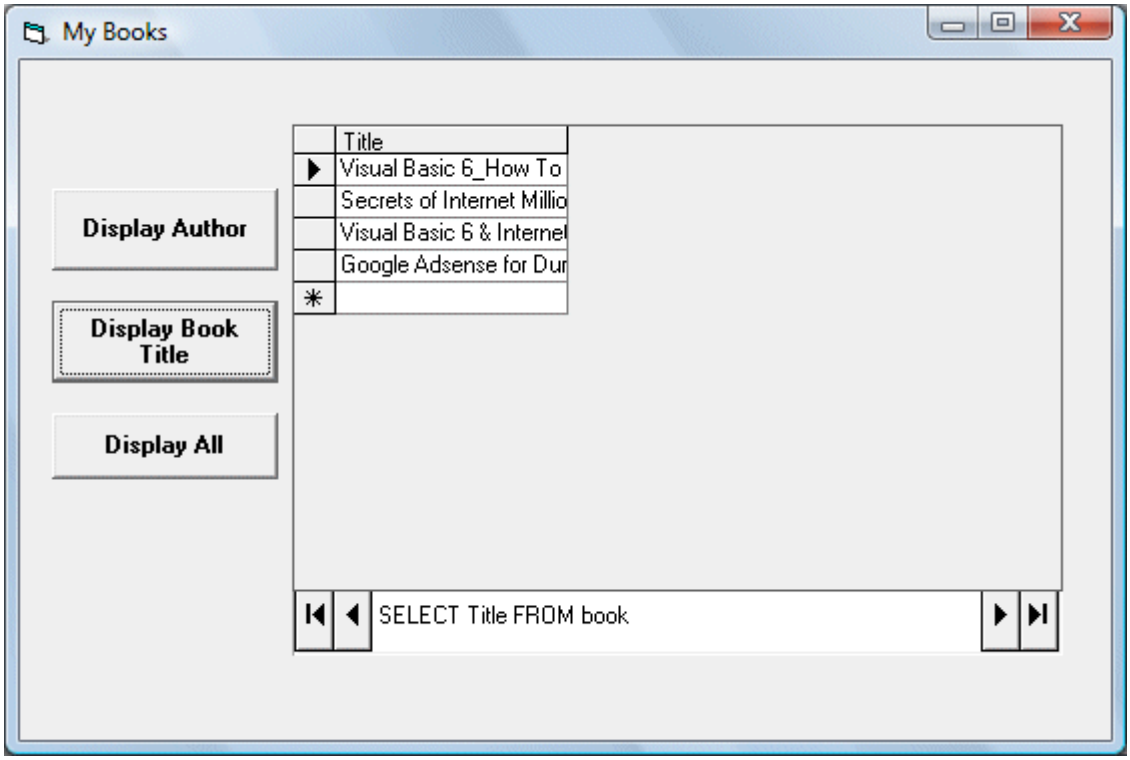


Figure 27.4

Lastly, click on the Display All button and all the information will be displayed, as shown in Figure 27.5 below:

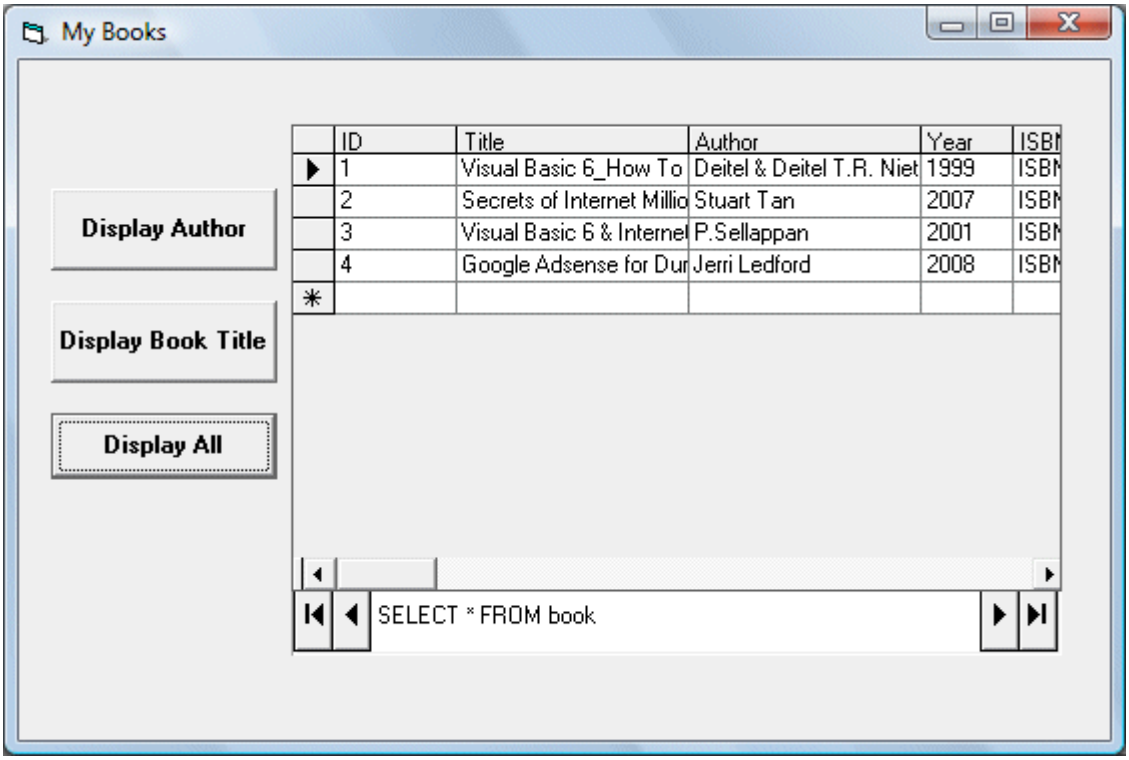


Figure 27.5

LESSON 28: MORE SQL KEYWORDS

In the previous lesson, we have learned how to use the basic SQL keywords SELECT and FROM to manipulate database in Visual Basic 6 environment. In this lesson, you will learn how to use more SQL keywords. One of the more important SQL keywords is WHERE. This keyword allows the user to search for data that fulfill certain criteria.

The Syntax is as follows:

SELECT fieldname1,fieldname2,.....,fieldnameN FROM TableName WHERE Criteria

The criteria can be specified using operators such as =, >,<, <=, >=, <> and more. Using the database books.mdb created in the previous chapter, we shall show you a few examples. First ,start a new project and insert a DataGrid control and an ADO control into the form. At the ADODC property pages dialog box, click on the Recordsource tab and select **1-adCmdText** under command type and under Command Text(SQL) key in **SELECT * FROM**

book. Next, insert one textbox and place it on top of the DataGrid control for the user can enter SQL query text. Insert one command button and change the caption to Query.

The design interface is shown below in Figure 28.1 below:

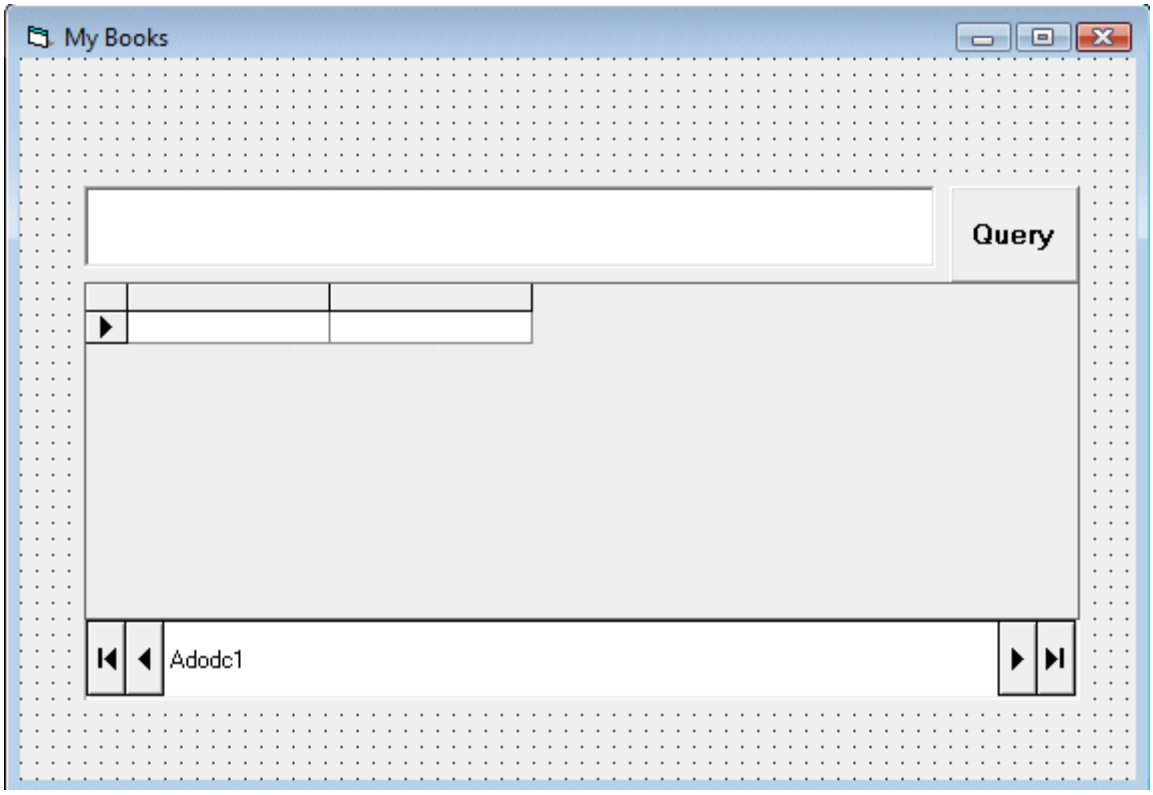


Figure 28.1: The Design Interface

Example 28.1: Query based on Author

Run the program and key in the following SQL query statement

SELECT Title, Author FROM book WHERE Author='Liew Voon Kiong'

Where you click on the query button, the DataGrid will display the author name Liew Voon Kiong. as shown in Figure 28.2 below:

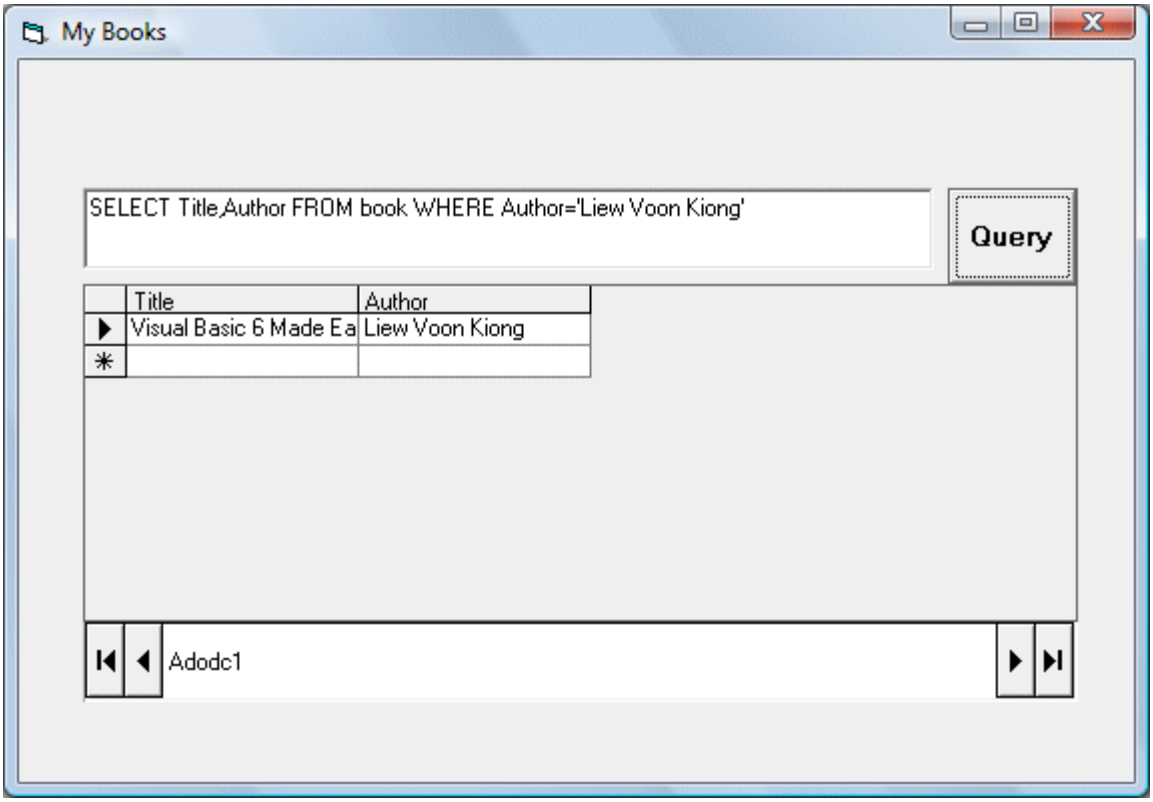


Figure 28.2

Example 28.2:Query based on year

Run the program and key in the following SQL query statement:

SELECT * FROM book WHERE Year>2005

When you click on the query button, the DataGrid will display all the books that were published after the year 2005, as shown in Figure 28.3 below.

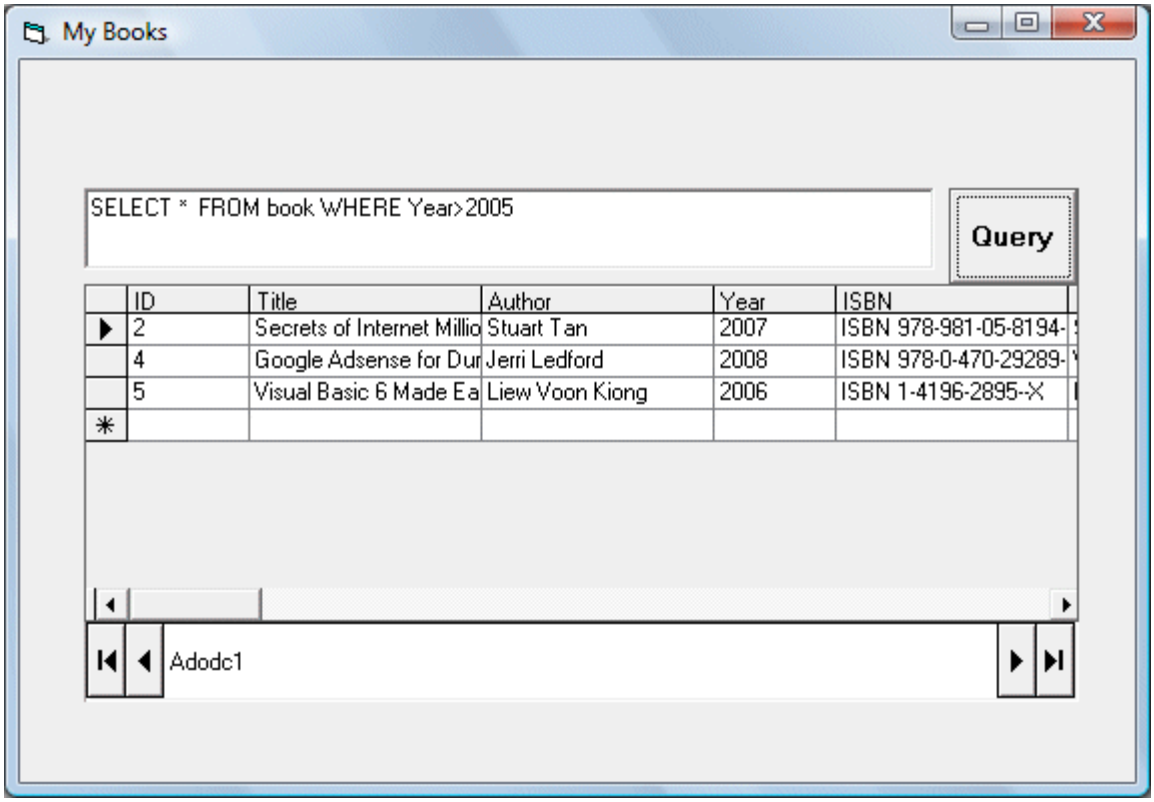


Figure 28.3

You can also try following queries:

SELECT * FROM book WHERE Price<=80

SELECT * FROM book WHERE Year=2008

SELECT * FROM book WHERE Author<>'Liew Voon Kiong'

You may also search for data that contain certain characters by pattern matching. It involves using the **Like** operator and the **%** symbol(also known as wildcard character). For example, if you want to search for a author name that begins with alphabet J, you can use the following query statement

SELECT * FROM book WHERE Author Like 'J%'>

Where you click on the query command button, the records where authors' name start with the alphabet J will be displayed, as shown in Figure 28.4 below:

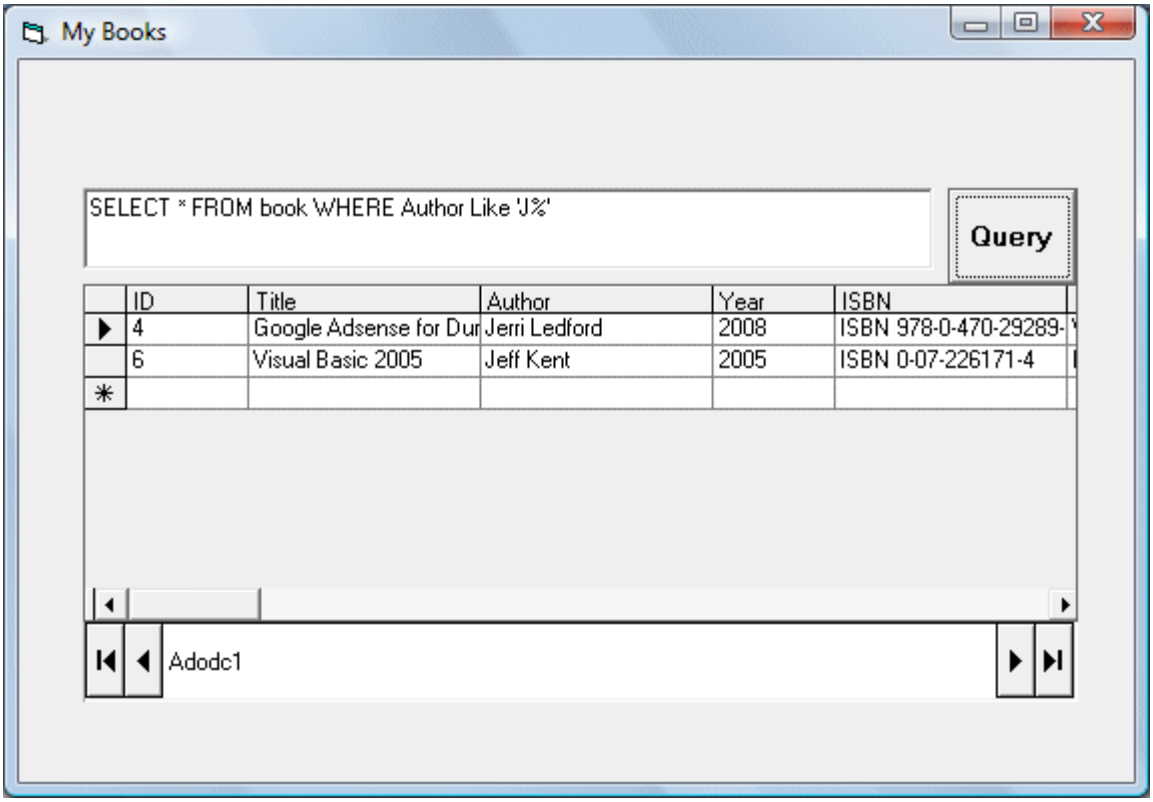


Figure 28.4

Next, if you wish to rank order the data, either in ascending or descending order, you can use the **ORDER By , ASC (for ascending) and DESC(Descending)** SQL keywords.

The general structures are

SELECT fieldname1, fieldname2.....FROM table ORDER BY fieldname ASC

SELECT fieldname1, fieldname2.....FROM table ORDER BY fieldname DESC

Example 28.3:

The following query statement will rank the records according to Author in ascending order.

SELECT Title, Author FROM book ORDER BY Author ASC.

The runtime interafce is as shown in Figure 28.5 below:

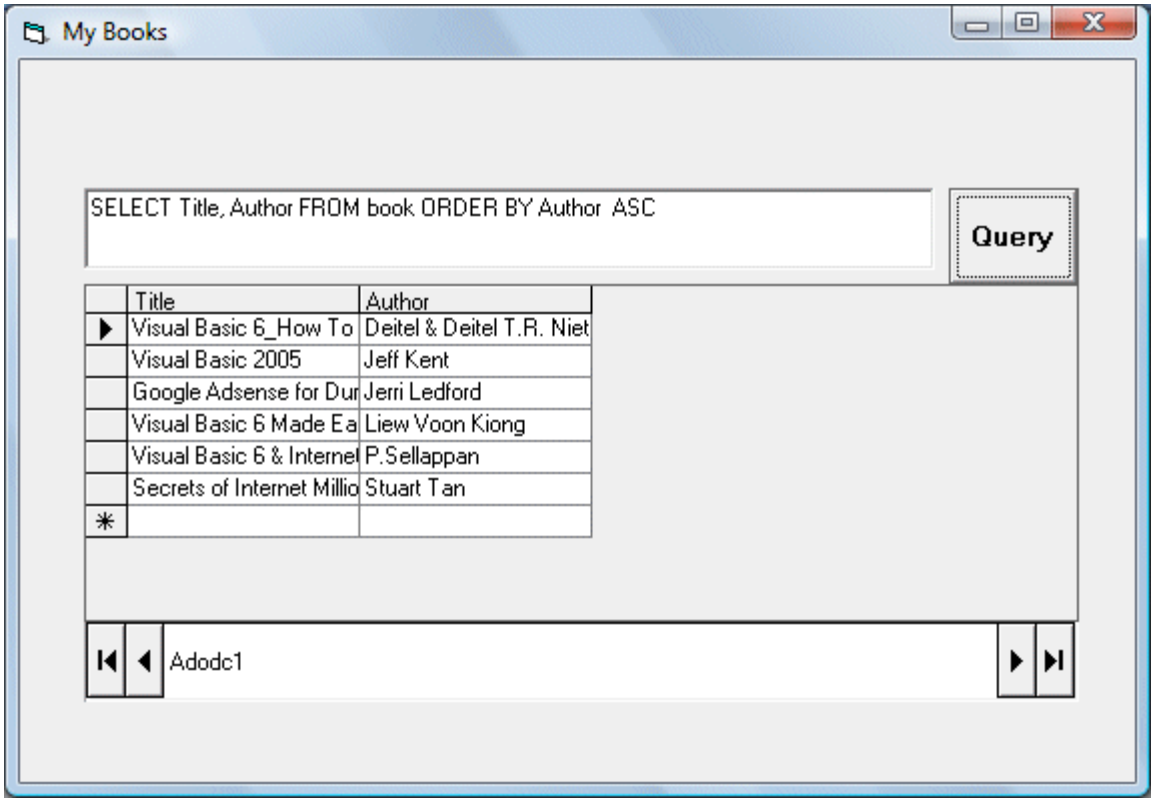


Figure 28.5

Example 28.4

The following query statement will rank the records according to price in descending order.

SELECT Title, Price FROM book ORDER BY Price DESC.

The runtime interafce is as shown in Figure 28.6 below:

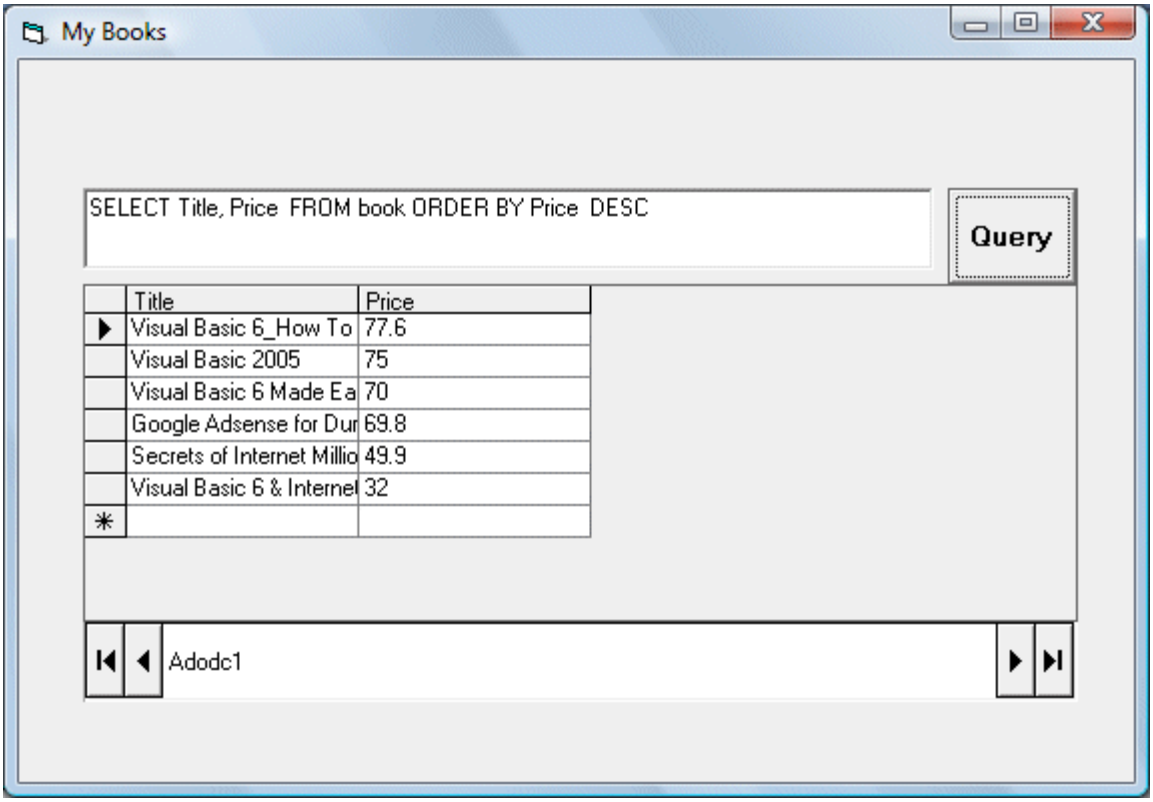


Figure 28.6

LESSON 37: CREATING MENUS FOR YOUR APPLICATIONS

<Previous Lesson> <<Home>> <Next Lesson>

Menu bar is the standard feature of most windows applications. The main purpose of the menus is for easy navigation and control of an application. Some of the most common menu items are File, Edit, View, Tools, Help and more. Each item on the main menu bar also provide a list of options in the form of a pull-down menu. When you create a Visual Basic 6 program, you need not include as many menu items as a full fledge Windows application. What you need is to include those menu items that can improve the ease of usage by the user. There are two ways to add menus to your application, using the Visual Basic's Application Wizard and or the menu editor.

37.1 ADDING MENU BAR USING VISUAL BASIC'S APPLICATION WIZARD

The easiest way to add menu bar to your application is by using Visual Basic's Application Wizard. This wizard allows the user to insert fully customized standard windows menu into his or her application. To start using Visual Basic's Application Wizard, click on the Application Wizard icon at the Visual Basic new project dialog box, as shown in Figure 37.1 below:

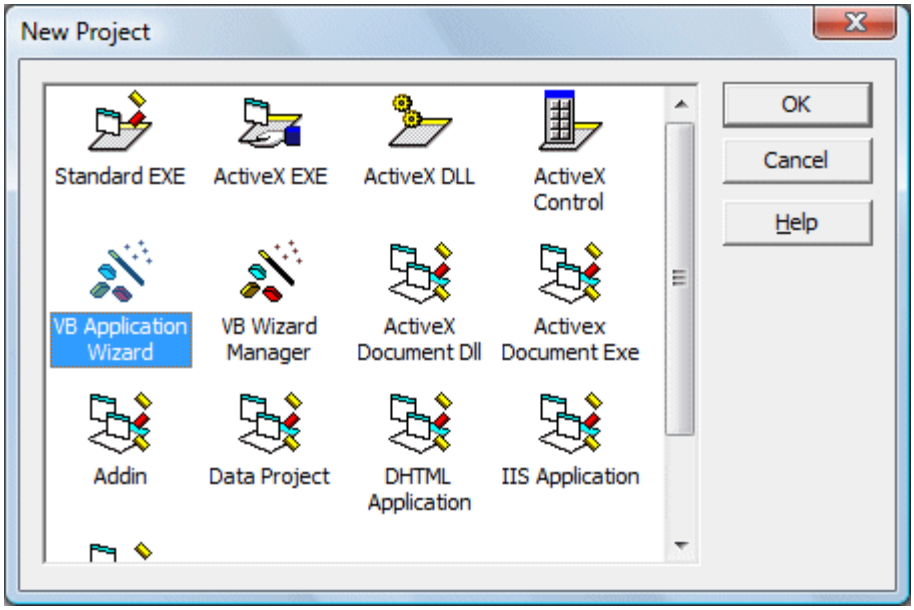


Figure 37.1: New Project Window

When you click on the VB Application wizard, the introduction dialog box will appear, as shown in Figure 37.2. As you are not loading any default setting, just click on the Next button.

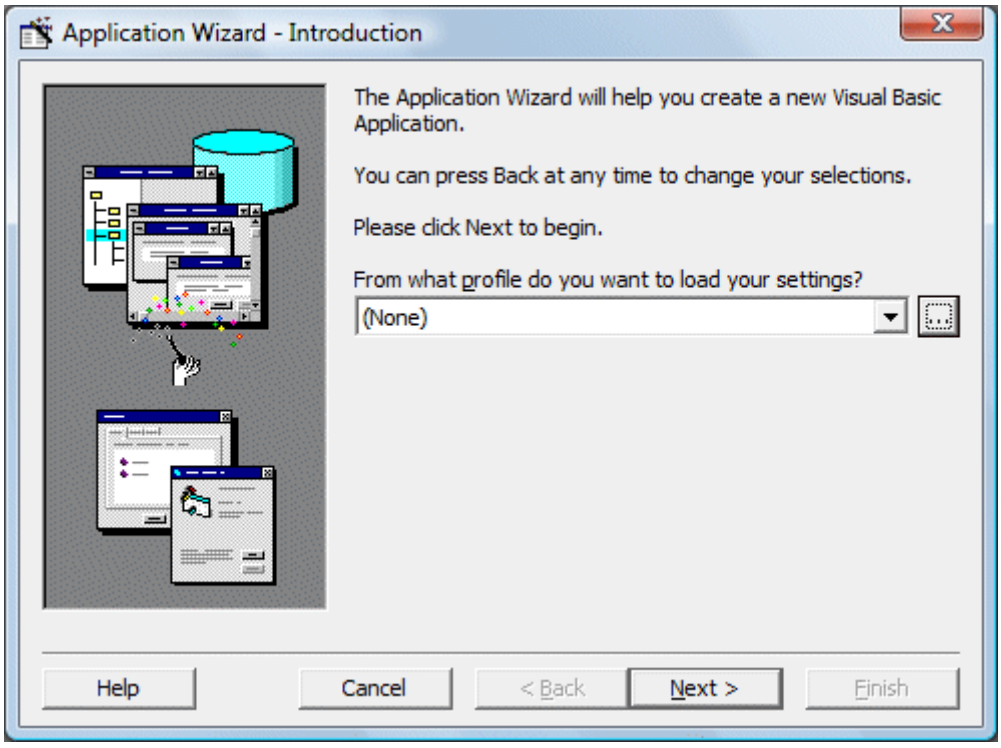


Figure 37.2

After clicking the Next button, the interface type dialog box will be displayed, as shown in Figure 37.3. There are three choices of interface available for your project. As we currently not creating a

Multiple Document Interface (MDI), we choose Single Document Interface (SDI). You can also type the project name in the textbox below, here I am using MyFirstMenu.

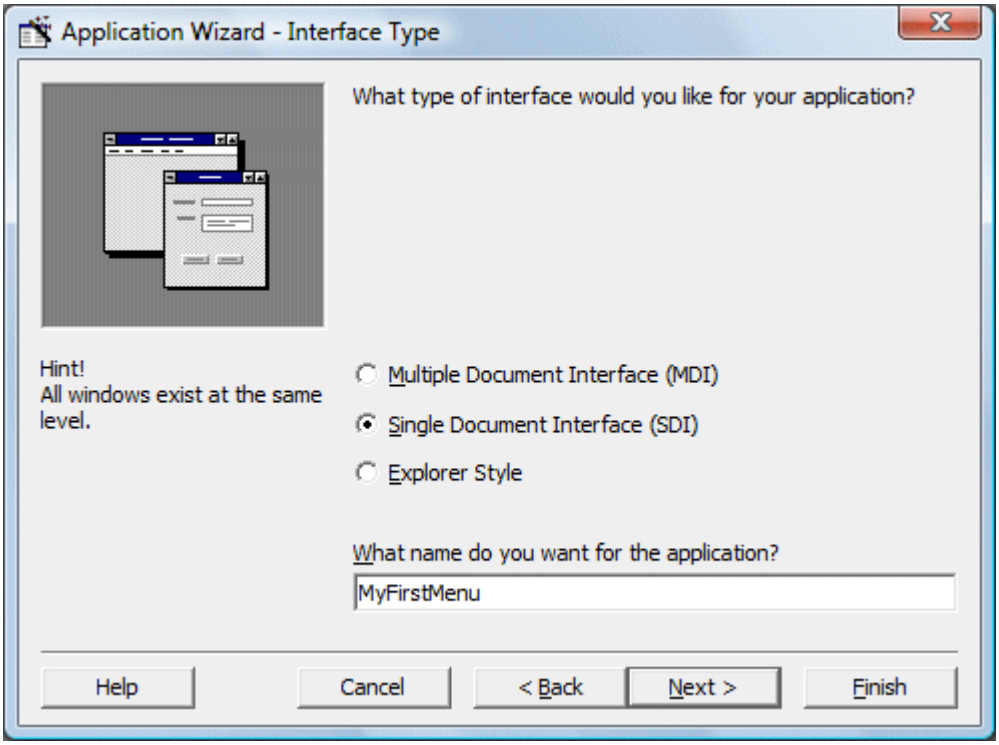


Figure 37.3

Clicking the Next button wiill bring up a list of menus and submenus that you can add them to your application. Check to select a menu item and uncheck to unselect a menu item as shown in Figure 37.4. Let say we choose all the menus and click next, then you will get an interface comprises File, Edit, View and Help menus, as shown in Figure 37.5

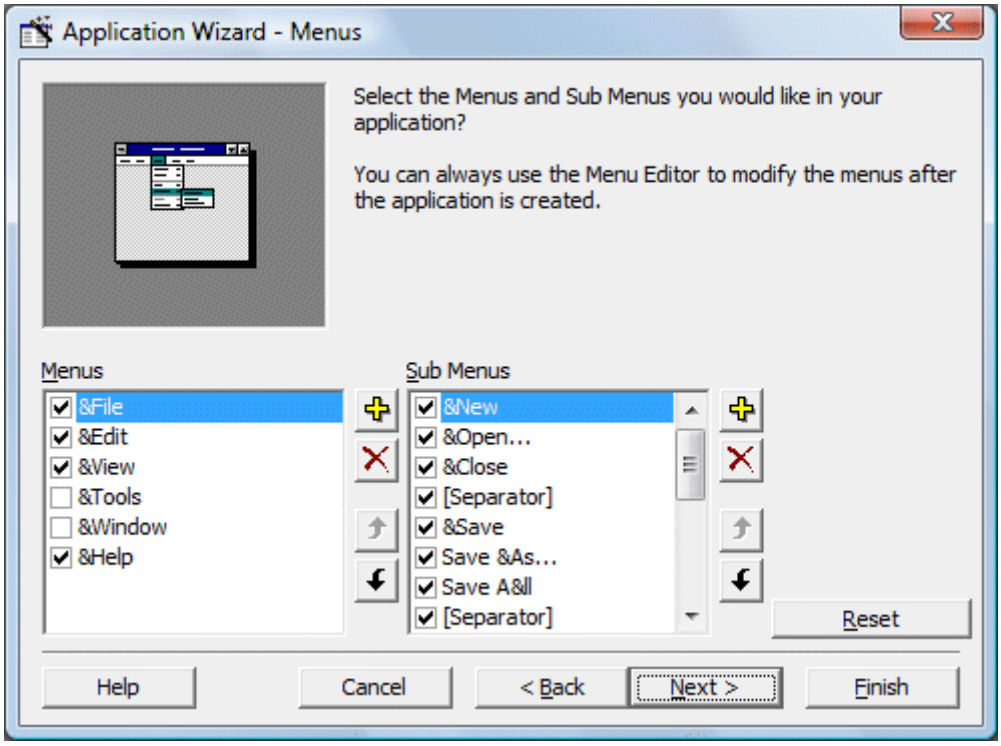


Figure 37.4

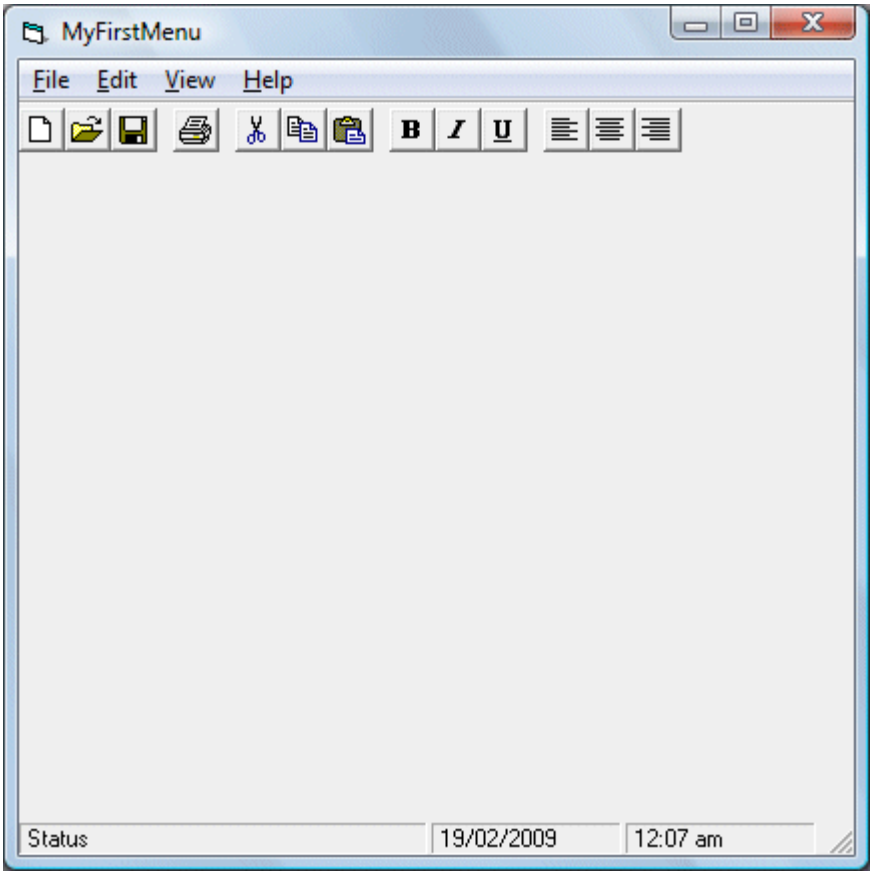


Figure 37.5

When you click on any menu item, a list of drop-down submenu items will be displayed. For example, if you click on the File menu, the list of submenu items such as New, Open, Save, Save As and more will be displayed, as shown in Figure 37.6

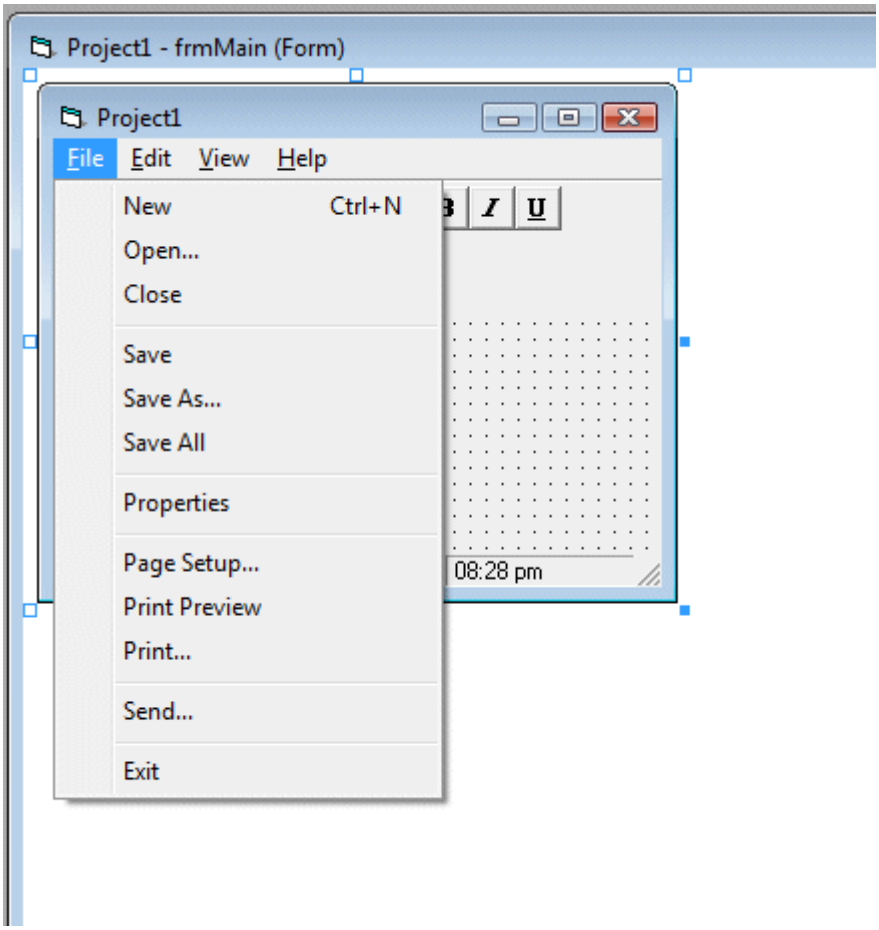


Figure 37.6

Clicking on any of the dropped down menu item will show the code associated with it, and this is where you can modify the code to suit your programming needs. For example, clicking on the item Open will reveal the following code:

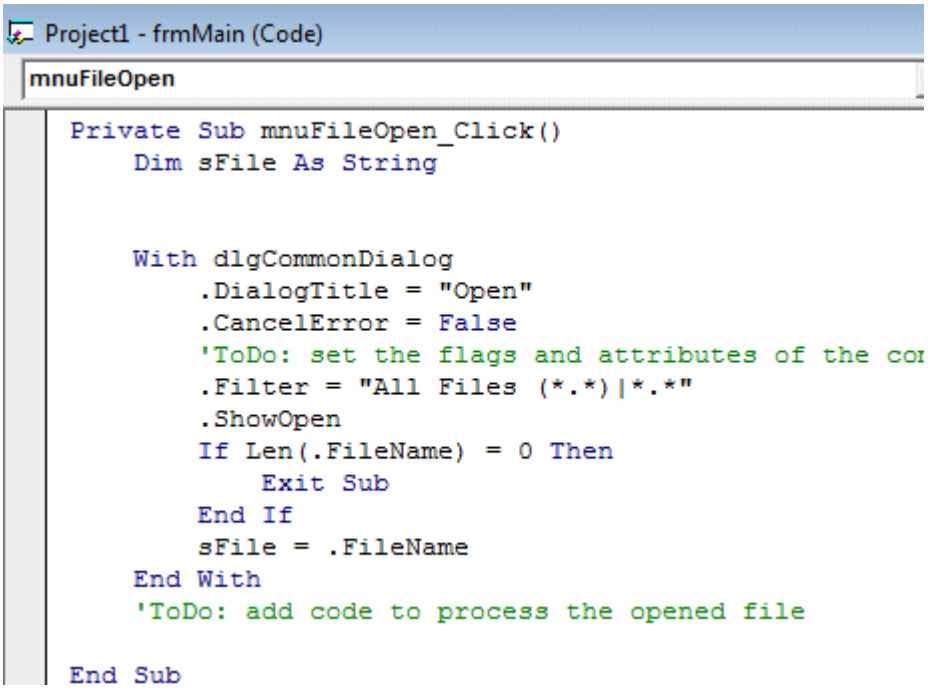


Figure 37.7

Now, I will show you how to modify the code in order to open a graphic file and display it in an image box. For this program, you have to insert a Image box into the form. Next add the following lines so that the user can open graphic files of different formats.

.Filter = "Bitmaps(*.BMP)|*.BMP|Metafiles(*.WMF)|*. WMF|Jpeg Files(*.jpg)|*.jpg|GIF Files(*.gif)|*.gif|Icon Files(*.ico)|*.ico|All Files(*.*)|*.*".

Then, you need to load the image into the Image box with the following code:

Image1.Picture = LoadPicture(.FileName)

Also set the Stretch property of the Image box to true so that the image loaded can resize by itself. Please note that each menu item is a special control, so it has a name too. The name for the menu File in this example is mnuFileOpen.

The Code

Private Sub mnuFileOpen_Click()

Dim sFile As String

```
With dlgCommonDialog

.DialogTitle = "Open"

.CancelError = False

'Set the flags and attributes of the common dialog control
.Filter = "Bitmaps(*.BMP)|*.BMP|Metafiles(*.WMF)|*. WMF|Jpeg
Files(*.jpg)|*.jpg|GIF Files(*.gif)|*.gif|Icon Files(*.ico)|*.ico|All
Files(*.*)|*.*"

.ShowOpen
Image1.Picture = LoadPicture(.FileName)

If Len(.FileName) = 0 Then
 Exit Sub
End If
sFile = .FileName
End With

End Sub
```

When you run the program and click on the File menu and then the submenu Open, the following Open dialog box will be displayed, where you can look for graphic files of various formats to load it into the image box.

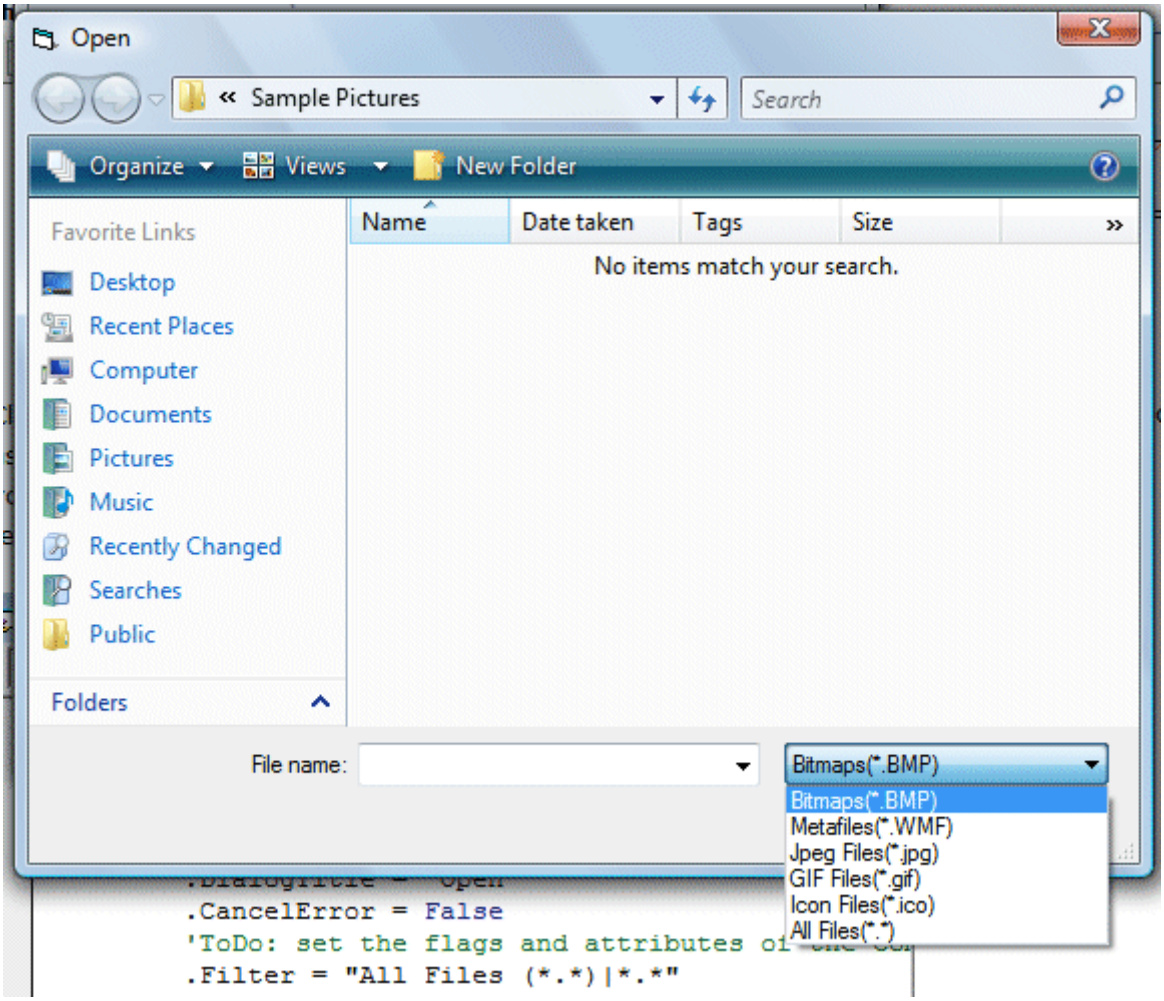


Figure 37.8

For example, selecting the jpeg file will allow you to choose the images of jpeg format, as shown in Figure 37.9.

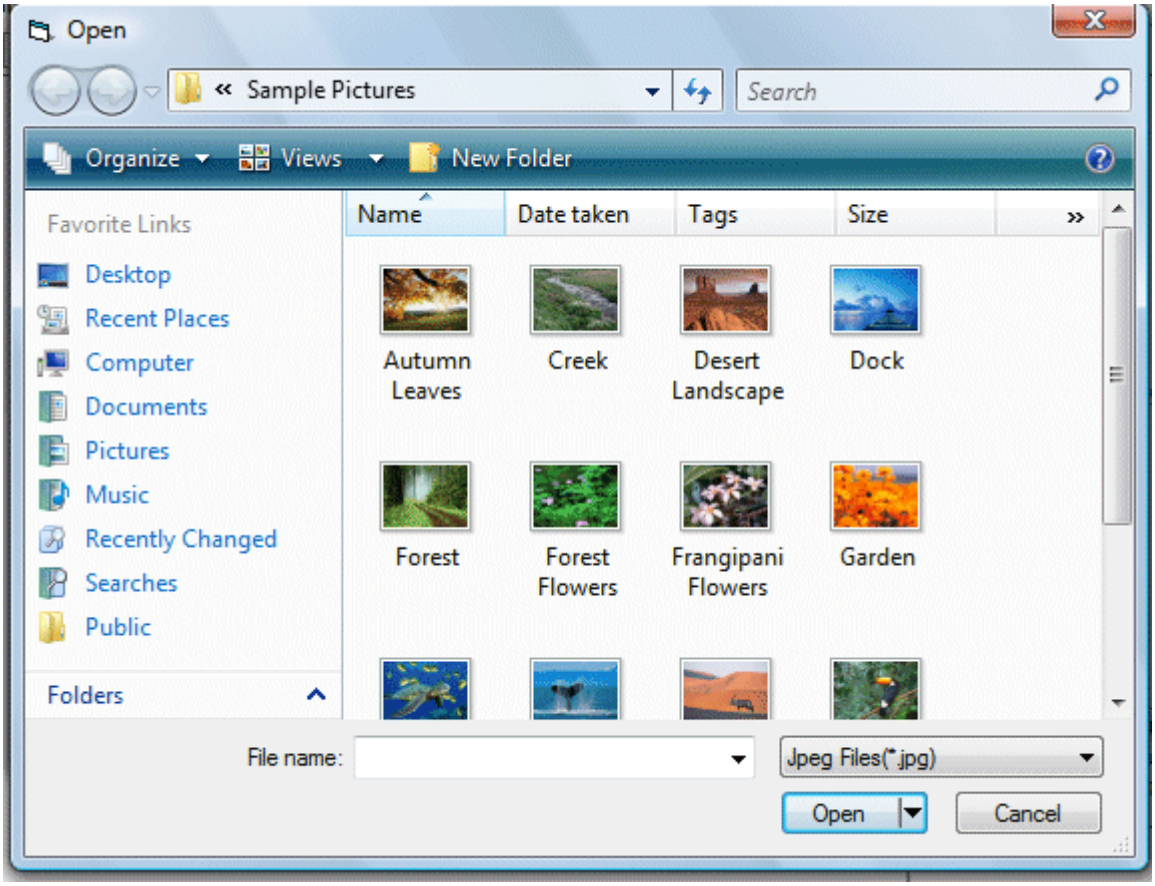


Figure 37.9

Clicking on the particular picture will load it into the image box, as shown in Figure 36.10 below

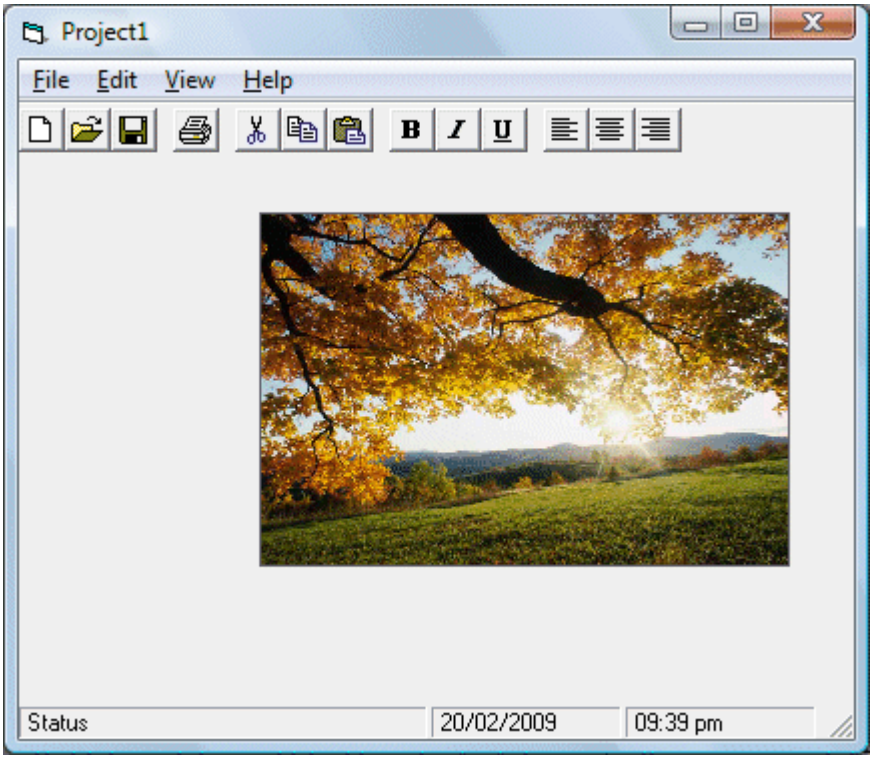


Figure 37.10

37.2: ADDING MENU BAR USING MENU EDITOR

To start adding menu items to your application, open an existing project or start a new project, then click on Tools in the menu bar of the Visual Basic IDE and select Menu Editor. When you click on the Menu Editor, the Menu Editor dialog will appear. In the Menu Editor dialog , key in the first item File in the caption text box. You can use the ampersand (&) sign in front of F so that F will be underlined when it appears in the menu, and F will become the hot key to initiate the action under this item by pressing the Alt key and the letter F. After typing &File in the Caption text box, move to the name textbox to enter the name for this menu item, you can type in mnuFile here. Now, click the Next button and the menu item &File will move into the empty space below, as shown in Figure 37.11:

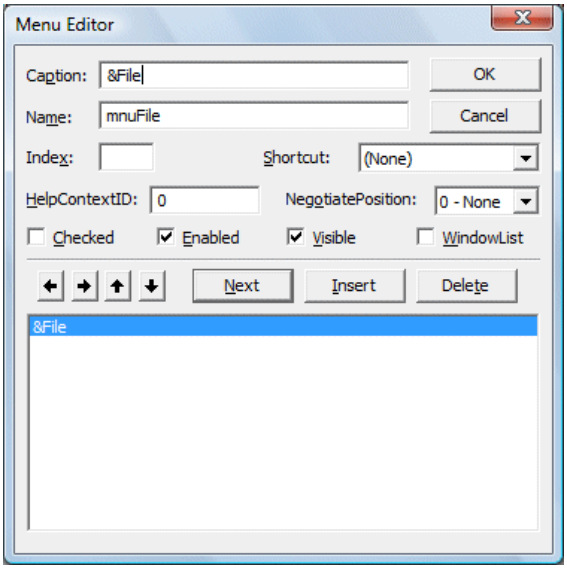


Figure 37.11

You can then add in other menu items on the menu bar by following the same procedure, as shown in Figure 37.12 below:

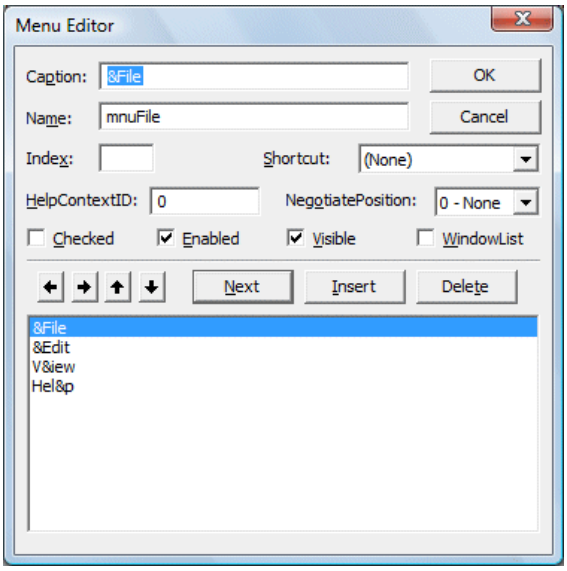


Figure 37.12

When you click Ok, the menu items will be shown on the menu bar of the form.

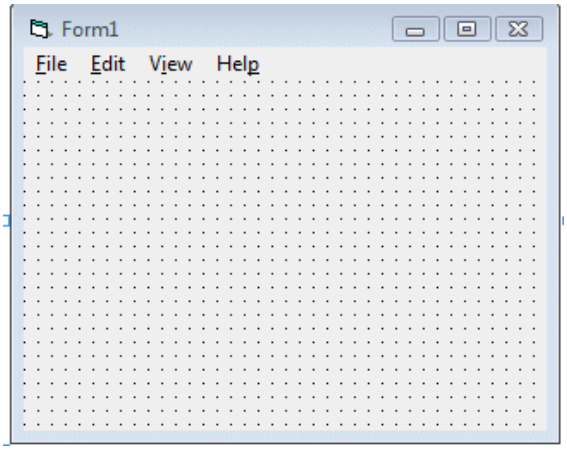


Figure 37.13

Now, you may proceed to add the sub menus. In the Menu Editor, click on the Insert button between File and Exit and then click the right arrow key, and the dotted line will appear. This shows the second level of the menu, or the submenu. Now key in the caption and the name. Repeat the same procedure to add other submenu items. Here, we are adding New, Open, Save, Save As and Exit.

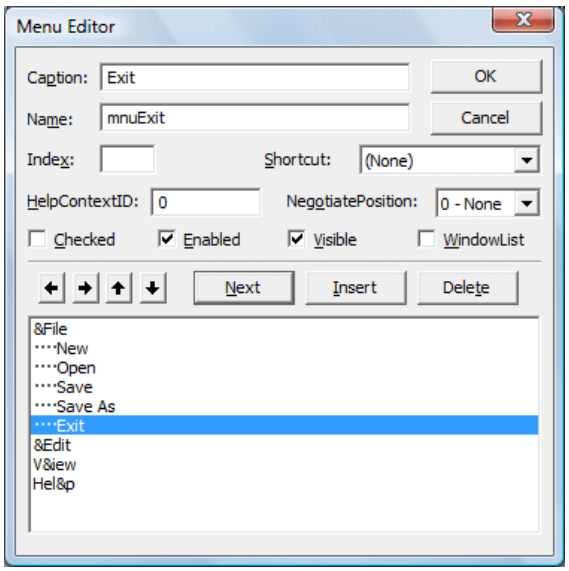


Figure 37.14

Now click the OK button and go back to your form. You can see the dropped down submenus when you click on the item File, as shown.

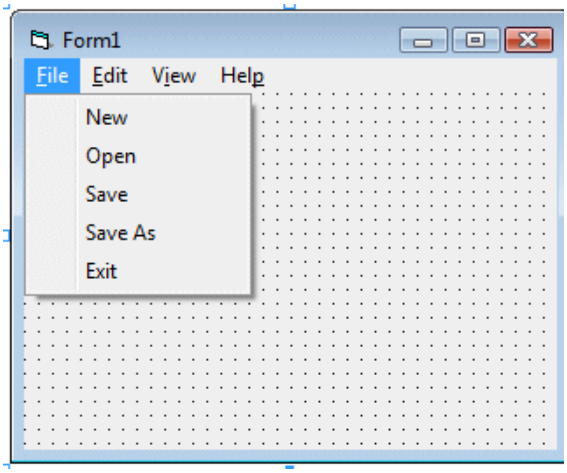


Figure 37.15

Finally, you can enter the code by clicking on any of the submenu items.

The Multiple Document Interface (MDI) in Visual Basic 6

The Multiple Document Interface (MDI) was designed to simplify the exchange of information among documents, all under the same roof. With the main application, you can maintain multiple open windows, but not multiple copies of the application. Data exchange is easier when you can view and compare many documents simultaneously.

You almost certainly use Windows applications that can open multiple documents at the same time and allow the user to switch among them with a mouse-click. Multiple Word is a typical example, although most people use it in single document mode. Each document is displayed in its own window, and all document windows have the same behavior. The main Form, or MDI Form, isn't duplicated, but it acts as a container for all the windows, and it is called the parent window. The windows in which the individual documents are displayed are called Child windows.

An MDI application must have at least two Form, the parent Form and one or more child Forms. Each of these Forms has certain properties. There can be many child forms contained within the parent Form, but there can be only one parent Form.

The parent Form may not contain any controls. While the parent Form is open in design mode, the icons on the ToolBox are not displayed, but you can't place any controls on the Form. The parent Form can, and usually has its own menu.

To create an MDI application, follow these steps:

Start a new project and then choose Project >>> Add MDI Form to add the parent Form.

Set the Form's caption to MDI Window

Choose Project >>> Add Form to add a SDI Form.

Make this Form as child of MDI Form by setting the MDI Child property of the SDI Form to True. Set the caption property to MDI Child window.

Visual Basic automatically associates this new Form with the parent Form. This child Form can't exist outside the parent Form; in the words, it can only be opened within the parent Form.

Parent and Child Menus

MDI Form cannot contain objects other than child Forms, but MDI Forms can have their own menus. However, because most of the operations of the application have meaning only if there is at least one child Form open, there's a peculiarity about the MDI Forms. The MDI Form usually has a menu with two commands to load a new child Form and to quit the application. The child Form can have any number of commands in its menu, according to the application. When the child Form is loaded, the child Form's menu replaces the original menu on the MDI Form

Following example illustrates the above explanation.

Open a new Project and name the Form as Menu.frm and save the Project as Menu.vbp

Design a menu that has the following structure.

MDIMenu Menu caption

MDIOpen opens a new child Form

MDIExit terminates the application

Then design the following menu for the child Form

ChildMenu Menu caption

Child Open opens a new child Form

Child Save saves the document in the active child Form

Child Close Closes the active child Form

At design time double click on MDI Open and add the following code in the click event of the open menu.

Form1.Show

And so double click on MDI Exit and add the following code in the click event

End

Double click on Child Close and enter the following code in the click event

Unload Me

Before run the application in the project properties set MDI Form as the start-up Form. Save and run the application. Following output will be displayed.

And as soon as you click MDI Open you can notice that the main menu of the MDI Form is replaced with the Menu of the Child Form. The reason for this behavior should be obvious. The operation available through the MDI Form are quite different from the operations of the child window. Moreover, each child Form shouldn't have it's own menu.

CONTROL ARRAYS IN VISUAL BASIC 6

A control array is a group of controls that share the same name type and the same event procedures. Adding controls with control arrays uses fewer resources than adding multiple control of same type at design time.

A control array can be created only at design time, and at the very minimum at least one control must belong to it. You create a control array following one of these three methods:

You create a control and then assign a numeric, non-negative value to its Index property; you have thus created a control array with just one element.

You create two controls of the same class and assign them an identical Name property. Visual Basic shows a dialog box warning you that there's already a control with that name and asks whether you want to create a control array. Click on the Yes button.

You select a control on the form, press Ctrl+C to copy it to the clipboard, and then press Ctrl+V to paste a new instance of the control, which has the same Name property as the original one. Visual Basic shows the warning mentioned in the previous bullet.

Control arrays are one of the most interesting features of the Visual Basic environment, and they add a lot of flexibility to your programs:

Controls that belong to the same control array share the same set of event procedures; this often dramatically reduces the amount of code you have to write to respond to a user's actions.

You can dynamically add new elements to a control array at run time; in other words, you can effectively create new controls that didn't exist at design time.

Elements of control arrays consume fewer resources than regular controls and tend to produce smaller executables. Besides, Visual Basic forms can host up to 256 different control names, but a control array counts as one against this number. In other words, control arrays let you effectively overcome this limit.

The importance of using control arrays as a means of dynamically creating new controls at run time is somewhat reduced in Visual Basic 6, which has introduced a new and more powerful capability.

Don't let the term array lead you to think control array is related to VBA arrays; they're completely different objects. Control arrays

can only be one-dimensional. They don't need to be dimensioned: Each control you add automatically extends the array. The Index property identifies the position of each control in the control array it belongs to, but it's possible for a control array to have holes in the index sequence. The lowest possible value for the Index property is 0. You reference a control belonging to a control array as you would reference a standard array item:

```
Text1(0).Text = ""
```

SHARING EVENT PROCEDURES

Event procedures related to items in a control array are easily recognizable because they have an extra Index parameter, which precedes all other parameters. This extra parameter receives the index of the element that's raising the event, as you can see in this example:

```
Private Sub Text1_KeyPress(Index As Integer, KeyAscii As Integer)
MsgBox "A key has been pressed on Text1(" & Index & ") control"
End Sub
```

The fact that multiple controls can share the same set of event procedures is often in itself a good reason to create a control array. For example, say that you want to change the background color of each of your TextBox controls to yellow when it receives the input focus and restore its background color to white when the user clicks on another field:

```
Private Sub Text1_GotFocus(Index As Integer)
Text1(Index).BackColor = vbYellow
End Sub
Private Sub Text1_LostFocus(Index As Integer)
Text1(Index).BackColor = vbWhite
End Sub
```

Control arrays are especially useful with groups of OptionButton controls because you can remember which element in the group has been activated by adding one line of code to their shared Click event. This saves code when the program needs to determine which button is the active one:

```
' A module-level variable
Dim optFrequencyIndex As Integer

Private Sub optFrequency_Click(Index As Integer)
' Remember the last button selected.
optFrequencyIndex = Index
End Sub
```

CREATING CONTROLS AT RUN TIME

Control arrays can be created at run time using the statements

Load object (Index %)

Unload object (Index %)

Where object is the name of the control to add or delete from the control array. Index % is the value of the index in the array. The control array to be added must be an element of the existing array created at design time with an index value of 0. When a new element of a control array is loaded, most of the property settings are copied from the lowest existing element in the array.

Following example illustrates the use of the control array.

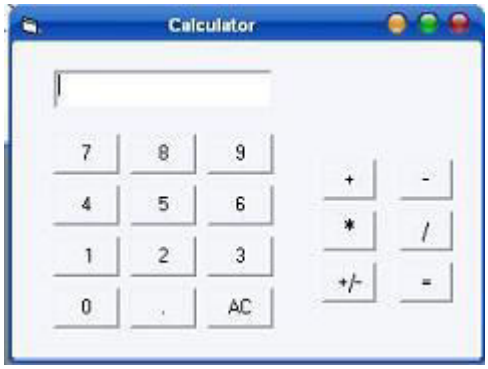
Open a Standard EXE project and save the Form as Calculator.frm and save the Project as Calculater.vbp.

Design the form as shown below.

Object	Property	Setting
Form	Caption Name	Calculator frmCalculator
CommandButton	Caption Name Index	1 cmd 0
CommandButton	Caption Name Index	2 cmd 1
CommandButton	Caption Name Index	3 cmd 2
CommandButton	Caption Name Index	4 cmd 3

CommandButton	Caption Name Index	5 cmd 4
CommandButton	Caption Name Index	6 cmd 5
CommandButton	Caption Name Index	7 cmd 6
CommandButton	Caption Name Index	8 cmd 7
CommandButton	Caption Name Index	9 cmd 8
CommandButton	Caption Name Index	0 cmd 10
CommandButton	Caption Name Index	. cmd 11
CommandButton	Caption Name	AC cmdAC
CommandButton	Caption Name	+ cmdPlus
CommandButton	Caption Name	- cmdMinus
CommandButton	Caption	*

	Name	cmdMultiply
CommandButton	Caption Name	/ cmdDivide
CommandButton	Caption Name	+/- cmdNeg
TextBox	Name Text	txtDisplay (empty)
CommandButton	Caption Name	= cmdEqual



The following variables are declared inside the general declaration

```
Dim Current As Double
Dim Previous As Double
Dim Choice As String
Dim Result As Double
```

The following code is entered in the cmd_Click( ) (Control Array) event procedure

```
Private Sub cmd_Click(Index As Integer)
txtDisplay.Text = txtDisplay.Text & cmd(Index).Caption
'&is the concatenation operator
Current = Val(txtDisplay.Text)
End Sub
```

The following code is entered in the cmdAC_Click ( ) event procedure

```
Private Sub cmdAC_Click()
Current = Previous = 0
txtDisplay.Text = ""
End Sub
```

The below code is entered in the cmdNeg_Click( ) procedure

```
Private Sub cmdNeg_Click()
Current = -Current
txtDisplay.Text = Current
End Sub
```

The following code is entered in the click events of the cmdPlus, cmdMinus, cmdMultiply, cmdDevide controls respectively.

```
Private Sub cmdDevide_Click()
txtDisplay.Text = ""
Previous = Current
Current = 0
Choice = "/"
End Sub

Private Sub cmdMinus_Click()
txtDisplay.Text = ""
Previous = Current
Current = 0
Choice = "-"
End Sub

Private Sub cmdMultiply_Click()
txtDisplay.Text = ""
Previous = Current
Current = 0
Choice = "*"
End Sub

Private Sub cmdPlus_Click()
txtDisplay.Text = ""
Previous = Current
Current = 0
Choice = "+"
End Sub
```

To print the result on the text box, the following code is entered in the cmdEqual_Click ( ) event procedure.

```
Private Sub cmdEqual_Click()

Select Case Choice

Case "+"
Result = Previous + Current
txtDisplay.Text = Result
Case "-"
```

```
Result = Previous - Current
txtDisplay.Text = Result
Case "*"
Result = Previous * Current
txtDisplay.Text = Result
Case "/"
Result = Previous / Current
txtDisplay.Text = Result
End Select

Current = Result

End Sub
```

Save and run the project. On clicking digits of user's choice and an operator button, the output appears.

ITERATING ON THE ITEMS OF A CONTROL ARRAY

Control arrays often let you save many lines of code because you can execute the same statement, or group of statements, for every control in the array without having to duplicate the code for each distinct control. For example, you can clear the contents of all the items in an array of TextBox controls as follows:

```
For i = txtFields.LBound To txtFields.UBound
txtFields(i).Text = ""
Next
```

Here you're using the LBound and UBound methods exposed by the control array object, which is an intermediate object used by Visual Basic to gather all the controls in the array. In general, you shouldn't use this approach to iterate over all the items in the array because if the array has holes in the Index sequence an error will be raised. A better way to loop over all the items of a control array is using the For Each statement:

```
Dim txt As TextBox
For Each txt In txtFields
txt.Text = ""
Next
```

A third method exposed by the control array object, Count, returns the number of elements it contains. It can be useful on several occasions (for example, when removing all the controls that were added dynamically at run time):

```
' This code assumes that txtField(0) is the only control that was
' created at design time (you can't unload it at run time).
```

```
Do While txtFields.Count > 1
Unload txtFields(txtFields.UBound)
Loop
```

Arrays of Menu Items

Control arrays are especially useful with menus because arrays offer a solution to the proliferation of menu Click events and, above all, permit you to create new menus at run time. An array of menu controls is conceptually similar to a regular control array, only you set the Index property to a numeric (non-negative) value in the Menu Editor instead of in the Properties window.

There are some limitations, though: All the items in an array of menu controls must be adjacent and must belong to the same menu level, and their Index properties must be in ascending order (even though holes in the sequence are allowed). This set of requirements severely hinders your ability to create new menu items at run time. In fact, you can create new menu items in well-defined positions of your menu hierarchy—namely, where you put a menu item with a nonzero Index value—but you can't create new submenus or new top-level menus.

Now that you have a thorough understanding of how Visual Basic's forms and controls work, you're ready to dive into the subtleties of the Visual Basic for Applications (VBA) language.

Using TextBox Control In Visual Basic 6

TextBox controls offer a natural way for users to enter a value in your program. For this reason, they tend to be the most frequently used controls in the majority of Windows applications. TextBox controls, which have a great many properties and events, are also among the most complex intrinsic controls. In this section, I guide you through the most useful properties of TextBox controls and show how to solve some of the problems that you're likely to encounter.

Setting properties to a TextBox

Text can be entered into the text box by assigning the necessary string to the text property of the control

If the user needs to display multiple lines of text in a TextBox, set the MultiLine property to True

To customize the scroll bar combination on a TextBox, set the ScrollBars property.

Scroll bars will always appear on the TextBox when it's MultiLine property is set to True and its ScrollBars property is set to anything except None(0)

If you set the MultilIne property to True, you can set the alignment using the Alignment property. The test is left-justified by default. If the MultiLine property is et to False, then setting the Alignment property has no effect.

RUN-TIME PROPERTIES OF A TEXTBOX CONTROL

The Text property is the one you'll reference most often in code, and conveniently it's the default property for the TextBox control. Three other frequently used properties are these:

The *SelStart* **property** sets or returns the position of the blinking caret (the insertion point where the text you type appears). Note that the blinking cursor inside TextBox and other controls is named caret, to distinguish it from the cursor (which is implicitly the mouse cursor). When the caret is at the beginning of the contents of the TextBox control, SelStart returns 0; when it's at the end of the string typed by the user, SelStart returns the value Len(Text). You can modify the SelStart property to programmatically move the caret.

The *SelLength* **property** returns the number of characters in the portion of text that has been highlighted by the user, or it returns 0 if there's no highlighted text. You can assign a nonzero value to this property to programmatically select text from code. Interestingly, you can assign to this property a value larger than the current text's length without raising a run-time error.

The *SelText* **property** sets or returns the portion of the text that's currently selected, or it returns an empty string if no text is highlighted. Use it to directly retrieve the highlighted text without having to query Text, SelStart, and SelLength properties. What's even more interesting is that you can assign a new value to this property, thus replacing the current selection with your own. If no text is currently selected, your string is simply inserted at the current caret position.

When you want to append text to a TextBox control, you should use the following code (instead of using the concatenation operator) to reduce flickering and improve performance:

```
Text1.SelStart = Len(Text1.Text)
Text1.SelText = StringToBeAdded
```

One of the typical operations you could find yourself performing with these properties is selecting the entire contents of a TextBox control. You often do it when the caret enters the field so that the user can quickly override the existing value with a new one, or start editing it by pressing any arrow key:

```
Private Sub Text1_GotFocus()
Text1.SelStart = 0
' A very high value always does the trick.
Text1.SelLength = 9999
End Sub
```

Always set the SelStart property first and then the SelLength or SelText properties. When you assign a new value to the SelStart property, the other two are automatically reset to 0 and an empty string respectively, thus overriding your previous settings.

The selected text can be copied to the Clipboard by using SelText:

Clipboard.SelText text, [format]

In the above syntax, text is the text that has to be placed into the Clipboard, and format has three possible values.

VbCFLink - conversation information
2. VbCFRTF - Rich Text Format
3. VbCFText - Text

We can get text from the clipboard using the GetText() function this way:

Clipboard.GetText ([format])

The following Figure summarizes the common TextBox control's properties and methods.

Property/ Method	**Description**
Properties	
Enabled	specifies whether user can interact with this control or not
Index	Specifies the control array index
Locked	If this control is set to True user can use it else if this control is set to false the control cannot be used

MaxLength	Specifies the maximum number of characters to be input. Default value is set to 0 that means user can input any number of characters
MousePointer	Using this we can set the shape of the mouse pointer when over a TextBox
Multiline	By setting this property to True user can have more than one line in the TextBox
PasswordChar	This is to specify mask character to be displayed in the TextBox
ScrollBars	This to set either the vertical scrollbars or horizontal scrollbars to make appear in the TextBox. User can also set it to both vertical and horizontal. This property is used with the Multiline property.
Text	Specifies the text to be displayed in the TextBox at runtime
ToolTipIndex	This is used to display what text is displayed or in the control
Visible	By setting this user can make the Textbox control visible or invisible at runtime
Method	
SetFocus	Transfers focus to the TextBox
Event procedures	
Change	Action happens when the TextBox changes
Click	Action happens when the TextBox is clicked
GotFocus	Action happens when the TextBox receives the active focus
LostFocus	Action happens when the TextBox loses it focus
KeyDown	Called when a key is pressed while the TextBox has the focus
KeyUp	Called when a key is released while the

	TextBox has the focus

VB6 CommandButton And OptionButton Controls - Visual Basic 6

When compared to TextBox controls, these controls are really simple. Not only do they expose relatively few properties, they also support a limited number of events, and you don't usually write much code to manage them.

CommandButton Controls in VB6

Using CommandButton controls is trivial. In most cases, you just draw the control on the form's surface, set its Caption property to a suitable string (adding an & character to associate a hot key with the control if you so choose), and you're finished, at least with user-interface issues. To make the button functional, you write code in its Click event procedure, as in this fragment:

```
Private Sub Command1_Click()
' Save data, then unload the current form.
Call SaveDataToDisk
Unload Me
End Sub
```

You can use two other properties at design time to modify the behavior of a CommandButton control. You can set the Default property to True if it's the default push button for the form (the button that receives a click when the user presses the Enter key—usually the OK or Save button). Similarly, you can set the Cancel property to True if you want to associate the button with the Escape key.

The only relevant CommandButton's run-time property is Value, which sets or returns the state of the control (True if pressed, False otherwise). Value is also the default property for this type of control. In most cases, you don't need to query this property because if you're inside a button's Click event you can be sure that the button is being activated. The Value property is useful only for programmatically clicking a button:

```
This fires the button's Click event.
Command1.Value = True
```

The CommandButton control supports the usual set of keyboard and mouse events (KeyDown, KeyPress, KeyUp, MouseDown, MouseMove, MouseUp, but not the DblClick event) and also the GotFocus and LostFocus events, but you'll rarely have to write code in the corresponding event procedures.

Properties of a CommandButton control

To display text on a CommandButton control, set its ***Caption*** property.

An event can be activated by clicking on the CommandButton.

To set the background colour of the CommandButton, select a colour in the BackColor property.

To set the text colour set the Forecolor property.

Font for the CommandButton control can be selected using the Font property.

To enable or disable the buttons set the Enabled property to True or False

To make visible or invisible the buttons at run time, set the Visible property to True or False.

Tooltips can be added to a button by setting a text to the Tooltip property of the CommandButton.

A button click event is handled whenever a command button is clicked. To add a click event handler, double click the button at design time, which adds a subroutine like the one given below.

```
Private Sub Command1_Click( )
.....
End Sub
```

OPTIONBUTTON CONTROLS IN VB6

OptionButton controls are also known as radio buttons because of their shape. You always use OptionButton controls in a group of two or more because their purpose is to offer a number of mutually exclusive choices. Anytime you click on a button in the group, it switches to a selected state and all the other controls in the group become unselected.

Preliminary operations for an OptionButton control are similar to those already described for CheckBox controls. You set an OptionButton control's Caption property to a meaningful string, and if you want you can change its Alignment property to make the control right aligned. If the control is the one in its group that's in the selected state, you also set its Valueproperty to True. (The OptionButton's Value property is a Boolean value because

only two states are possible.) Value is the default property for this control.

At run time, you typically query the control's Value property to learn which button in its group has been selected. Let's say you have three OptionButton controls, named optWeekly, optMonthly, and optYearly. You can test which one has been selected by the user as follows:

```
If optWeekly.Value Then
' User prefers weekly frequency.
ElseIf optMonthly.Value Then
' User prefers monthly frequency.
ElseIf optYearly.Value Then
' User prefers yearly frequency.
End If
```

Strictly speaking, you can avoid the test for the last OptionButton control in its group because all choices are supposed to be mutually exclusive. But the approach I just showed you increases the code's readability.

A group of OptionButton controls is often hosted in a Frame control. This is necessary when there are other groups of OptionButton controls on the form. As far as Visual Basic is concerned, all the OptionButton controls on a form's surface belong to the same group of mutually exclusive selections, even if the controls are placed at the opposite corners of the window. The only way to tell Visual Basic which controls belong to which group is by gathering them inside a Frame control. Actually, you can group your controls within any control that can work as a container—PictureBox, for example—but Frame controls are often the most reasonable choice.

Example

Open a new Standard EXE project and the save the Form as Option.frm and save the project as Option.vbp.

Design the Form as per the following specifications table.

Object	Property	Settings
Label	Caption Name	Enter a Number Label1
TextBox	Text	(empty)

	Name	Text1
CommandButton	Caption Name	&Close Command1
OptionButton	Caption Name	&Octal optOct
OptionButton	Caption Name	&Hexadecimal optHex
OptionButton	Caption Name	&Decimal optDec

The application responds to the following events

The change event of the TextBox reads the value and stores it in a form-level numeric variable.

The click event of optOct button returns curretval in octal.

The click event of the optHex button curerntval in hexadecimal

The click event of the optDec button returns the decimal equivalent of the value held currentval.

The following code is entered in the general declarations section of the Form.

Dim currentval as variant

The variable is initialized to 0 by default. The change event procedure checks to ascertain the number system (Octal, Hexadecimal) that is in effect and then reads in the number.

```
Private Sub Text1_Change()
If optOct.Value = True Then
currentval = Val ("&O" & LTrim (Text1.Text) & "&")
Elseif optDec.value = True Then
currentval = Val (LTrim (Text1.Text) & "&")
Else
currentval = Val ("&H" & LTrim (Text1.Text) & "&")
End if
End Sub
```

The Val function is used to translate string to a number and can recognize Octal and Hexadecimal strings. The LTrim function

trims the leading blanks in the text. The following code is entered in the click events of the OptionButton controls.

```
Private Sub optOct_Click()
Text1.Text = Oct(currentval)
End Sub

Private Sub optHex_Click()
Text1.Text = Hex(currentval)
End Sub

Private Sub optDec_Click()
Text1.Text = Format(currentval)
End Sub
```

The follwoing code is entered in the click event of teh Close button.

```
Private Sub cmdClose_Click()
Unlod Me
End Sub
```

The Application is run by pressing F5 or clicking on the Run icon in the tool bar. By pressing the Exit button the program is terminated.

Label And Frame Controls In Visual Basic 6 (VB6)

Label and Frame controls have a few features in common, so it makes sense to explain them together. First they're mostly "decorative" controls that contribute to the user interface but are seldom used as programmable objects. In other words, you often place them on the form and arrange their properties as your user interface needs dictate, but you rarely write code to serve their events, generally, or manipulate their properties at run time.

Label Controls

Most people use Label controls to provide a descriptive caption and possibly an associated hot key for other controls, such as TextBox, ListBox, and ComboBox, that don't expose the Caption property. In most cases, you just place a Label control where you need it, set its Caption property to a suitable string (embedding an ampersand character in front of the hot key you want to assign), and you're done. Caption is the default property for Label controls. Be careful to set the Label's TabIndex property so that it's 1 minus the TabIndex property of the companion control.

Other useful properties are BorderStyle(if you want the Label control to appear inside a 3D border) and Alignment (if you want to align the caption to the right or center it on the control). In most cases, the alignment depends on how the Label control relates to its companion control: for example, if the Label control is placed to the left of its companion field, you might want to set its Alignment property to 1-Right Justify. The value 2-Center is especially useful for stand-alone Label controls.

Different settings for the Alignment property of Label controls.

You can insert a literal & character in a Label control's Caption property by doubling it. For example, to see Research & Development you have to type &Research && Development. Note that if you have multiple but isolated &s, the one that selects the hot key is the last one and all others are ignored. This tip applies to all the controls that expose a Caption property. (The & has no special meaning in forms' Caption properties, however.)

If the caption string is a long one, you might want to set the Label's WordWrap property to True so that it will extend for multiple lines instead of being truncated by the right border of the control. Alternatively, you might decide to set the AutoSize property to True and let the control automatically resize itself to accommodate longer caption strings.

You sometimes need to modify the default value of a Label's BackStyle property. Label controls usually cover what's already on the form's surface (other lightweight controls, output from graphic methods, and so on) because their background is considered to be opaque. If you want to show a character string somewhere on the form but at the same time you don't want to obscure underlying objects, set the BackStyle property to 0-Transparent.

If you're using the Label control to display data read from elsewhere—for example, a database field or a text file—you should set its UseMnemonics property to False. In this case, & characters

have no special meaning to the control, and so you indirectly turn off the control's hot key capability. I mention this property because in older versions of Visual Basic, you had to manually double each & character to make the ampersand appear in text. I don't think all developers are aware that you can now treat ampersands like regular characters.

As I said before, you don't usually write code in Label control event procedures. This control exposes only a subset of the events supported by other controls. For example, because Label controls can never get the input focus, they don't support GotFocus, LostFocus, or any keyboard-related events. In practice, you can take advantage only of their mouse events: Click, DblClick, MouseDown, MouseMove, and MouseUp. If you're using a Label control to display data read from a database, you might sometimes find it useful to write code in its Change event. A Label control doesn't expose a specific event that tells programmers when users press its hot keys.

You can do some interesting tricks with Label controls. For example, you can use them to provide rectangular hot spots for images loaded onto the form. To create that context-sensitive ToolTip, I loaded the image on the form using the form's Picture property and then I placed a Label control over the Microsoft BackOffice logo, setting its Caption property to an empty string and the BackStyle property to 0-Transparent. These properties make the Label invisible, but it correctly shows its ToolTip when necessary. And because it still receives all mouse events, you can use its Click event to react to users' actions.

FRAME CONTROLS

Frame controls are similar to Label controls in that they can serve as captions for those controls that don't have their own. Moreover, Frame controls can also (and often do) behave as containers and host other controls. In most cases, you only need to drop a Frame control on a form and set its Caption property. If you want to create a borderless frame, you can set its BorderStyle property to 0-None.

Controls that are contained in the Frame control are said to be child controls. Moving a control at design time over a Frame control—or over any other container, for that matter—doesn't automatically make that control a child of the Frame control. After you create a Frame control, you can create a child control by selecting the child control's icon in the Toolbox and drawing a new instance inside the Frame's border. Alternatively, to make an existing control a child of a Frame control, you must select the control, press Ctrl+X to cut it to the Clipboard, select the Frame

control, and press Ctrl+V to paste the control inside the Frame. If you don't follow this procedure and you simply move the control over the Frame, the two controls remain completely independent of each other, even if the other control appears in front of the Frame control.

Frame controls, like all container controls, have two interesting features. If you move a Frame control, all the child controls go with it. If you make a container control disabled or invisible, all its child controls also become disabled or invisible. You can exploit these features to quickly change the state of a group of related controls.

PictureBox And Image Controls In Visual Basic 6

Both PictureBox and Image controls let you display an image, so let's compare them and see when it makes sense to choose one or the other.

The PictureBox Control

PictureBox controls are among the most powerful and complex items in the Visual Basic Toolbox window. In a sense, these controls are more similar to forms than to other controls. For example, PictureBox controls support all the properties related to graphic output, including AutoRedraw, ClipControls, HasDC, FontTransparent, CurrentX, CurrentY, and all the Drawxxxx, Fillxxxx, and Scalexxxx properties. PictureBox controls also support all graphic methods, such as Cls, PSet, Point, Line, and Circle and conversion methods, such as ScaleX, ScaleY, TextWidth, and TextHeight. In other words, all the techniques that I described for forms can also be used for PictureBox controls (and therefore won't be covered again in this section).

Loading images

Once you place a PictureBox on a form, you might want to load an image in it, which you do by setting the Picture property in the Properties window. You can load images in many different graphic formats, including bitmaps (BMP), device independent bitmaps (DIB), metafiles (WMF), enhanced metafiles (EMF), GIF and JPEG compressed files, and icons (ICO and CUR). You can decide whether a control should display a border, resetting the BorderStyle to 0-None if necessary. Another property that comes handy in this phase is AutoSize: Set it to True and let the control automatically resize itself to fit the assigned image.

You might want to set the Align property of a PictureBox control to something other than the 0-None value. By doing that, you attach the control to one of the four form borders and have Visual Basic automatically move and resize the PictureBox control when the form is resized. PictureBox controls expose a Resize event, so you can trap it if you need to move and resize its child controls too.

You can do more interesting things at run time. To begin with, you can programmatically load any image in the control using the LoadPicture function:

```
Picture1.Picture = LoadPicture("c:\windows\setup.bmp")
```

and you can clear the current image using either one of the following statements:

```
' These are equivalent.
Picture1.Picture = LoadPicture("")
Set Picture1.Picture = Nothing
```

The LoadPicture function has been extended in Visual Basic 6 to support icon files containing multiple icons. The new syntax is the following:

```
LoadPicture(filename, [size], [colordepth], [x], [y])
```

where values in square brackets are optional. If filename is an icon file, you can select a particular icon using the size or colordepth arguments. Valid sizes are 0-vbLPSmall, 1-vbLPLarge (system icons whose sizes depend on the video driver), 2-vbLPSmallShell, 3-vbLPLargeShell (shell icons whose dimensions are affected by the Caption Button property as set in the Appearance tab in the screen's Properties dialog box), and 4-vbLPCustom (size is determined by x and y). Valid color depths are 0-vbLPDefault (the icon in the file that best matches current screen settings), 1-vbLPMonochrome, 2-vbLPVGAColor (16 colors), and 3-vbLPColor (256 colors).

You can copy an image from one PictureBox control to another by assigning the target control's Picture property:

```
Picture2.Picture = Picture1.Picture
```

The PaintPicture method

PictureBox controls are equipped with a very powerful method that enables the programmer to perform a wide variety of graphic

effects, including zooming, scrolling, panning, tiling, flipping, and many fading effects: This is the PaintPicture method. (This method is also exposed by form objects, but it's most often used with PictureBox controls.) In a nutshell, this method performs a pixel-by-pixel copy from a source control to a destination control. The complete syntax of this method is complex and rather confusing:

```
DestPictBox.PaintPicture SrcPictBox.Picture, destX, destY, [destWidth], _
[destHeight], [srcX], [srcY2], [srcWidth], [srcHeight], [Opcode])
```

The only required arguments are the source PictureBox control's Picture property and the coordinates inside the destination control where the image must be copied. The destX / destY arguments are expressed in the ScaleMode of the destination control; by varying them, you can make the image appear exactly where you want. For example, if the source PictureBox control contains a bitmap 3000 twips wide and 2000 twips tall, you can center this image on the destination control with this command:

```
picDest.PaintPicture picSource.Picture, (picDest.ScaleWidth - 3000) / 2, _
(picDest.ScaleHeight - 2000) / 2
```

In general, Visual Basic doesn't provide a way to determine the size of a bitmap loaded into a PictureBox control. But you can derive this information if you set the control's AutoSize property to True and then read the control's ScaleWidth and ScaleHeight properties. If you don't want to resize a visible control just to learn the dimensions of a bitmap, you can load it into an invisible control, or you can use this trick, based on the fact that the Picture property returns an StdPicture object, which in turn exposes the Height and Width properties:

```
' StdPicture's Width and Height properties are expressed in
' Himetric units.
With Picture1
width = CInt(.ScaleX(.Picture.Width, vbHimetric, vbPixels))
height = CInt(.ScaleY(.Picture.Height, vbHimetric, _
vbPixels))
End With
```

By the way, in all subsequent code examples I assume that the source PictureBox control's ScaleWidth and ScaleHeight properties match the actual bitmap's size. By default, the PaintPicture method copies the entire source bitmap. But you can copy just a portion of it, passing a value for srcWidth and srcHeight:

```
' Copy the upper left portion of the source image.
picDest.PaintPicture picSource.Picture, 0, 0, , , , , _
picSource.ScaleWidth / 2, picSource.ScaleHeight / 2
```

If you're copying just a portion of the source image, you probably want to pass a specific value for the srcX and srcY values as well, which correspond to the coordinates of the top-left corner of the area that will be copied from the source control:

```
' Copy the bottom-right portion of the source image
' in the corresponding corner in the destination.
wi = picSource.ScaleWidth / 2
he = picSource.ScaleHeight / 2
picDest.PaintPicture picSource.Picture, wi, he, , , wi, he, wi, he
```

You can use this method to tile a target PictureBox control (or form) with multiple copies of an image stored in another control:

```
' Start with the leftmost column.
x = 0
Do While x < picDest.ScaleWidth
y = 0
' For each column, start at the top and work downward.
Do While y < picDest.ScaleHeight
picDest.PaintPicture picSource.Picture, x, y, , , 0, 0
' Next row
y = y + picSource.ScaleHeight
Loop
' Next column
x = x + picSource.ScaleWidth
Loop
```

Another great feature of the PaintPicture method lets you resize the image while you transfer it, and you can even specify different zoom-in and zoom-out factors for the x- and y-axes independently. You just have to pass a value to the destWidth and destHeight arguments: If these values are greater than the source image's corresponding dimensions, you achieve a zoom-in effect, and if they are less you get a zoom-out effect. For example, see how you can double the size of the original image:

```
picDest.PaintPicture picSource.Picture, 0, 0, _
picSource.ScaleWidth * 2, picSource.ScaleHeight * 2
```

As a special case of the syntax of the PaintPicture method, the source image can even be flipped along its x-axis, y-axis, or both by passing negative values for these arguments:

```
' Flip horizontally.
picDest.PaintPicture picSource.Picture, _
picSource.ScaleWidth, 0, -picSource.ScaleWidth
' Flip vertically.
picDest.PaintPicture picSource.Picture, 0, _
picSource.ScaleHeight, , -picSource.ScaleHeight
' Flip the image on both axes.
picDest.PaintPicture picSource.Picture, picSource.ScaleWidth, _
picSource.ScaleHeight, -picSource.ScaleWidth, -
picSource.ScaleHeight
```

As you might expect, you can combine all these effects together, magnifying, reducing, or flipping just a portion of the source image, and have the result appear in any point of the destination PictureBox control (or form). You should find no problem in reusing all those routines in your own applications.

As if all these capabilities weren't enough, we haven't covered the last argument of the PaintPicture method yet. The opcode argument lets you specify which kind of Boolean operation must be performed on pixel bits as they're transferred from the source image to the destination. The values you can pass to this argument are the same that you assign to the DrawMode property. The default value is 13-vbCopyPen, which simply copies the source pixels in the destination control. By playing with the other settings, you can achieve many interesting graphical effects, including simple animations.

THE IMAGE CONTROL

Image controls are far less complex than PictureBox controls. They don't support graphical methods or the AutoRedraw and the ClipControls properties, and they can't work as containers, just to hint at their biggest limitations. Nevertheless, you should always strive to use Image controls instead of PictureBox controls because they load faster and consume less memory and system resources. Remember that Image controls are windowless objects that are actually managed by Visual Basic without creating a Windows object. Image controls can load bitmaps and JPEG and GIF images.

When you're working with an Image control, you typically load a bitmap into its Picture property either at design time or at run time using the LoadPicture function. Image controls don't expose the AutoSize property because by default they resize to display the contained image (as it happens with PictureBox controls set at AutoSize = True). On the other hand, Image controls support a Stretch property that, if True, resizes the image (distorting it if necessary) to fit the control. In a sense, the Stretch property

somewhat remedies the lack of the PaintPicture method for this control. In fact, you can zoom in to or reduce an image by loading it in an Image control and then setting its Stretch property to True to change its width and height:

```
' Load a bitmap.
Image1.Stretch = False
Image1.Picture = LoadPicture("c:\windows\setup.bmp")
' Reduce it by a factor of two.
Image1.Stretch = True
Image1.Move 0, 0, Image1.Width / 2, Image1.Width / 2
```

Image controls support all the usual mouse events. For this reason, many Visual Basic developers have used Image controls to simulate graphical buttons and toolbars. Now that Visual Basic natively supports these controls, you'd probably better use Image controls only for what they were originally intended.

The Timer, Line, Shape and OLE Controls in Visual Basic 6 (VB6)

The Timer Control

A Timer control is invisible at run time, and its purpose is to send a periodic pulse to the current application. You can trap this pulse by writing code in the Timer's Timer event procedure and take advantage of it to execute a task in the background or to monitor a user's actions. This control exposes only two meaningful properties: Interval and Enabled. Interval stands for the number of milliseconds between subsequent pulses (Timer events), while Enabled lets you activate or deactivate events. When you place the Timer control on a form, its Interval is 0, which means no events. Therefore, remember to set this property to a suitable value in the Properties window or in the Form_Load event procedure:

```
Private Sub Form_Load()
Timer1.Interval = 500 ' Fire two Timer events per second.
End Sub
```

Timer controls let you write interesting programs with just a few lines of code. The typical (and abused) example is a digital clock. Just to make things a bit more compelling, I added flashing colons:

```
Private Sub Timer1_Timer()
Dim strTime As String
strTime = Time$
If Mid$(lblClock.Caption, 3, 1) = ":" Then
Mid$(strTime, 3, 1)= " "
```

```
Mid$(strTime, 6, 1) = " "
End If
lblClock.Caption = strTime
End Sub
```

You must be careful not to write a lot of code in the Timer event procedure because this code will be executed at every pulse and therefore can easily degrade your application's performance. Just as important, never execute a DoEvents statement inside a Timer event procedure because you might cause the procedure to be reentered, especially if the Interval property is set to a small value and there's a lot of code inside the procedure.

Timer controls are often useful for updating status information on a regular basis. For example, you might want to display on a status bar a short description of the control that currently has the input focus. You can achieve that by writing some code in the GotFocus event for all the controls on the form, but when you have dozens of controls this will require a lot of code (and time). Instead, at design time load a short description for each control in its Tag property, and then place a Timer control on the form with an Interval setting of 500. This isn't a time-critical task, so you can use an even larger value. Finally add two lines of code to the control's Timer event:

```
Private Sub Timer1_Timer()
On Error Resume Next
lblStatusBar.Caption = ActiveControl.Tag
End Sub
```

THE LINE CONTROL

The Line control is a decorative control whose only purpose is let you draw one or more straight lines at design time, instead of displaying them using a Line graphical method at run time. This control exposes a few properties whose meaning should sound familiar to you by now: BorderColor (the color of the line), BorderStyle (the same as a form's DrawStyle property), BorderWidth (the same as a form's DrawWidth property), and DrawMode. While the Line control is handy, remember that using a Line method at run time is usually better in terms of performance.

THE SHAPE CONTROL

In a sense, the Shape control is an extension of the Line control. It can display six basic shapes: Rectangle, Square, Oval, Circle, Rounded Rectangle, and Rounded Square. It supports all the Line control's properties and a few more: BorderStyle (0-Transparent,

1-Solid), FillColor, and FillStyle (the same as a form's properties with the same names). The same performance considerations I pointed out for the Line control apply to the Shape control.

THE OLE CONTROL

When OLE first made its appearance, the concept of Object Linking and Embedding seemed to most developers nothing short of magic. The ability to embed a Microsoft Word Document or a Microsoft Excel worksheet within another Windows application seemed an exciting one, and Microsoft promptly released the OLE control—then called the OLE Container control—to help Visual Basic support this capability.

In the long run, however, the Embedding term in OLE has lost much of its appeal and importance, and nowadays programmers are more concerned and thrilled about Automation, a subset of OLE that lets them control other Windows applications from the outside, manipulating their object hierarchies through OLE. For this reason, I won't describe the OLE control: It's a rather complex object, and a thorough description of its many properties, methods, and events (and quirks) would take too much space.

USING LISTBOX AND COMBOBOX CONTROLS IN VISUAL BASIC 6

ListBox and ComboBox controls present a set of choices that are displayed vertically in a column. If the number of items exceed the value that be displayed, scroll bars will automatically appear on the control. These scroll bars can be scrolled up and down or left to right through the list.

The following Fig lists some of the common **ComboBox** properties and methods.

Property/Method	Description
Properties	
Enabled	By setting this property to True or False user can decide whether user can interact with this control or not
Index	Specifies the Control array index
List	String array. Contains the strings displayed in the drop-down list. Starting array index is 0.
ListCount	Integer. Contains the number of drop-down list items
ListIndex	Integer. Contains the index of the

	selected ComboBox item. If an item is not selected, ListIndex is -1
Locked	Boolean. Specifies whether user can type or not in the ComboBox
MousePointer	Integer. Specifies the shape of the mouse pointer when over the area of the ComboBox
NewIndex	Integer. Index of the last item added to the ComboBox. If the ComboBox does not contain any items , NewIndex is -1
Sorted	Boolean. Specifies whether the ComboBox's items are sorted or not.
Style	Integer. Specifies the style of the ComboBox's appearance
TabStop	Boolean. Specifies whether ComboBox receives the focus or not.
Text	String. Specifies the selected item in the ComboBox
ToolTipIndex	String. Specifies what text is displayed as the ComboBox's tool tip
Visible	Boolean. Specifies whether ComboBox is visible or not at run time
Methods	
AddItem	Add an item to the ComboBox
Clear	Removes all items from the ComboBox
RemoveItem	Removes the specified item from the ComboBox
SetFocus	Transfers focus to the ComboBox
Event Procedures	
Change	Called when text in ComboBox is changed
DropDown	Called when the ComboBox drop-down list is displayed
GotFocus	Called when ComboBox receives the focus

LostFocus	Called when ComboBox loses it focus

ADDING ITEMS TO A LIST

It is possible to populate the list at design time or run time

Design Time : To add items to a list at design time, click on List property in the property box and then add the items. Press CTRL+ENTER after adding each item as shown below.

Run Time : The AddItem method is used to add items to a list at run time. The AddItem method uses the following syntax.

Object.AddItemitem, Index

The ***item*** argument is a string that represents the text to add to the list

The ***index*** argument is an integer that indicates where in the list to add the new item. Not giving the index is not a problem, because by default the index is assigned.

Following is an example to add item to a combo box. The code is typed in the Form_Load event

```
Private Sub Form_Load()

Combo1.AddItem 1
Combo1.AddItem 2
Combo1.AddItem 3
Combo1.AddItem 4
Combo1.AddItem 5
Combo1.AddItem 6

End Sub
```

REMOVING ITEMS FROM A LIST

The RemoveItem method is used to remove an item from a list. The syntax for this is given below.

Object.RemoveItem index

The following code verifies that an item is selected in the list and then removes the selected item from the list.

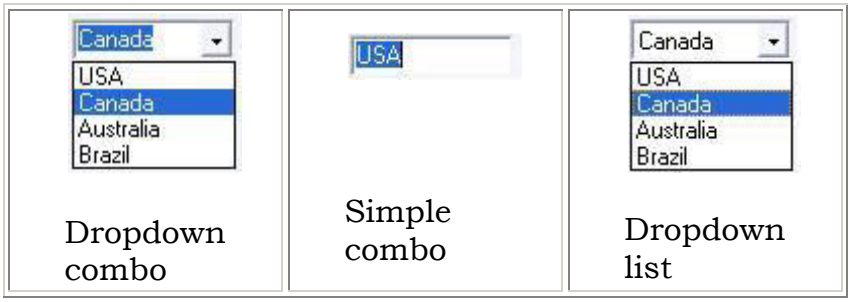
```
Private Sub cmdRemove_Click()
If List1.ListIndex > -1 Then
List1.RemoveItem List1. ListIndex
End If
End Sub
```

SORTING THE LIST

The Sorted property is set to True to enable a list to appear in alphanumeric order and False to display the list items in the order which they are added to the list.

USING THE COMBOBOX

A ComboBox combines the features of a TextBox and a ListBox. This enables the user to select either by typing text into the ComboBox or by selecting an item from the list. There are three types of ComboBox styles that are represented as shown below.



Dropdown Combo (style 0)

Simple Combo (style 1)

Dropdown List (style 2)

The Simple Combo box displays an edit area with an attached list box always visible immediately below the edit area. A simple combo box displays the contents of its list all the time. The user can select an item from the list or type an item in the edit box portion of the combo box. A scroll bar is displayed beside the list if there are too many items to be displayed in the list box area.

The Dropdown Combo box first appears as only an edit area with a down arrow button at the right. The list portion stays hidden until the user clicks the down-arrow button to drop down the list

portion. The user can either select a value from the list or type a value in the edit area.

The Dropdown list combo box turns the combo box into a Dropdown list box. At run time , the control looks like the Dropdown combo box. The user could click the down arrow to view the list. The difference between Dropdown combo & Dropdown list combo is that the edit area in the Dropdown list combo is disabled. The user can only select an item and cannot type anything in the edit area. Anyway this area displays the selected item.

Example

This example is to Add , Remove, Clear the list of items and finally close the application.

Open a new Standard EXE project is opened an named the Form as Listbox.frm and save the project as Listbox.vbp

Design the application as shown below.

Object	Property	Settings
Form	Caption Name	ListBox frmListBox
TextBox	Text Name	(empty) txtName
Label	Caption Name	Enter a name lblName
ListBox	Name	lstName
Label	Caption Name	Amount Entered lblAmount
Label	Caption Name Border Style	(empty) lblDisplay 1 Fixed Single
CommandButton	Caption	Add

	Name	cmdAdd
CommandButton	Caption Name	Remove cmdRemove
CommandButton	Caption Name	Clear cmdClear
CommandButton	Caption Name	Exit cmdExit

The following event procedures are entered for the TextBox and CommandButton controls.

```
Private Sub txtName_Change()
If (Len(txtName.Text) > 0) Then 'Enabling the Add button
'if atleast one character
'is entered
cmdAdd.Enabled = True
End If
End Sub

Private Sub cmdAdd_Click()
lstName.AddItem txtName.Text 'Add the entered the characters to
the list box

txtName.Text = "" 'Clearing the text box

txtName.SetFocus 'Get the focus back to the
'text box

lblDisplay.Caption = lstName.ListCount 'Display the number of
items in the list box

cmdAdd.Enabled = False ' Disabling the Add button
```

```
End Sub
```

The click event of the Add button adds the text to the list box that was typed in the Text box. Then the text box is cleared and the focus is got to the text box. The number of entered values will is increased according to the number of items added to the listbox.

```
Private Sub cmdClear_Click()
lstName.Clear
lblDisplay.Caption = lstName.ListCount
End Sub

Private Sub cmdExit_Click()
Unload Me
End Sub

Private Sub cmdRemove_Click()
Dim remove As Integer

remove = lstName.ListIndex 'Getting the index

If remove >= 0 Then 'make sure an item is selected
'in the list box

lstName.RemoveItem remove 'Remove item from the list box

lblDisplay.Caption = lstName.ListCount 'Display the number of
items
'in the listbox

End If

End Sub
```

Remove button removes the selected item from the list as soon as you pressed the Remove button. The number of items is decreased in the listbox and the value is displayed in the label.

The code for the clear button clears the listbox when you press it. And the number of items shown in the label becomes 0.

VB ScrollBar - Using ScrollBar Control In Visual Basic 6 (VB6)

The ScrollBar is a commonly used control, which enables the user to select a value by positioning it at the desired location. It represents a set of values. The Min and Max property represents the minimum and maximum value. The value property of the ScrollBar represents its current value, that may be any integer between minimum and maximum values assigned.

The HScrollBar and the VScrollBar controls are perfectly identical, apart from their different orientation. After you place an instance of such a control on a form, you have to worry about only a few properties: Min and Max represent the valid range of values, SmallChange is the variation in value you get when clicking on the scroll bar's arrows, and LargeChange is the variation you get when you click on either side of the scroll bar indicator. The default initial value for those two properties is 1, but you'll probably have to change LargeChange to a higher value. For example, if you have a scroll bar that lets you browse a portion of text, SmallChange should be 1 (you scroll one line at a time) and LargeChange should be set to match the number of visible text lines in the window.

The most important run-time property is Value, which always returns the relative position of the indicator on the scroll bar. By default, the Min value corresponds to the leftmost or upper end of the control:

```
' Move the indicator near the top (or left) arrow.
VScroll1.Value = VScroll1.Min
' Move the indicator near the bottom (or right) arrow.
VScroll1.Value = VScroll1.Max
```

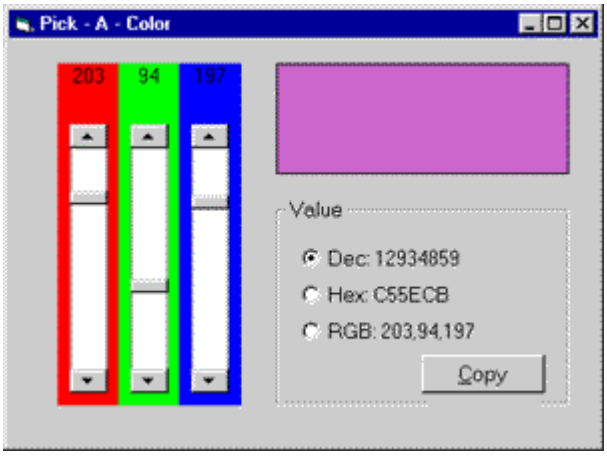
While this setting is almost always OK for horizontal scroll bars, you might sometimes need to reverse the behavior of vertical scroll bars so that the zero is near the bottom of your form. This arrangement is often desirable if you want to use a vertical scroll bar as a sort of slider. You obtain this behavior by simply inverting the values in the Min and Max properties. (In other words, it's perfectly legal for Min to be greater than Max.)

There are two key events for scrollbar controls: the Change event fires when you click on the scroll bar arrows or when you drag the indicator; the Scroll event fires while you drag the indicator. The reason for these two distinct possibilities is mostly historical. First versions of Visual Basic supported only the Change event, and when developers realized that it wasn't possible to have continuous feedback when users dragged the indicator, Microsoft engineers added a new event instead of extending the Change event. In this way, old applications could be recompiled without unexpected changes in their behavior. At any rate, this means that you must often trap two distinct events:

```
' Show the current scroll bar's value.
Private VScroll1_Change()
Label1.Caption = VScroll1.Value
End Sub
Private VScroll1_Scroll()
```

```
Label1.Caption = VScroll1.Value
End Sub
```

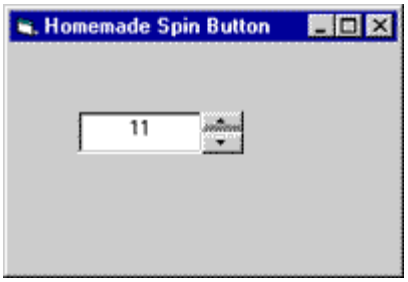
The example shown in the following figure uses three VScrollBar controls as sliders to control the individual RGB (red, green, blue) components of a color. The three scroll bars have their Min property set to 255 and their Max property set to 0, while their SmallChange is 1 and LargeChange is 16. This example is also a moderately useful program in itself because you can select a color and then copy its numeric value to the clipboard and paste it in your application's code as a decimal value, a hexadecimal value, or an RGB function.



Use scrollbar controls to visually create colors.

Scrollbar controls can receive the input focus, and in fact they support both the TabIndex and TabStop properties. If you don't want the user to accidentally move the input focus on a scrollbar control when he or she presses the Tab key, you must explicitly set its TabStop property to False. When a scrollbar control has the focus, you can move the indicator using the Left, Right, Up, Down, PgUp, PgDn, Home, and End keys. For example, you can take advantage of this behavior to create a read-only TextBox control with a numeric value that can be edited only through a tiny companion scroll bar. This scroll bar appears to the user as a sort of spin button, as you can see in the figure below. To make the trick work, you need to write just a few lines of code:

```
Private Sub Text1_GotFocus()
' Pass the focus to the scroll bar.
VScroll1.SetFocus
End Sub
Private Sub VScroll1_Change()
' Scroll bar controls the text box value.
Text1.Text = VScroll1.Value
End Sub
```



You don't need external ActiveX controls to create functional spin buttons

Scrollbar controls are even more useful for building scrolling forms, like the one displayed in Figure 3-15. To be certain, scrolling forms aren't the most ergonomic type of user interface you can offer to your customers: If you have that many fields in a form, you should consider using a Tab control, child forms, or some other custom interface. Sometimes, however, you badly need scrollable forms, and in this situation you are on your own because Visual Basic forms don't support scrolling.

Fortunately, it doesn't take long to convert a regular form into a scrollable one. You need a couple of scrollbar controls, plus a PictureBox control that you use as the container for all the controls on the form, and a filler control—a CommandButton, for example—that you place in the bottom-right corner of the form when it displays the two scroll bars. The secret to creating scrollable forms is that you don't move all the child controls one by one. Instead, you place all the controls in the PictureBox control (named picCanvas in the following code), and you move it when the user acts on the scroll bar:

```
Sub MoveCanvas()
picCanvas.Move -HScroll1.Value, -VScroll1.Value
End Sub
```

In other words, to uncover the portion of the form near the right border, you assign a negative value to the PictureBox's Left property, and to display the portion near the form's bottom border you set its Top property to a negative value. It's really that simple. You do this by calling the MoveCanvas procedure from within the scroll bars' Change and Scroll events. Of course, it's critical that you write code in the Form_Resize event, which makes a scroll bar appear and disappear as the form is resized, and that you assign consistent values to Max properties of the scrollbar controls:

```
' size of scrollbars in twips
Const SB_WIDTH = 300 ' width of vertical scrollbars
Const SB_HEIGHT = 300 ' height of horizontal scrollbars
```

```
Private Sub Form_Resize()
' Resize the scroll bars along the form.
HScroll1.Move 0, ScaleHeight - SB_HEIGHT, ScaleWidth -
SB_WIDTH
VScroll1.Move ScaleWidth - SB_WIDTH, 0, SB_WIDTH, _
ScaleHeight - SB_HEIGHT
cmdFiller.Move ScaleWidth - SB_WIDTH, ScaleHeight -
SB_HEIGHT, _
SB_WIDTH, SB_HEIGHT

' Put these controls on top.
HScroll1.ZOrder
VScroll1.ZOrder
cmdFiller.ZOrder
picCanvas.BorderStyle = 0

' A click on the arrow moves one pixel.
HScroll1.SmallChange = ScaleX(1, vbPixels, vbTwips)
VScroll1.SmallChange = ScaleY(1, vbPixels, vbTwips)
' A click on the scroll bar moves 16 pixels.
HScroll1.LargeChange = HScroll1.SmallChange * 16
VScroll1.LargeChange = VScroll1.SmallChange * 16

' If the form is larger than the picCanvas picture box,
' we don't need to show the corresponding scroll bar.
If ScaleWidth < picCanvas.Width + SB_WIDTH Then
HScroll1.Visible = True
HScroll1.Max = picCanvas.Width + SB_WIDTH - ScaleWidth
Else
HScroll1.Value = 0
HScroll1.Visible = False
End If
If ScaleHeight < picCanvas.Height + SB_HEIGHT Then
VScroll1.Visible = True
VScroll1.Max = picCanvas.Height + SB_HEIGHT - ScaleHeight
Else
VScroll1.Value = 0
VScroll1.Visible = False
End If
' Make the filler control visible only if necessary.
cmdFiller.Visible = (HScroll1.Visible Or VScroll1.Visible)
MoveCanvas
End Sub
```

Working with scrollable forms at design time isn't comfortable. I suggest that you work with a maximized form and with the PictureBox control sized as large as possible. When you're finished with the form interface, resize the PictureBox control to

the smallest area that contains all the controls, and then reset the form's WindowState property to 0-Normal.

DriveListBox, DirListBox, And FileListBox Controls In Visual Basic 6

Three of the controls on the ToolBox let you access the computer's file system. They are DriveListBox, DirListBox and FileListBox controls (see below figure) , which are the basic blocks for building dialog boxes that display the host computer's file system. Using these controls, user can traverse the host computer's file system, locate any folder or files on any hard disk, even on network drives. The files are controls are independent of one another, and each can exist on it's own, but they are rarely used separately. The files controls are described next.

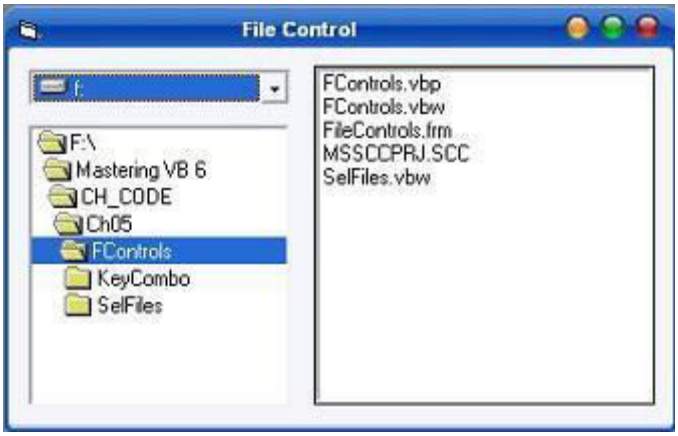
In a nutshell, the DriveListBox control is a combobox-like control that's automatically filled with your drive's letters and volume labels. The DirListBox is a special list box that displays a directory tree. The FileListBox control is a special-purpose ListBox control that displays all the files in a given directory, optionally filtering them based on their names, extensions, and attributes.

These controls often work together on the same form; when the user selects a drive in a DriveListBox, the DirListBox control is updated to show the directory tree on that drive. When the user selects a path in the DirListBox control, the FileListBox control is filled with the list of files in that directory. These actions don't happen automatically, however—you must write code to get the job done.

After you place a DriveListBox and a DirListBox control on a form's surface, you usually don't have to set any of their properties; in fact, these controls don't expose any special property, not in the Properties window at least. The FileListBox control, on the other hand, exposes one property that you can set at design time—the Pattern property. This property indicates which files are to be shown in the list area: Its default value is *.* (all files), but you can enter whatever specification you need, and you can also enter multiple specifications using the semicolon as a separator. You can also set this property at run time, as in the following line of code:

```
File1.Pattern = "*.txt;*.doc;*.rtf"
```

Following figure shows three files controls are used in the design of Forms that let users explore the entire structure of their hard disks.



DriveListBox : Displays the names of the drives within and connected to the PC. The basic property of this control is the drive property, which set the drive to be initially selected in the control or returns the user's selection.

DirListBox : Displays the folders of current Drive. The basic property of this control is the Path property, which is the name of the folder whose sub folders are displayed in the control.

FileListBox : Displays the files of the current folder. The basic property of this control is also called Path, and it's the path name of the folder whose files are displayed.

The three File controls are not tied to one another. If you place all three of them on a Form, you will see the names of all the folders under the current folder, and so on. Each time you select a folder in the DirlistBox by double clicking its name, its sub folders are displayed. Similarly , the FileListBox control will display the names of all files in the current folder. Selecting a drive in the DriveListBox control, however this doesn't affect the contents of the DirListBox.

To connect to the File controls, you must assign the appropriate values to the properties. To compel the DirListBox to display the folders of the selected drive in the DriveListBox, you must make sure that each time the user selects another drive, the Path property of the DirListBox control matches the Drive property of the DriveListBox.

After these preliminary steps, you're ready to set in motion the chain of events. When the user selects a new drive in the DriveListBox control, it fires a Change event and returns the drive letter (and volume label) in its Drive property. You trap this event and set the DirListBox control's Path property to point to the root directory of the selected drive:

```
Private Sub Drive1_Change()
' The Drive property also returns the volume label, so trim it.
Dir1.Path = Left$(Drive1.Drive, 1) & ":\"
End Sub
```

When the user double-clicks on a directory name, the DirListBox control raises a Change event; you trap this event to set the FileListBox's Path property accordingly:

```
Private Sub Dir1_Change()
File1.Path = Dir1.Path
End Sub
```

Finally, when the user clicks on a file in the FileListBox control, a Click event is fired (as if it were a regular ListBox control), and you can query its Filename property to learn which file has been selected. Note how you build the complete path:

```
Filename = File1.Path
If Right$(Filename, 1) <> "\" Then Filename = Filename & "\"
Filename = Filename & File1.Filename
```

The DirListBox and FileListBox controls support most of the properties typical of the control they derive from—the ListBox control—including the ListCount and the ListIndex properties and the Scroll event. The FileListBox control supports multiple selection; hence you can set its MultiSelect property in the Properties window and query the SelCount and Selected properties at run time.

The FileListBox control also exposes a few custom Boolean properties, Normal, Archive, Hidden, ReadOnly, and System, which permit you to decide whether files with these attributes should be listed. (By default, the control doesn't display hidden and system files.) This control also supports a couple of custom events, PathChange and PatternChange, that fire when the corresponding property is changed through code. In most cases, you don't have to worry about them, and I won't provide examples of their usage.

The problem with the DriveListBox, DirListBox and FileListBox controls is that they're somewhat outdated and aren't used by most commercial applications any longer. Moreover, these controls are known to work incorrectly when listing files on network servers and sometimes even on local disk drives, especially when long file and directory names are used. For this reason, I discourage you from using them and suggest instead that you use the Common Dialog controls for your FileOpen and FileSave dialog boxes. But if you need to ask the user for the

name of a directory rather than a file, you're out of luck because—while Windows does include such a system dialog box, named BrowseForFolders dialog—Visual Basic still doesn't offer a way to display it (unless you do some advanced API programming). Fortunately, Visual Basic 6 comes with a new control—the ImageCombo control—that lets you simulate the appearance of the DriveListBox control. It also offers you a powerful library—the FileSystemObject library—that completely frees you from using these three controls, if only as hidden controls that you use just for quickly retrieving information on the file system.

Using A CheckBox Control In Visual Basic 6

The CheckBox control is similar to the option button, except that a list of choices can be made using check boxes where you cannot choose more than one selection using an OptionButton. By ticking the CheckBox the value is set to True. This control can also be grayed when the state of the CheckBox is unavailable, but you must manage that state through code.

When you place a CheckBox control on a form, all you have to do, usually, is set its Caption property to a descriptive string. You might sometimes want to move the little check box to the right of its caption, which you do by setting the Alignment property to 1-Right Justify, but in most cases the default setting is OK. If you want to display the control in a checked state, you set its Value property to 1-Checked right in the Properties window, and you set a grayed state with 2-Grayed.

The only important event for CheckBox controls is the Click event, which fires when either the user or the code changes the state of the control. In many cases, you don't need to write code to handle this event. Instead, you just query the control's Value property when your code needs to process user choices. You usually write code in a CheckBox control's Click event when it affects the state of other controls. For example, if the user clears a check box, you might need to disable one or more controls on the form and reenable them when the user clicks on the check box again. This is how you usually do it (here I grouped all the relevant controls in one frame named Frame1):

```
Private Sub Check1_Click()
Frame1.Enabled = (Check1.Value = vbChecked)
End Sub
```

Note that Value is the default property for CheckBox controls, so you can omit it in code. I suggest that you not do that, however, because it would reduce the readability of your code.

The following example illustrates the use of CheckBox control

Open a new Project and save the Form as CheckBox.frm and save the Project as CheckBox.vbp

Design the Form as shown below

Object	Property	Setting
Form	Caption Name	CheckBox frmCheckBox
CheckBox	Caption Name	Bold chkBold
CheckBox	Caption Name	Italic chkItalic
CheckBox	Caption Name	Underline chkUnderline
OptionButton	Caption Name	Red optRed
OptionButton	Caption Name	Blue optBlue
OptionButton	Caption Name	Green optGreen
TextBox	Name Text	txtDisplay (empty)
CommandButton	Caption Name	Exit cmdExit

Following code is typed in the Click() events of the CheckBoxes

```
Private Sub chkBold_Click()
If chkBold.Value = 1 Then
  txtDisplay.FontBold = True
Else
  txtDisplay.FontBold = False
End If
End Sub
Private Sub chkItalic_Click()
If chkItalic.Value = 1 Then
  txtDisplay.FontItalic = True
Else
  txtDisplay.FontItalic = False
End If
End Sub
Private Sub chkUnderline_Click()
If chkUnderline.Value = 1 Then
  txtDisplay.FontUnderline = True
Else
  txtDisplay.FontUnderline = False
End If
End Sub
```

Following code is typed in the Click() events of the OptionButtons

```
Private Sub optBlue_Click()
  txtDisplay.ForeColor = vbBlue
End Sub
Private Sub optRed_Click()
  txtDisplay.ForeColor = vbRed
End Sub
Private Sub optGreen_Click()
  txtDisplay.ForeColor = vbGreen
End Sub
```

To terminate the program following code is typed in
the Click() event of the Exit button

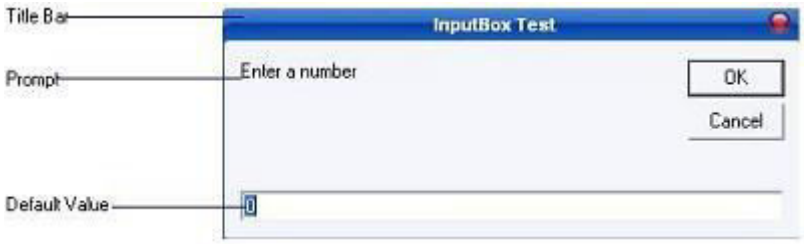
```
Private Sub cmdExit_Click()
  End
End Sub
```

Run the program by pressing F5. Check the program by clicking on OptionButtons and CheckBoxes.

INPUTBOX FUNCTION IN VISUAL BASIC 6 (VB6)

Displays a prompt in a dialog box, waits for the user to input text or click a button, and returns a String containing the contents of the text box.

Following is an expanded InputBox



Syntax :

memory_variable = InputBox (prompt[,title][,default])

memory_variable is a variant data type but typically it is declared as string, which accept the message input by the users. The arguments are explained as follows:

Prompt - String expression displayed as the message in the dialog box. If prompt consists of more than one line, you can separate the lines using the vbCrLf constant

Title - String expression displayed in the title bar of the dialog box. If you omit the title, the application name is displayed in the title bar

default-text - The default text that appears in the input field where users can use it as his intended input or he may change to the message he wish to key in.

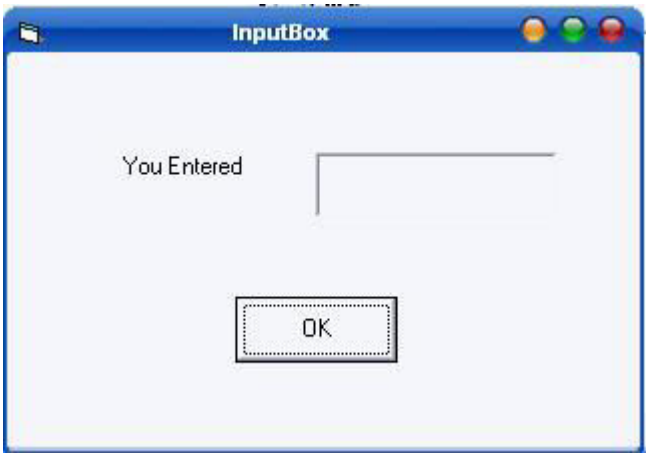
x-position and y-position - the position or the coordinate of the input box.

Following example demonstrates the use of InputBox function

* Open a new project and save the Form as InputBox.frm and save the Project as InputBox.vbp

Design the application as shown below.

Object	Property	Setting
Form	Caption Name	InputBox test frmInputBox
Label	Caption Name	You entered lbl1
Label	Caption Name BorderStyle	(empty) lbl2 1-Fixed Single
CommandButton	Caption Name	OK cmdOK

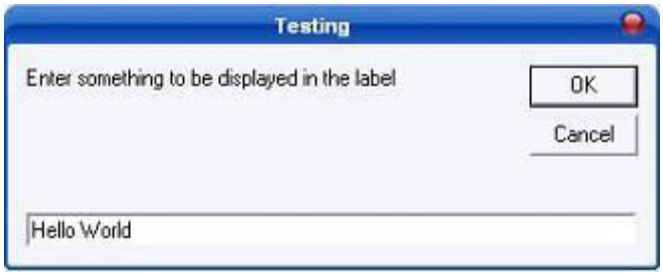


Following code is entered in **cmdOK_Click ( )** event

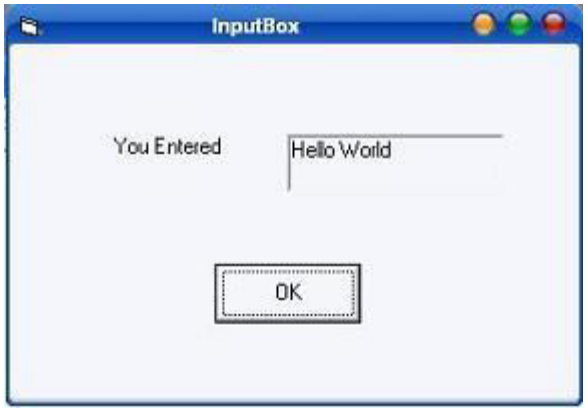
```
Private Sub cmdok_Click()
Dim ans As String
ans = InputBox("Enter something to be displayed in the label",
"Testing", 0)
If ans = "" Then
lbl2.Caption = "No message"
Else
lbl2.Caption = ans
```

End If
End Sub

Save and run the application. As soon as you click the OK button you will get the following InputBox



Here I have entered "Hello World" in text field. As soon as you click OK the output is shown as shown below



MESSAGEBOX FUNCTION IN VISUAL BASIC 6 (VB6)

Displays a message in a dialog box and wait for the user to click a button, and returns an integer indicating which button the user clicked.

Following is an expanded MessageBox

Syntax :

MsgBox (Prompt [,icons+buttons] [,title] **)**

memory_variable = MsgBox (prompt [, icons+ buttons] [,title] **)**

Prompt : String expressions displayed as the message in the dialog box. If prompt consist of more than one line, you can separate the lines using the**vbrCrLf** constant.

Icons + Buttons : Numeric expression that is the sum of values specifying the number and type of buttons and icon to display.

Title : String expression displayed in the title bar of the dialog box. If you omit title, the application name is placed in the title bar.

Icons

Constant	Value	Description
vbCritical	16	Display Critical message icon
vbQuestion	32	Display Warning Query icon
vbExclamation	48	Display Warning message icon
vbInformation	64	Display information icon

Buttons

Constant	Value	Description
vbOkOnly	0	Display OK button only
vbOkCancel	1	Display OK and Cancel buttons
vbAbortRetryIgnore	2	Display Abort, Retry and Ignore buttons
vbYesNoCancel	3	Display Yes, No and Cancel buttons
vbYesNo	4	Display Yes and No buttons

vbRetryCancel	5	Display Retry and Cancel buttons

Return Values

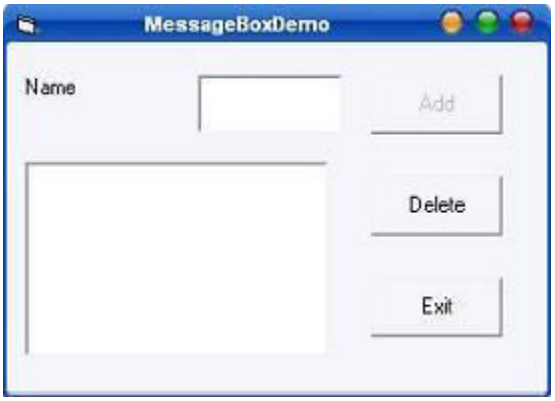
Constant	Value	Description
vbOk	1	Ok Button
vbCancel	2	Cancel Button
vbAbort	3	Abort Button
vbRetry	4	Retry Button
vbIgnore	5	Ignore Button
vbYes	6	Yes Button
vbNo	7	No Button

Following is an example illustrates the use of message boxes

Open a new Project and save the Form as messageboxdemo.frm and save the Project as messageboxdemo.vbp

Design the application as shown below.

Object	Property	Setting
Form	Caption Name	MessageBoxDemo frmMessageBoxDemo
Label	Caption Name	lblName Name
TextBox	Name Text	txtName (empty)
ListBox	Name	lstName
CommandButton	Caption Name	Add cmdAdd
CommandButton	Caption Name	Delete cmdDelete
CommandButton	Caption Name	Exit cmdExit



Following code is entered in the txtName_Change ( ) event

```
Private Sub txtName_Change()
If Len(txtName.Text) > 0 Then
cmdAdd.Enabled = True
End If
End Sub
```

Following code has to be entered in the cmdAdd_Click ( ) event

```
Private Sub cmdAdd_Click()
answer = MsgBox("Do you want to add this name to the list box?",
vbExclamation + vbYesNo,
"Add Confirm")
If answer = vbYes Then
lstName.AddItem txtName.Text
txtName.Text = ""
txtName.SetFocus
cmdAdd.Enabled = False
End If
End Sub
```

Following code is entered in the cmdDelete_Click ( ) event

```
Private Sub cmdDelete_Click()
Dim remove As Integer
remove = lstName.ListIndex
If remove < 0 Then
MsgBox "No names is selected", vbInformation, "Error"
Else
answer = MsgBox("Are you sure you want to delete " & vbCrLf &
"the selected name?",_
vbCritical + vbYesNo, "Warning")
If answer = vbYes Then
If remove >= 0 Then
lstName.RemoveItem remove
txtName.SetFocus
MsgBox "Selected name was deleted", vbInformation, "Delete
```

```
Confirm"

End If
End If
End If
End Sub
```

Following code is entered in the cmdExit_Click ( ) event

```
Private Sub cmdExit_Click()
answer = MsgBox("Do you want to quit?", vbExclamation +
vbYesNo, "Confirm")
If answer = vbYes Then
End
Else
MsgBox "Action canceled", vbInformation, "Confirm"
End If
End Sub
```

Save and run the application. You can notice the different type of message box types are used to perform an action

COMMON DIALOGS ALLOW A PROFESSIONAL VB APP

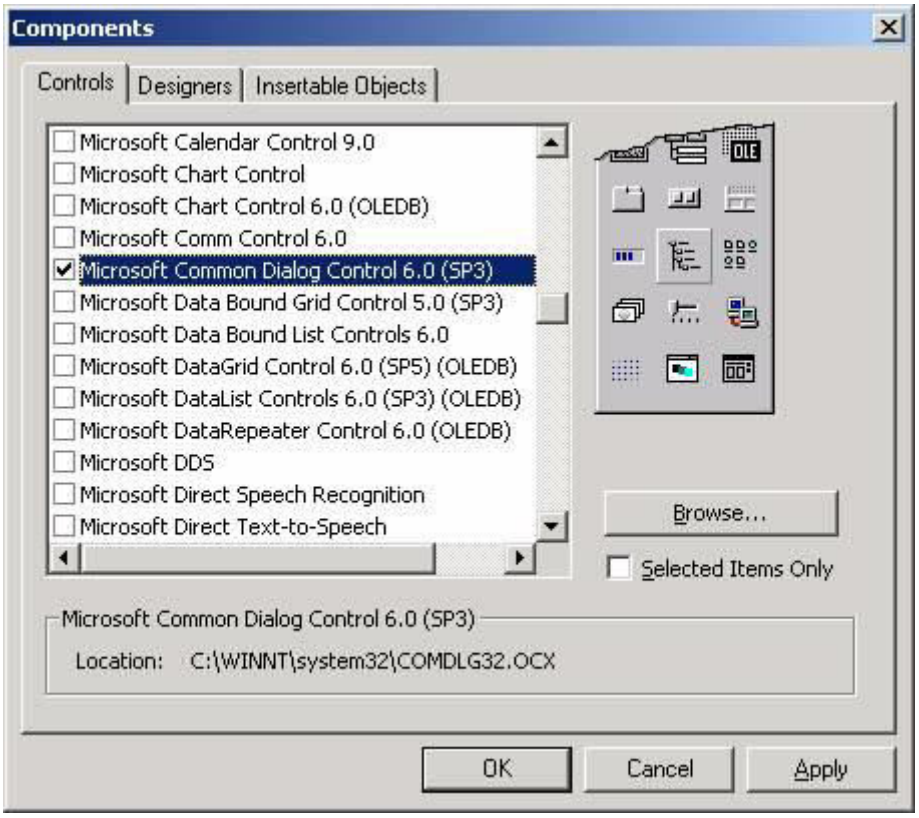
Level:

The Common Dialog control provides a standard set of dialog boxes for operations such as opening, saving, and printing files, as well as selecting colors and fonts and displaying help. Any six of the different dialog boxes can be displayed with just one Common Dialog control. A particular dialog box is displayed by using one of the six "Show..." methods of the Common Dialog control: **ShowOpen**, **ShowSave**, **ShowPrinter**, **ShowColor**, **Show Font**, or **ShowHelp.**

The Common Dialog control not an intrinsic control; rather, it is an "Active X" control that must be added to the toolbox via the**Components** dialog box, as shown below. This dialog box is accessed via the **Project** menu, **Components** item. Once you check "Microsoft Common Dialog Control 6.0" and click OK, the control is added to your toolbox (also shown below, circled). Then you can double-click it to make it appear on your form, as you would with any other control. The Common Dialog control is not visible at run-time.

The Components Dialog Box

Common Dialog Control Added to Toolbox



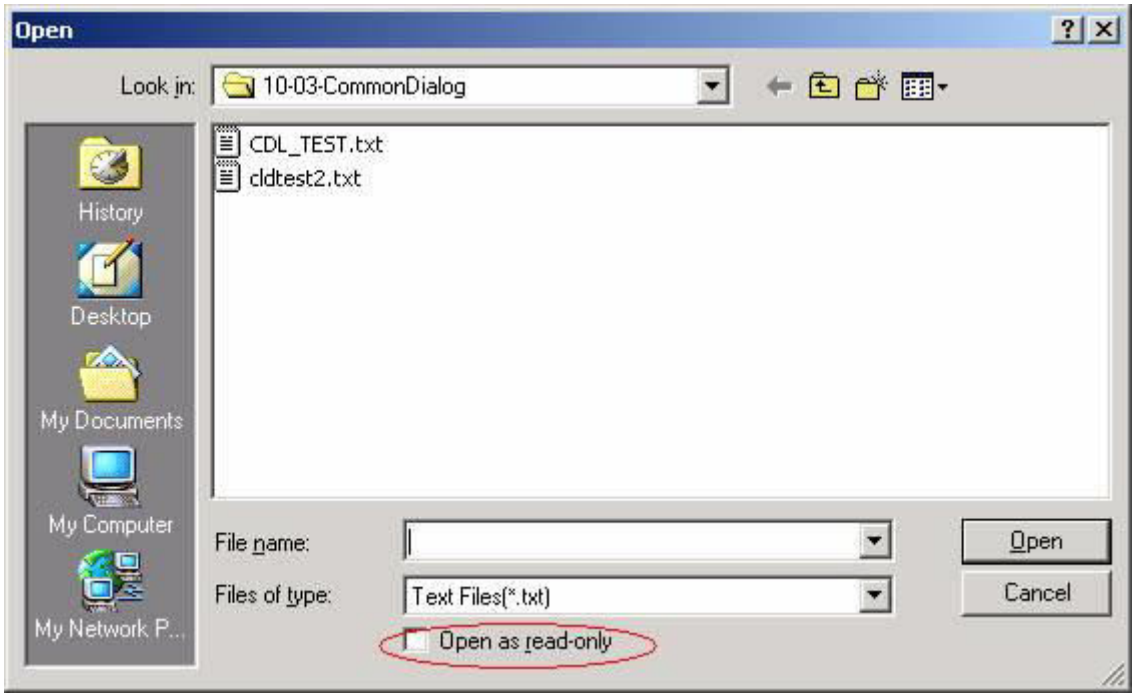
Certain functionality for the dialog boxes is provided automatically by VB and Windows, but other functionality must be coded. For example, with the Open and Save dialog boxes, the functionality to navigate to different drives and directories is built in, but the functionality to actually save or open a file must be coded in your program.

The sample program for this topic will be presented shortly, but first, two properties of the Common Dialog control, **Flags** and**CancelError**, will be discussed briefly.

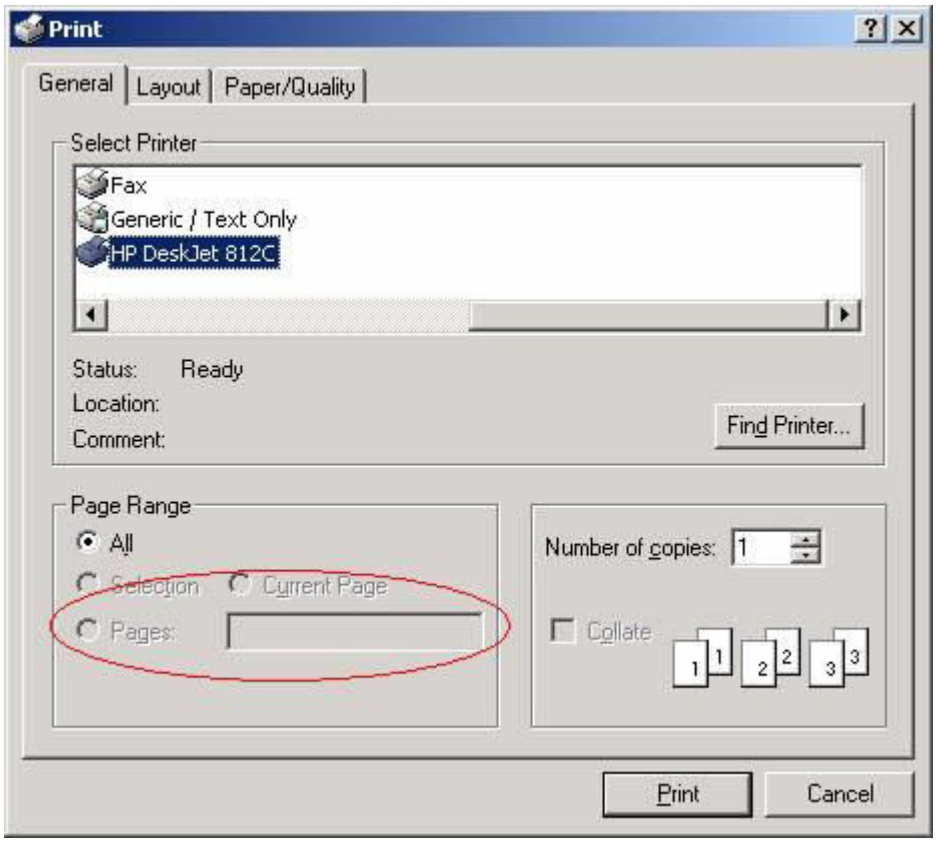
The Flags Property

The appearance and behavior of the dialog boxes can be modified to some degree with the **Flags** property of the Common Dialog control. Wherever possible, you should use the Flags property to control the appearance of the dialog box in question such that you only present features to the user that your application supports. Examples follow.

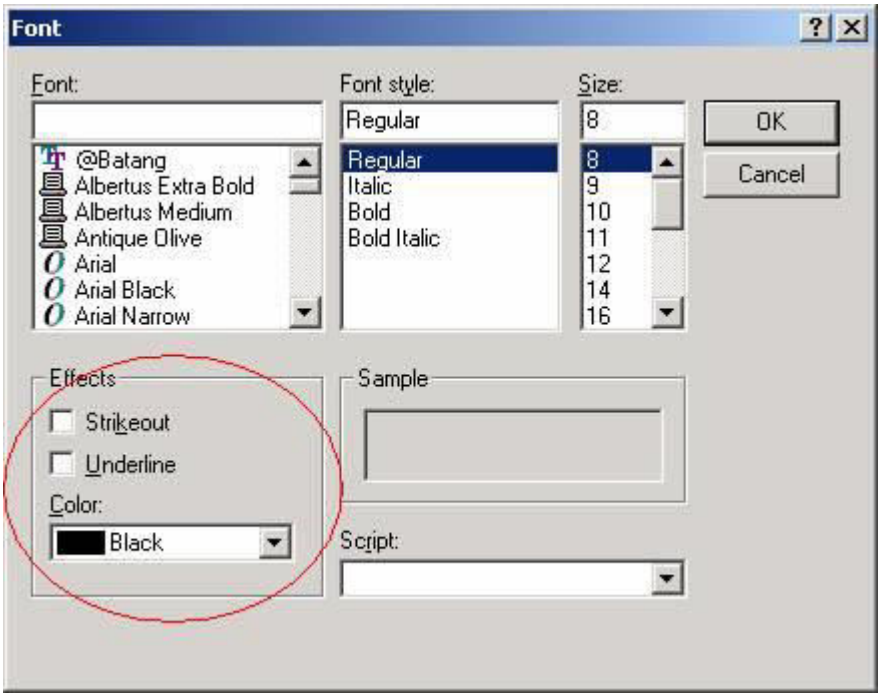
Shown below is a screen shot of the **Open** Common Dialog Box. Note that the item "Open as read only" is circled. You can use the Flags property to suppress this item (you should only show it if your application will let the user decide whether or not to open the file as read-only).



Shown below is a screen shot of the **Print** Common Dialog Box. Note that the circled items in the "Page Range" area (for printing a selection or a specific page range) are grayed out. These items were disabled via **Flags** property settings. You should only enable such options if your program contains the logic to act on them.



Shown below is a screen shot of the **Font** Common Dialog Box. The **Flags** property can control whether or not the "Effects" area (circled) is displayed.



The CancelError Property

In order to test whether or not the user clicked the **Cancel** button on a Common Dialog box, you must set up special error-handling logic. If you don't, VB will treat the clicking of the Cancel button as an unhandled error and will thus cause your program to end abruptly (this will not exactly endear you to your users).

You can test to see whether or not the user clicked the Cancel button by setting the **CancelError** property to **True** – this causes an error routine you have written (using the "On Error Goto *label* technique) to be executed when the user clicks Cancel.

The basic structure of a VB procedure that displays a Common Dialog box should be as follows:

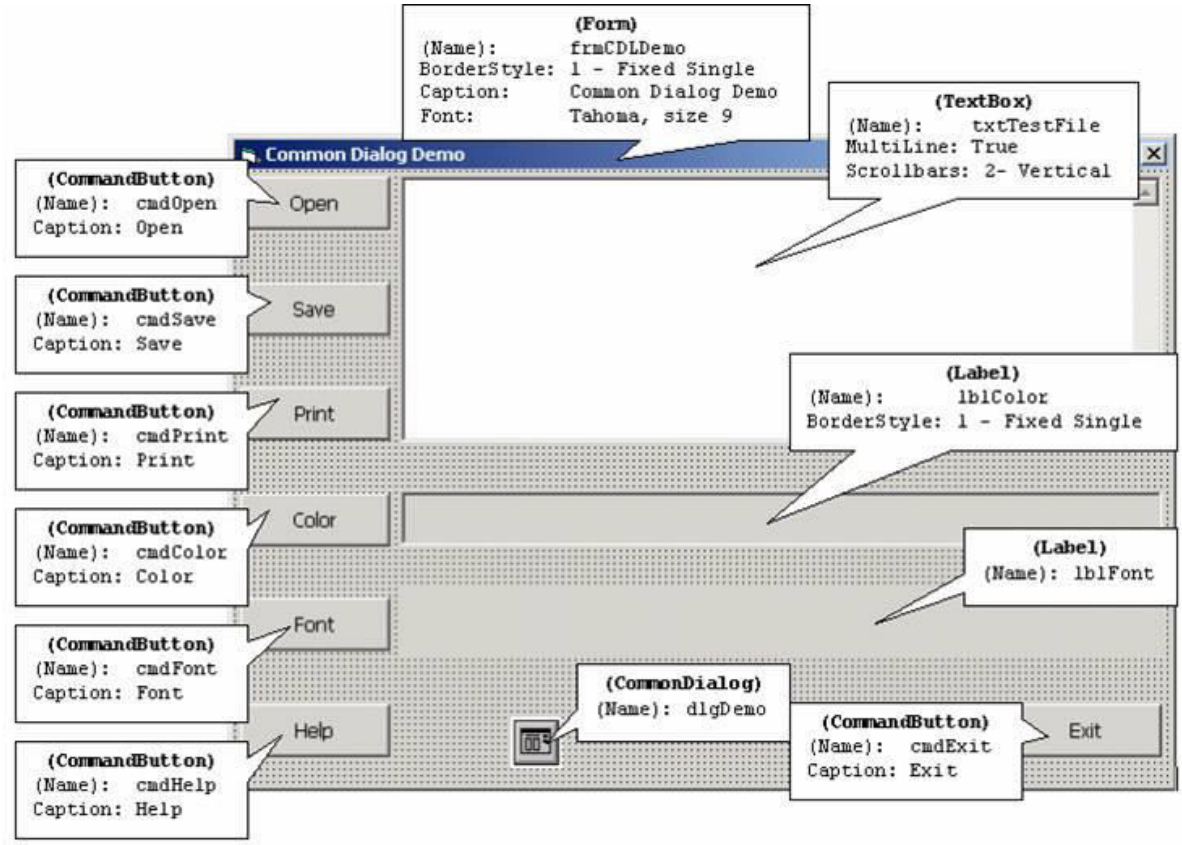
Private Sub WHATEVER()
DECLARE LOCAL VARIABLES
ON ERROR GOTO **CANCELERROR_ROUTINE**

SET **CancelError** PROPERTY TO TRUE (e.g., CommonDialog1.CancelError = True)
SET **Flags** AND OTHER PROPERTIES TO APPROPRIATE VALUES
SHOW THE COMMON DIALOG (e.g., CommonDialog1.ShowSave)

```
' When you show the common dialog box, processing is
suspending until the
' user performs an action. If they click the Cancel button, VB will
jump
' to the error-handling routine you set up
(i.e., CANCELERROR_ROUTINE).

' Assuming the user did not click Cancel, continue processing
below ...

' Now that the dialog box is done being shown, we can put a
"normal" error-
' handling routine in place, if desired ...
On Error GoTo NORMAL_ERROR_ROUTINE
NORMAL PROCESSING HERE

' Exit here so that you don't fall through to the error-handling
logic
Exit Sub
NORMAL_ERROR_ROUTINE:
MsgBox "Err # " & Err.Number & " - " & Err.Description,
vbCritical, "Error"
Exit Sub
CANCELERROR_ROUTINE:
' Do nothing, no problem if user clicks Cancel button ...
End Sub
```

COMMON DIALOG DEMO PROGRAM

The Common Dialog demo program shows how to use each of the six types of dialog boxes. The design-time form is shown below, with the names and property settings for each control on the form, as well as for the form itself, shown in callouts.



The coding for the demo program is provided below, with explanations.

The General Declarations Section

In the General Declarations section, a form-level String variable, **mstrLastDir**, is declared. This variable is used to store the directory of the last file accessed by an Open or Save operation, so it can be subsequently used as the default directory for the next Open or Save operation.

```
Option Explicit

Private mstrLastDir As String
```

The Form_Load Event

In the Form_Load event, the variable **mstrLastDir** is initialized to path where the program is running; this will serve as the default directory the first time that an Open or Save operation is performed.

```
Private Sub Form_Load()
mstrLastDir = App.Path
```

End Sub

The cmdOpen_Click Event

This event fires when the user clicks the **Open** button. The procedure follows the structure described above in the section discussed the CancelError property. Local variables are declared, an On Error statement is set up as part of the Cancel error handler, and then various properties of the Common Dialog box (**dlgDemo**) are set.

As discussed above, setting the **CancelError** property to True enables us to handle the run-time error that will occur if the user clicks the dialog's Cancel button.

The **InitDir** property tells the Common Dialog control where to start its navigation of the file system. As discussed above, we are using the form-level variable **mstrLastDir** to value this property.

The **Flags** property, as discussed earlier, is used to modify the appearance and/or behavior of the dialog boxes. The Flags property is set by assigning one or more predefined VB constants (all beginning with the letters "cdl") to it. If more than one flag is to be assigned to the Flags property, you do so by adding the constants together:
CommonDialog1.Flags = cdlThisFlag + cdlThatFlag + cdlTheOtherFlag
Multiple flags can also be assigned by joining them together with the logical **Or** operator:
CommonDialog1.Flags = cdlThisFlag Or cdlThatFlag Or cdlTheOtherFlag
In this case, we are assigning one flag to the Flags property, **cdlOFNHideReadOnly**, which tells the Common Dialog control to suppress the "Open as read only" checkbox.

The **FileName** property is initially set to "" so that a filename is not pre-selected when the dialog box is displayed (if we wanted to, we could initialize it with a default filename). After the Common Dialog has been shown and the user has interacted with it, we use the FileName property to determine what file the user has selected.

The **Filter** property is a pipe-delimited string specifying what types of files should be shown in the file list portion of the Common Dialog box. The Filter string specifies a list of file filters that are displayed in the **Files of type** drop-down box. The Filter property string has the following format:
description1 | *filter1* | *description2* | *filter2...*

Description is the string displayed in the list box — for example, "**Text Files (*.txt)**." *Filter* is the actual file filter — for example, "***.txt**." Each *description* | *filter* set must be separated by a pipe symbol (|).

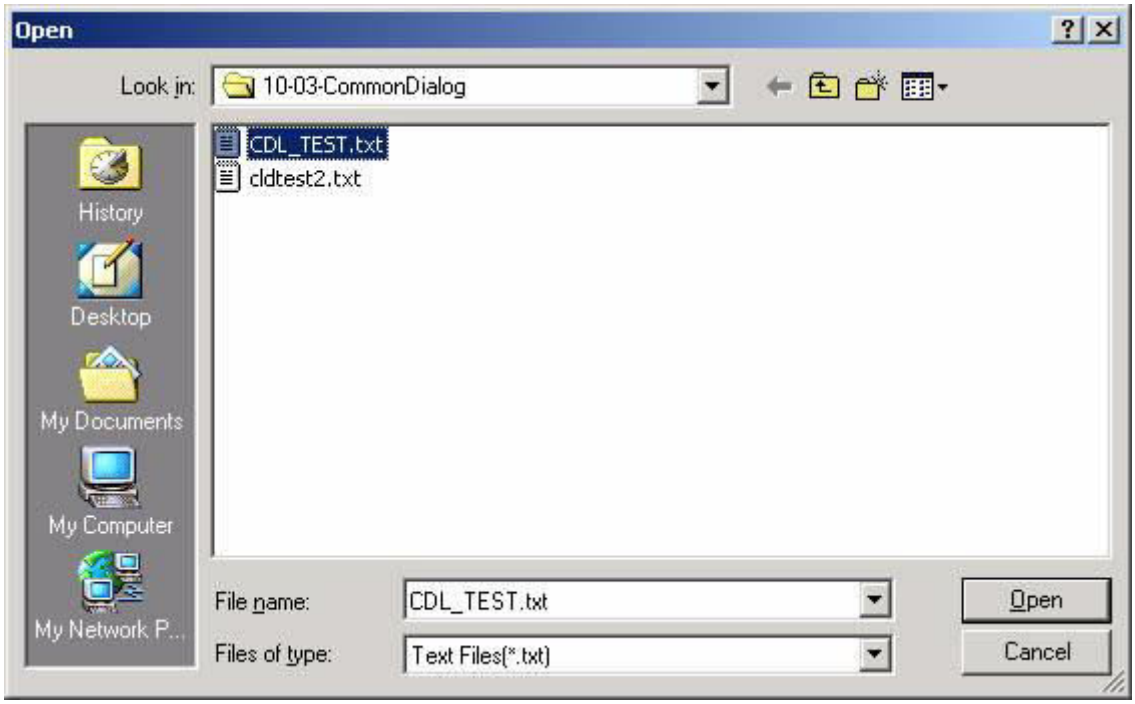
The **ShowOpen** method displays the Open Common Dialog box. At this point, processing will pause until the user either selects a file to open and clicks OK, or clicks Cancel. If the user clicks Cancel, the process will branch to the **cmdOpen_Click_Exit** label and the procedure will end. If the user selects a file and clicks OK, processing will continue with the statement following the execution of the ShowOpen method.

Assuming the user selects a file and clicks OK,
the **FileName** property, which now contains the full path and filename of the file that the user selected, is assigned to the local variable **strFileToOpen**. The remaining code actually opens the file and loads into the mutli-line textbox (the code uses techniques discussed in previous topics). The statement prior to Exit Sub resets the **mstrLastDir**variable to reflect the path of the file that the user had selected.

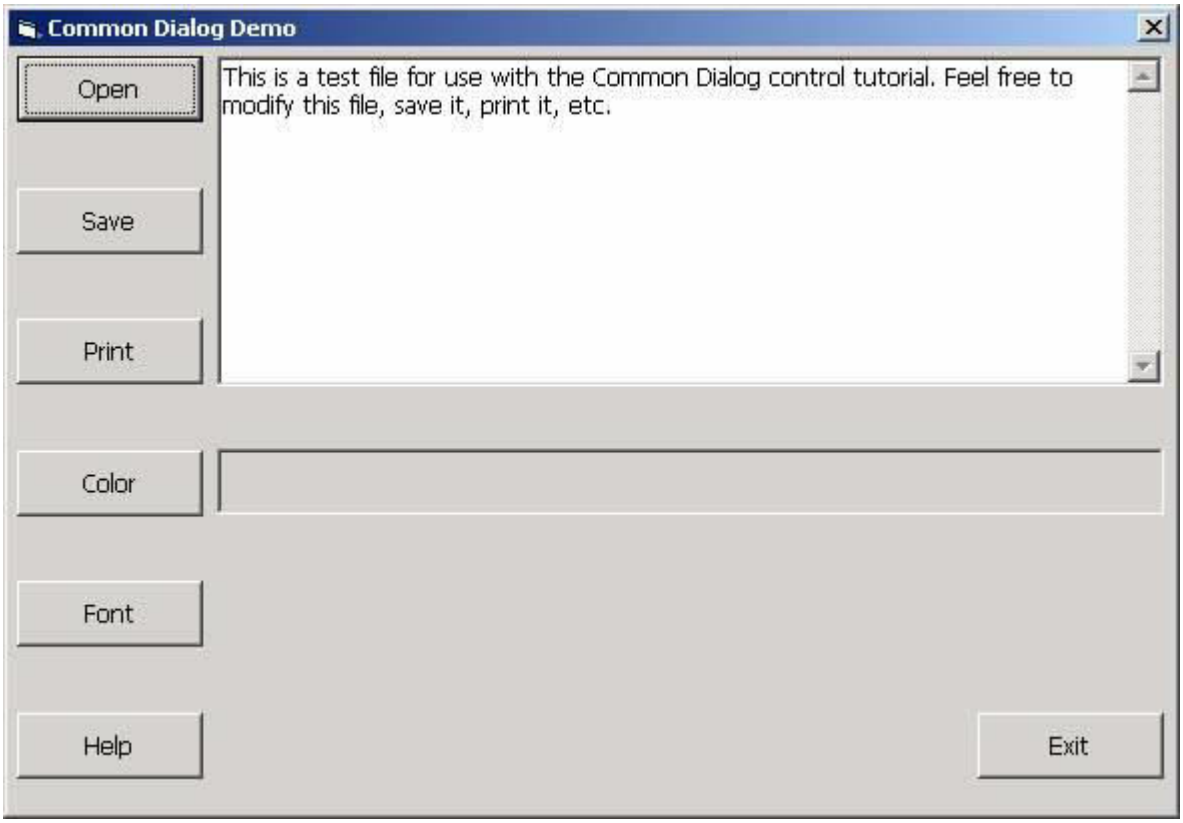
```
Private Sub cmdOpen_Click()

Dim strBuffer As String
Dim intDemoFileNbr As Integer
Dim strFileToOpen As String
On Error GoTo cmdOpen_Click_Exit

With dlgDemo
.CancelError = True
.InitDir = mstrLastDir
.Flags = cdlOFNHideReadOnly
.FileName = ""
.Filter = "Text Files(*.txt)|*.txt|All Files(*.*)|*.*"
.ShowOpen
strFileToOpen = .FileName
End With
On Error GoTo cmdOpen_Click_Error
intDemoFileNbr = FreeFile
Open strFileToOpen For Binary Access Read As #intDemoFileNbr
strBuffer = Input(LOF(intDemoFileNbr), intDemoFileNbr)
txtTestFile.Text = strBuffer
Close #intDemoFileNbr

mstrLastDir = Left$(strFileToOpen, InStrRev(strFileToOpen, "\") -
1)

Exit Sub
```

```
cmdOpen_Click_Error:
MsgBox "The following error has occurred:" & vbNewLine _
& "Err # " & Err.Number & " - " & Err.Description, _
vbCritical, _
"Open Error"
cmdOpen_Click_Exit:
End Sub
```

Screen shot of the Open Common Dialog box:



Screen shot of the main form after the user has opened the "CDL_TEST.txt" File:



The cmdSave_Click Event

This event fires when the user clicks the **Save** button. In this demo application, the contents of the multi-line textbox will be saved to filename specified. The code for this event procedure is very similar to that of the cmdOpen_Click event, with the obvious differences that the **ShowSave** method of the Common Dialog control is invoked, and that we are writing out a file rather than reading one in.

We are assigning two flags to the Flags property, **cdlOFNOverwritePrompt** (which will cause the Common Dialog control to automatically prompt the user for confirmation if they attempt to save a file that already exists) and **cdlOFNPathMustExist** (which specifies that the user can enter only valid paths - if this flag is set and the user enters an invalid path, a warning message is displayed).

```
Private Sub cmdSave_Click()
Dim strBuffer As String
Dim intDemoFileNbr As Integer
Dim strFileToSave As String
On Error GoTo cmdSave_Click_Exit

With dlgDemo
```

```
.CancelError = True
.InitDir = mstrLastDir
.Flags = cdlOFNOverwritePrompt + cdlOFNPathMustExist
.FileName = ""
.Filter = "Text Files(*.txt)|*.txt|All Files(*.*)|*.*"
.ShowSave
strFileToSave = .FileName
End With
On Error GoTo cmdSave_Click_Error
intDemoFileNbr = FreeFile
Open strFileToSave For Binary Access Write As #intDemoFileNbr
strBuffer = txtTestFile.Text
Put #intDemoFileNbr, , strBuffer
Close #intDemoFileNbr

mstrLastDir = Left$(strFileToSave, InStrRev(strFileToSave, "\") - 1)

Exit Sub
cmdSave_Click_Error:
MsgBox "The following error has occurred:" & vbNewLine _
& "Err # " & Err.Number & " - " & Err.Description, _
vbCritical, _
"Save Error"
cmdSave_Click_Exit:
End Sub
```

The cmdPrint_Click Event

This event fires when the user clicks the **Print** button. In this demo application, this will cause the contents of the multi-line textbox to be printed to the printer specified.

We are assigning three flags to the **Flags** property, **cdlPDHidePrintToFile** (which suppresses the display of the "Print to file" checkbox), **cdlPDNoPageNums** (which grays out the "Pages" option of the "Page Range" area) and **cdlPDNoSelection** (which grays out the "Selection" option of the "Page Range" area).

Note that after the **ShowPrinter** method is executed, we are saving the value of the **Copies** property, as our program must implement the logic to print multiple copies if the user has selected more than one copy on the "Number of copies" spinner of the Printer Common Dialog box. Following that, various methods and properties of the Printer object are employed to carry out the task of printing the textbox contents.

```
Private Sub cmdPrint_Click()
```

```
Dim intX As Integer
Dim intCopies As Integer
On Error GoTo cmdPrint_Click_Exit

With dlgDemo
.CancelError = True
.Flags = cdlPDHidePrintToFile + cdlPDNoPageNums _
+ cdlPDNoSelection
.ShowPrinter
intCopies = .Copies
End With
On Error GoTo cmdPrint_Click_Error
For intX = 0 To Printer.FontCount - 1
If Printer.Fonts(intX) Like "Courier*" Then
Printer.FontName = Printer.Fonts(intX)
Exit For
End If
Next
Printer.FontSize = 10
For intX = 1 To intCopies
If intX > 1 Then
Printer.NewPage
End If
Printer.Print txtTestFile.Text
Next
Printer.EndDoc

Exit Sub
cmdPrint_Click_Error:
MsgBox "The following error has occurred:" & vbNewLine _
& "Err # " & Err.Number & " - " & Err.Description, _
vbCritical, _
"Print Error"
cmdPrint_Click_Exit:
End Sub
```

The cmdColor_Click Event

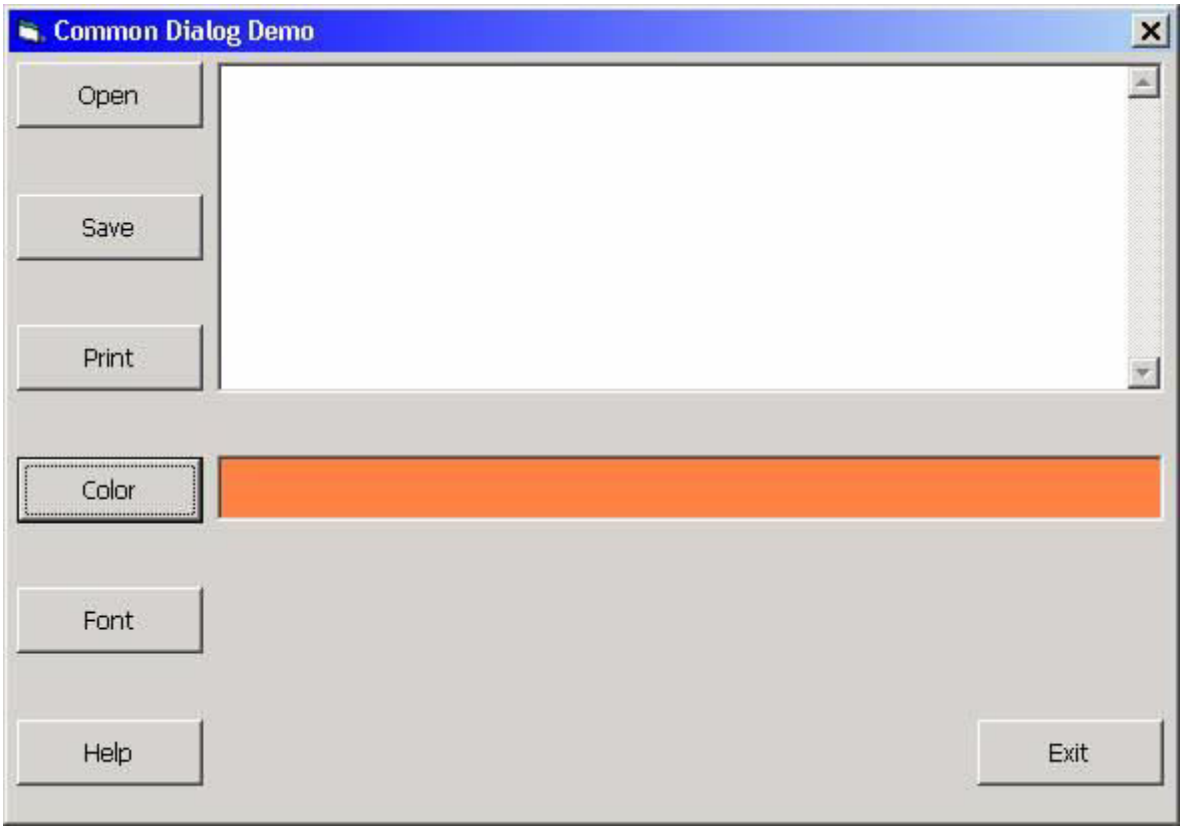
This event fires when the user clicks the **Color** button. In this demo application, this will cause the **BackColor** property of the Label**lblColor** to change to the selected color. In this example, no flags are set for the Color Common Dialog box. After the **ShowColor**method has been executed, the selected color is retrieved from the Common Dialog control's **Color** property.

```
Private Sub cmdColor_Click()
```

```
Dim lngColor As Long
On Error GoTo cmdColor_Click_Exit

With dlgDemo
.CancelError = True
.ShowColor
lngColor = .Color
End With
On Error GoTo cmdColor_Click_Error
lblColor.BackColor = lngColor
Exit Sub
cmdColor_Click_Error:
MsgBox "The following error has occurred:" & vbNewLine _
& "Err # " & Err.Number & " - " & Err.Description, _
vbCritical, _
"Color Error"
cmdColor_Click_Exit:
End Sub
```

Screen shot of the Color Common Dialog box:

Screen shot of the main form after the user has selected the orange color:



The cmdFont_Click Event

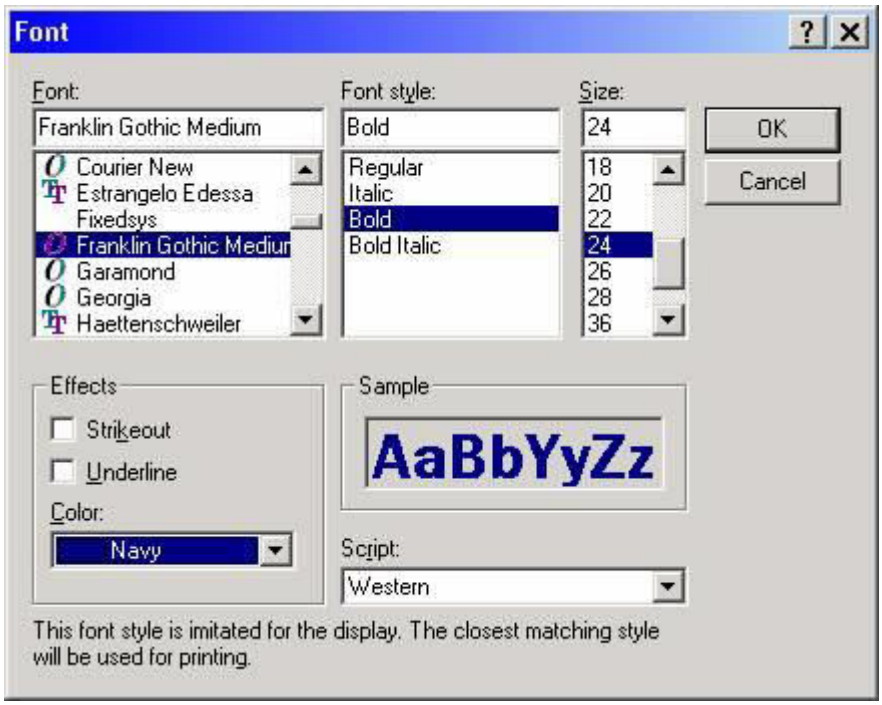
This event fires when the user clicks the **Font** button. In this demo application, this will cause the font-related attributes selected in the Font Common Dialog box to be assigned to the corresponding properties of the Label **lblFont**.

We are assigning three flags to the **Flags** property, **cdlCFBoth** (which Causes the dialog box to list the available printer and screen fonts), **cdlCFForceFontExist** (which specifies that an error message box is displayed if the user attempts to select a font or style that doesn't exist) and **cdlCFEffects** (which specifies that the dialog box enables strikethrough, underline, and color effects).

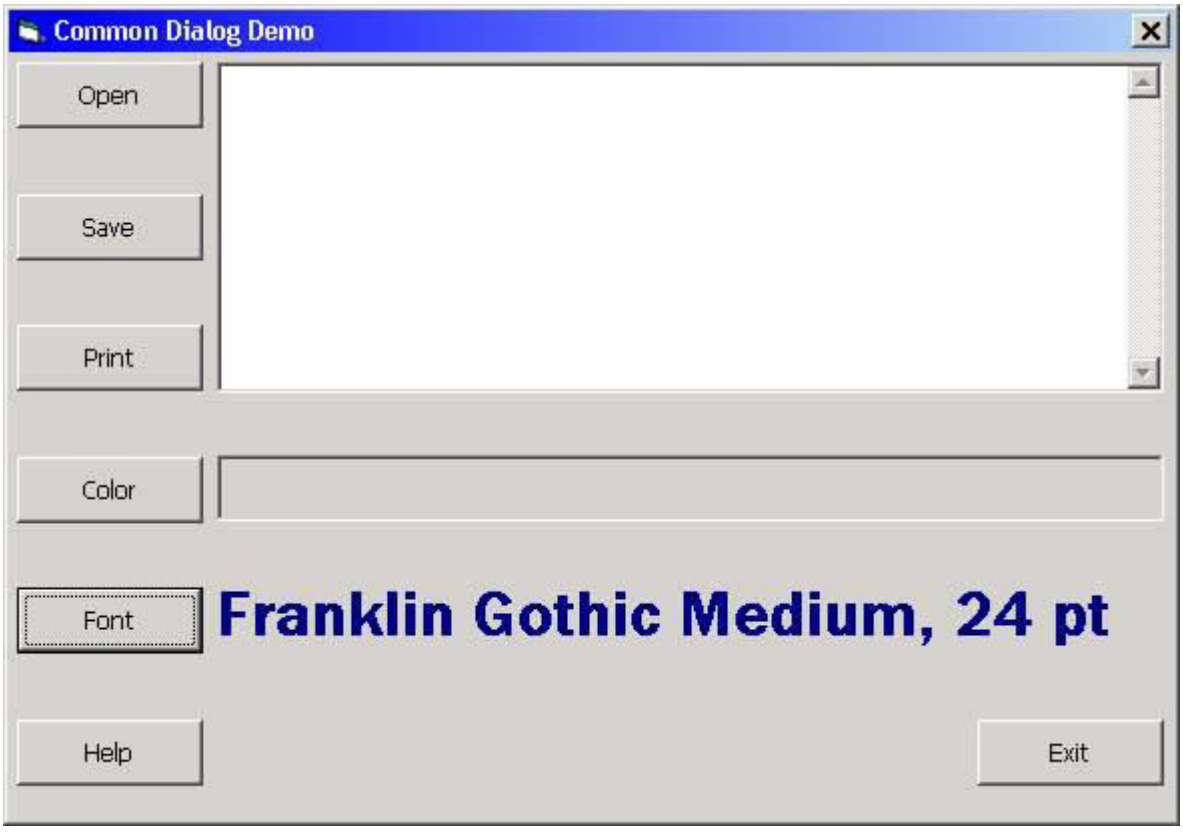
```
Private Sub cmdFont_Click()

Dim lngFont As Long
On Error GoTo cmdFont_Click_Exit

With dlgDemo
.CancelError = True
.Flags = cdlCFBoth + cdlCFForceFontExist + cdlCFEffects
.ShowFont
On Error GoTo cmdFont_Click_Error
```

```
lblFont.FontBold = .FontBold
lblFont.FontItalic = .FontItalic
lblFont.FontName = .FontName
lblFont.FontSize = .FontSize
lblFont.FontStrikethru = .FontStrikethru
lblFont.FontUnderline = .FontUnderline
lblFont.ForeColor = .Color
lblFont.Caption = .FontName & ", " & .FontSize & " pt"
End With
Exit Sub
cmdFont_Click_Error:
MsgBox "The following error has occurred:" & vbNewLine _
& "Err # " & Err.Number & " - " & Err.Description, _
vbCritical, _
"Font Error"
cmdFont_Click_Exit:
End Sub
```

Screen shot of the Font Common Dialog box:



Screen shot of the main form after the user has selected the Franklin Gothic Medium font (Bold, Size 24, in Navy color):



The cmdHelp_Click Event

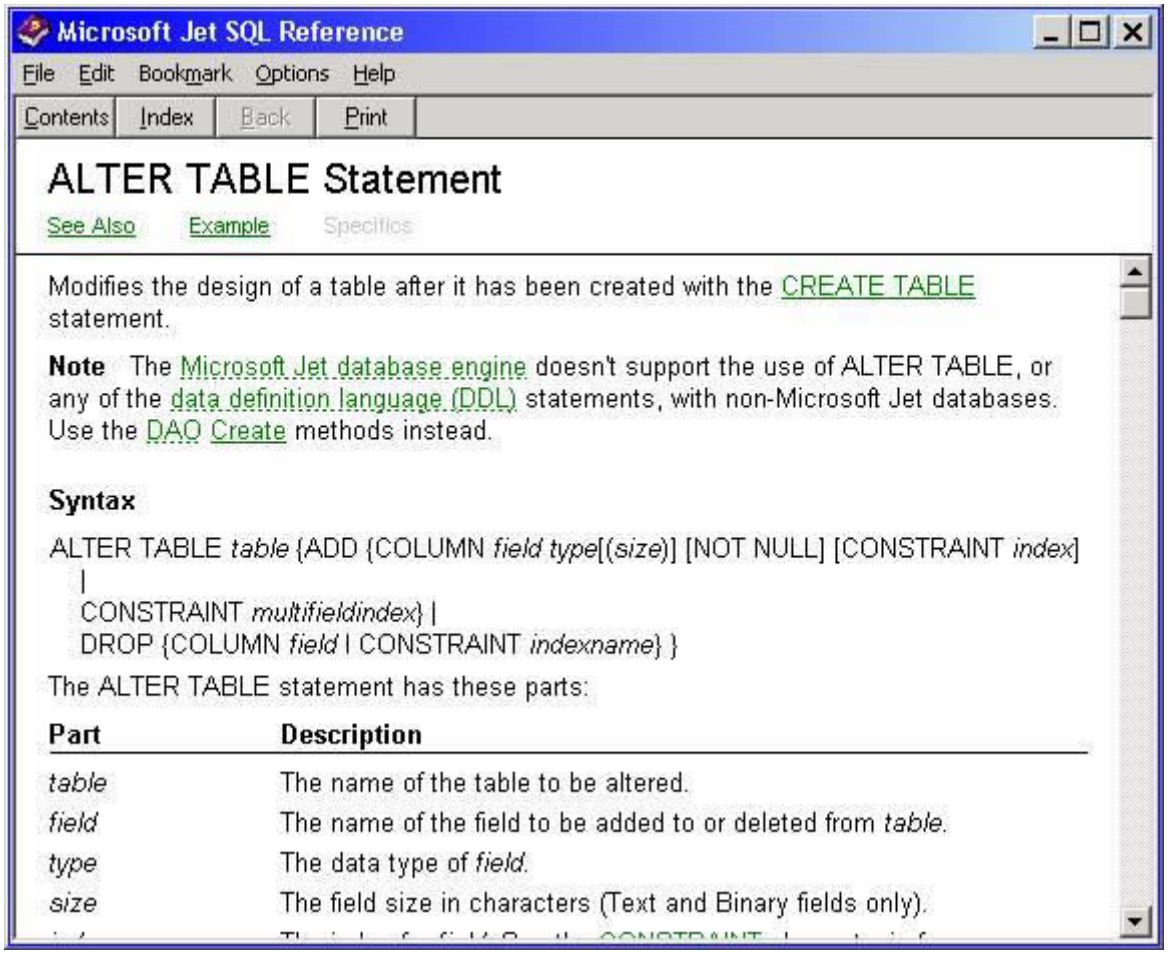
This event fires when the user clicks the **Help** button. In this event, the **ShowHelp** method of the Common Dialog control is invoked. Unlike the other five "Show" methods, ShowHelp does not display a dialog box per se, but rather it invokes the Windows Help Engine (Winhlp32.exe) to display a help file. ShowHelp can only display help files that are in "classic" WinHelp format (these files normally have the **.hlp** extension) – the ShowHelp method CANNOT display an HTML-format help file (files that normally have the extension **.chm**).

In order for the Help file to be displayed,
the **HelpCommand** and **HelpFile** properties of the Common Dialog control must be set to appropriate values. In the demo program, the HelpCommand property is set
to **cdlHelpForceFile** (which ensures WinHelp displays the correct help file), and the HelpFile property is set to the MS-Jet SQL Help file (JETSQL35.HLP).

```
Private Sub cmdHelp_Click()
On Error GoTo cmdHelp_Click_Error
With dlgDemo
.CancelError = True
```

```
.HelpCommand = cdlHelpForceFile
.HelpFile = App.Path & "\JETSQL35.HLP"
.ShowHelp
End With
Exit Sub

cmdHelp_Click_Error:
End Sub
```

Screen shot of the Help File displayed by the demo program when ShowHelp is invoked:



File Manipulation

1.1.1.1 File design

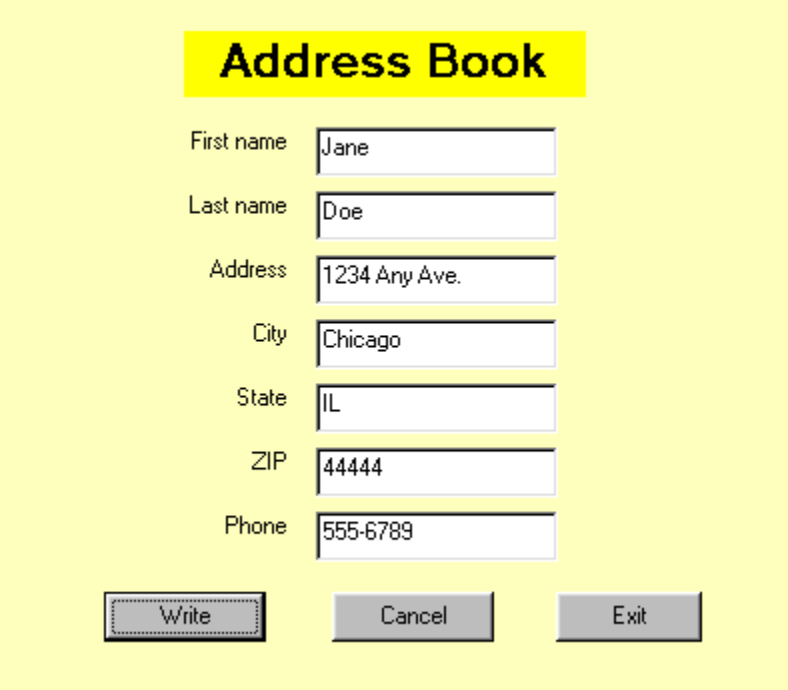
It has been determined that the file will store 7 fields of information. First and last names could be together and we could have a work phone number but, the Analyst (who gets paid big bucks to think this stuff up) has determined that 7 is what is required. It has also been decided that the file will be called "AdrsBook.txt" and will be stored in "C:\VBApps" - we need to know this for the Open statement.

It must also be determined, before we start to code, what the File mode is going to be when we output to the file. We could use "Output" but that would mean that every time that we want to add a new listing, we wipe-out the file. Not very practical! Therefore, we will use

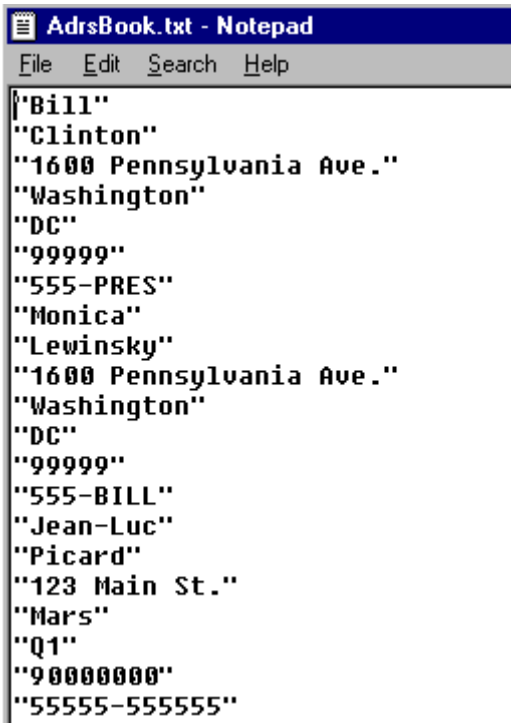
"Append" so that all new entries are added to the end of the existing file.

Finally, once the controls are in place on the form, we have to finalize the order in which we Tab through them when working from the keyboard. That is called the **Tab order**. To set the tab order, we use the **TabIndex property** for each control. It starts at 0 and goes up for every control in order. When the form opens, the control with TabIndex=0 gets focus; when you tab from that, focus goes to TabIndex=1, and so on. Controls that don't get focus - Labels, Pictures, etc. - do have a TabIndex but their **TabStop property** is set to False. If you don't want Tab to stop on a control, set its TabStop to False.

Here is what the Sequential Output form will look like when we use it:



Once the file has been created we can use Notepad to look at it. Notice that the last entry, the one on the form above, is not yet in the file. It gets written only when you hit the Write button. Each field entered is stored as a separate line in the file. When we read them, we read in the same order as that in which they were written.



1.1.1.2 Creating the Sequential Output form

The form SAdresOut is used to capture data from the user and then output that data to the AdrsBook.txt file. The design of the form is what you see in the diagram above.

As you can see, we need 7 TextBox controls to capture the 7 fields. To simplify the code, we will use a technique we haven't used before in these lessons: the **Control Array**. You may have seen that come up before if you tried to copy and paste controls. What we do is: create one TextBox control, give it a name - we call it "txt_field" -, and then copy that control and paste it 6 times on the form. When you paste a control, since it has the same name as the existing one, the editor asks whether you want to give it a new name or create a control array. In this case we tell it to create the control array. This means that, instead of 7 different TextBoxes, we will have an array of TextBoxes, named txt_field(0) to txt_field(6). As you can see from the code, this allows us to use For ... Next loops to do things like clear the controls and write to the file.

The Cancel button simply clears all the TextBoxes and does not executes a Write operation. The Exit button closes the open files and unloads the form which returns us automatically to the Menu form. There is no End statement, as that would cause the program to end.

```
Form                                    Load

Option Explicit

Private Sub Form_Load()
    'Make sure all TextBoxes are blank

    Dim intCnt As Integer
    For intCnt = 0 To 6
        txt_field(intCnt).Text = ""
    Next intCnt

    'You can specify any path you want for the file:
    'Open "C:\VBApps\AdrsBook.txt" For Output As #1

    'Now, if we want to keep adding to the file instead of
    'overwriting it every time, we change the Open
    'to read: For Append instead of For Output
    'and use this next statement for the Open:

    Open "C:\VBApps\AdrsBook.txt" For Append As #1
End Sub
```

The code to write to the file is fairly straightforward. Once information has been entered into the 7 TextBoxes, we use a FOR ... NEXT loop to execute the Write command. The reason for this is that the Write command outputs only one field at a time. So, we have to do 7 writes to output the whole record. After the TextBoxes have been written-out, we clear them to create the next record.

```
Private Sub cb_write_Click()
    Dim intCnt As Integer
    Dim intCnt2 As Integer

    For intCnt = 0 To 6
        Write #1, txt_field(intCnt).Text
    Next intCnt

    For intCnt2 = 0 To 6
        txt_field(intCnt2).Text = ""
    Next intCnt2
End Sub

Private Sub cb_cancel_Click()
    Dim intCnt As Integer
    For intCnt = 0 To 6
        txt_field(intCnt).Text = ""
    Next intCnt

    txt_field(0).SetFocus
End Sub

Private Sub cb_Exit_Click()
    Close
    Unload Me
End Sub
```

Top

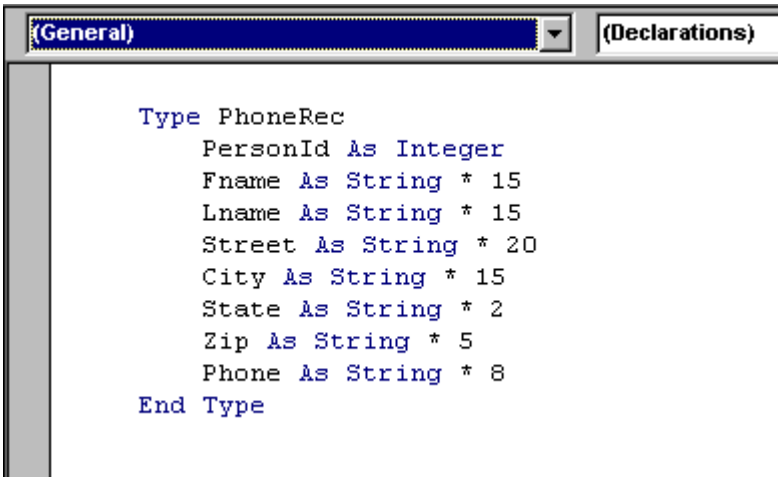
1.1.2 Working with a Random file

For this exercise we will use the same Menu form that we started with but we'll create a new output file which we will call "PhoneBook.txt". Since this file format is different from the sequential, we can't use the same file to test the code. The PhoneBook file will have almost the same content as the AdresBook file. The only difference is that we'll add a field for PersonId at the beginning of each record. That will allow us to retrieve records using a record number.

1.1.2.1 User-defined data type

In addition to data types like String, Integer, Date and so on, you can also define your own data type. This type is called **structure** or **structs** in other languages. We will use it in our application to simplify our I/O operations since our I/O commands, **Put** and **Get** only handle one field at a time. What we do with the user-defined data type is to create a new variable which contains a whole record.

The user-defined variable must be declared in a **module**. That's a program at the application level, not tied to any specific event. To create a module: **Menu bar --> Project --> Add module --> Open**. When you save the module, it will take the .BAS extension. The information contained in modules is available to all the forms in the application. This is what your first module should contain:



The **Type** statement creates a new data type; in this case, it's **PhoneRec**. Once it's been defined, the new type can be used like any other type, String or Integer, etc. to declare a variable:

Dim InRecord As PhoneRec

The individual fields in the structured variable can be accessed using dot notation:

Label5.Caption = InRecord.Fname
txt_city.Text = InRecord.City

When you define the fields within the new type, it's important to determine the length of each string. Random access is sensitive about record lengths. When you define a String field like: **Fname As String * 15** you determine that the size of the field will always be 15 characters. **This is important for the processing to work properly!** Just make sure that the size you assign is big enough to handle most situations. You do not have to worry about the Integer field because its size is standard.

1.1.2.2 Writing and Reading records

The command to write records to the Random file is **Put**. Its format is:

Put #Filenumber, [RecordNumber], Variable

RecordNumber is optional and, if it's omitted, variable is written in Next record position after last Put or Get statement.

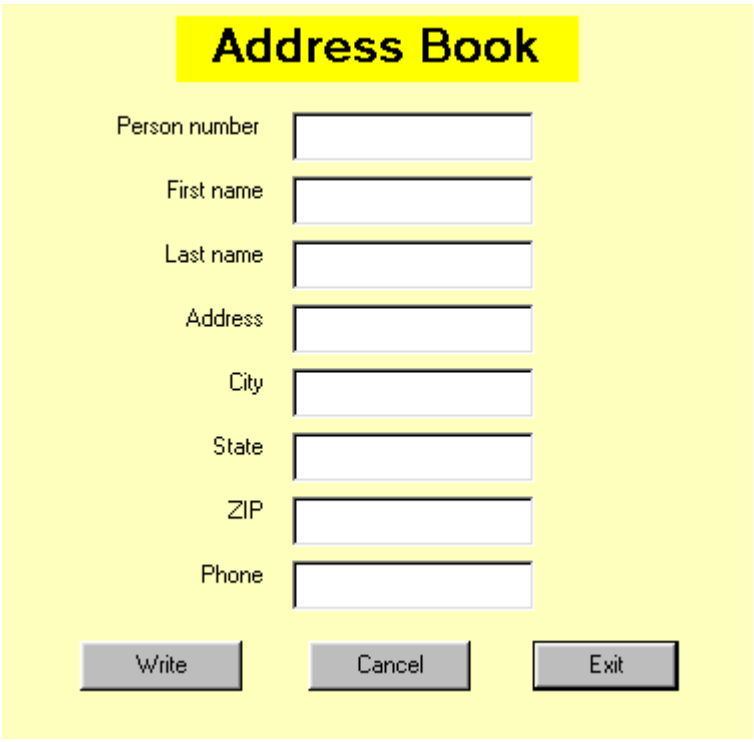
The command to read records from a Random file is: **Get**. Its format is:

Get #FileNumber, [RecordNumber], Variable

If RecordNumber is omitted, next record is read from the file.

1.1.2.3 Creating the Random file

To create the PhoneBook file, we will need a new form which is just a copy of the SAdresOut form with the additional Person number TextBox, which is in fact the record number. Then we'll write the code, making use of the user-defined data type "**PhoneRec**" described earlier. This form, "**RAdresOut**", obtains the next record number from the file, accepts input from the user and writes- the record out to the file.



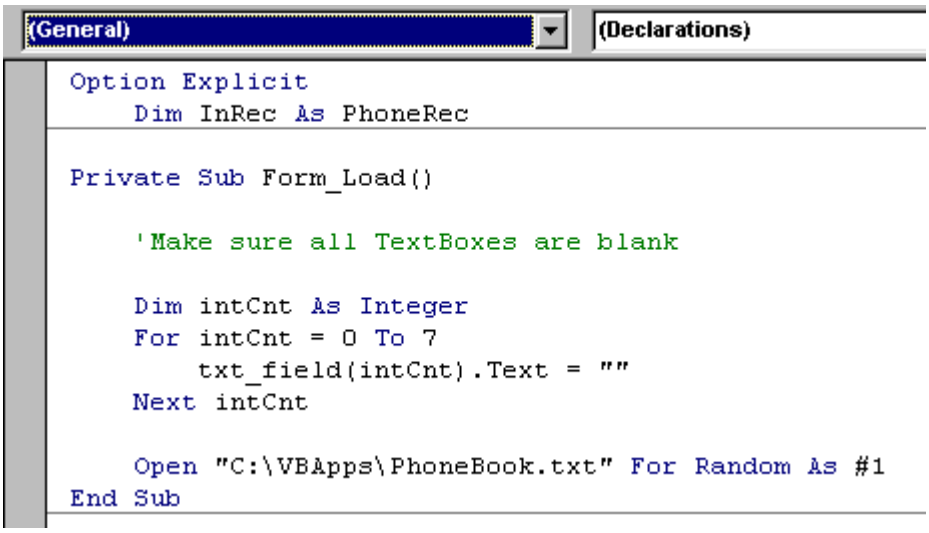
Form | Load

```
Option Explicit
    Dim OutRec As PhoneRec
    Dim position As Integer
    Dim lastrecord As Integer

Private Sub Form_Load()
    'Make sure all TextBoxes are blank
    Dim intCnt As Integer
    For intCnt = 0 To 7
        txt_field(intCnt).Text = ""
    Next intCnt

    'To keep this example separate from
    'the Sequential file create a new file.
    Open "C:\VBApps\PhoneBook.txt" For Random As #1

    'Read the file until the end
    'Get without position is a "Read next".
    Do While Not EOF(1)
        Get #1, , OutRec
    Loop
    'Seek(1) returns number of current record,
    'which is End so, subtract 1 to get last valid.
    lastrecord = Seek(1) - 1
    position = lastrecord
End Sub
```

```
Private Sub cb_write_Click()
    Dim intCnt As Integer

    On Error GoTo errRtn

    position = position + 1   'add 1 to record number
    txt_field(0).Text = position
    OutRec.PersonId = position
    OutRec.Fname = txt_field(1).Text
    OutRec.Lname = txt_field(2).Text
    OutRec.Street = txt_field(3).Text
    OutRec.City = txt_field(4).Text
    OutRec.State = txt_field(5).Text
    OutRec.Zip = txt_field(6).Text
    OutRec.Phone = txt_field(7).Text


    Put #1, position, OutRec    'write output

    For intCnt = 0 To 7         'clear TextBoxes
        txt_field(intCnt).Text = ""
    Next intCnt
errRtn:
    Resume Next     'basically, ignore error
End Sub
```

To read records from the file, we have to specify a record number. This number is accepted into the Person number TextBox and then used to locate the appropriate record in the file.

The error-trapping routine is useful in this procedure because you are almost certain to encounter the "Reading past End-of-file" error when you enter a Person number that does not exist.



```
Private Sub cb_read_Click()
    On Error GoTo errRtn

    Dim intCnt As Integer
    Dim intCnt2 As Integer
    Dim position
    position = txt_field(0).Text

    Get #1, position, InRec

    txt_field(1).Text = InRec.Fname
    txt_field(2).Text = InRec.Lname
    txt_field(3).Text = InRec.Street
    txt_field(4).Text = InRec.City
    txt_field(5).Text = InRec.State
    txt_field(6).Text = InRec.Zip
    txt_field(7).Text = InRec.Phone

errRtn:
    Resume Next      'continue processing at
                     'next statement - ignore error
End Sub
```

VC++

Features of VC++

- Smart Pointers
- Expression parsing
- Exception Handling
- New Containers
- Polymorphism
- Garbage Collection

Components of VC++

- The Project: A project is a collection of interrelated source files that are compiled and linked to make up an executable windows based program.
- The Resource Editors: Click the resource view tab to list the resources; double click to edit the resources such as dialogbox,… The rc file has # include statements to bring in resources from other subdirectories.
- The C/C++ compiler: The compiler can process both C and C++ source code with extensions .c and .cpp

Components of VC++

- The Source code editor: It includes a sophisticated source code editor that supports many features such as dynamic syntax coloring, auto-tabbing, keyboard binding and autocomplete.
- The resource compiler: It reads an ASCII resource script (rc) file from the resource editors and writes a binary RES file for the linker.
- The Linker: The linker reads .obj and .res files produced by the compiler, accesses MFC runtime library and writes project exe files.

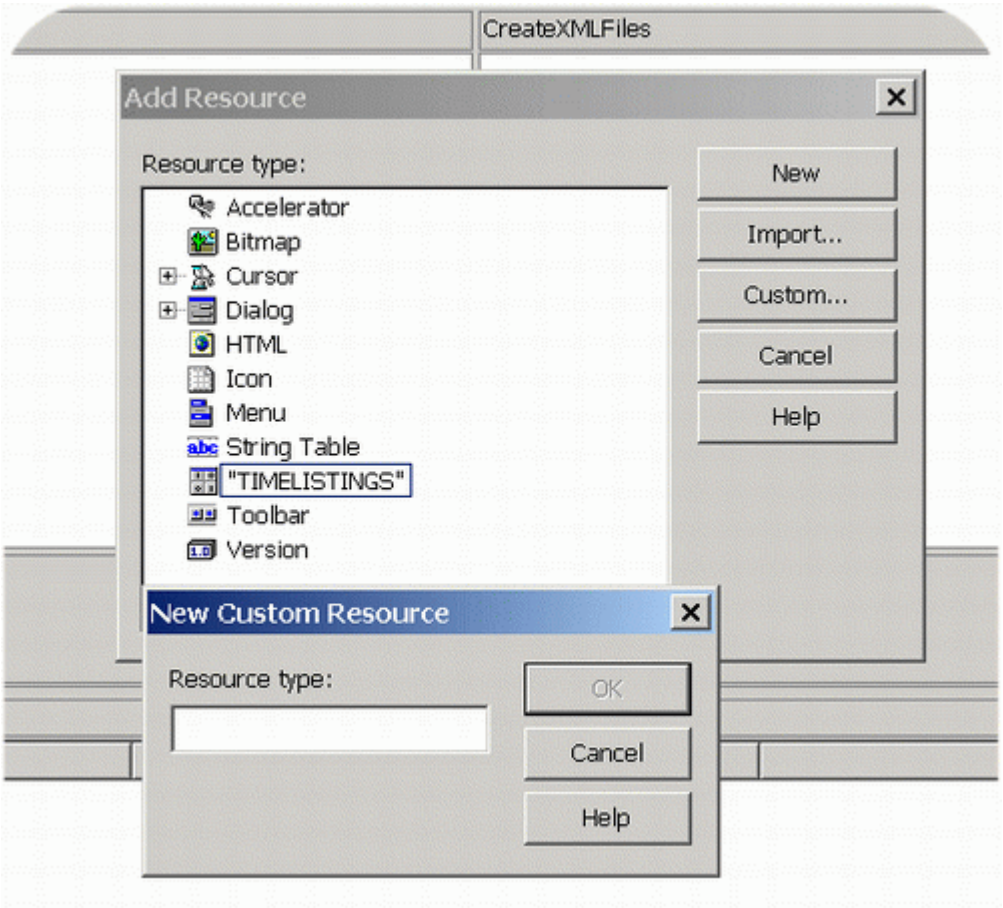
Components of VC++

- The Debugger: The debug session can be invoked through the Build menu and Start Debug sub menu. It also had edit and continue feature.
- AppWizard: It is a code generator that creates a working templete of the windows application with features, class name and source code filenames through dialog boxes.
- Class Wizard: When a new class/function/message handler is required, it writes a prototypes and code to link it with a

function.

Resources

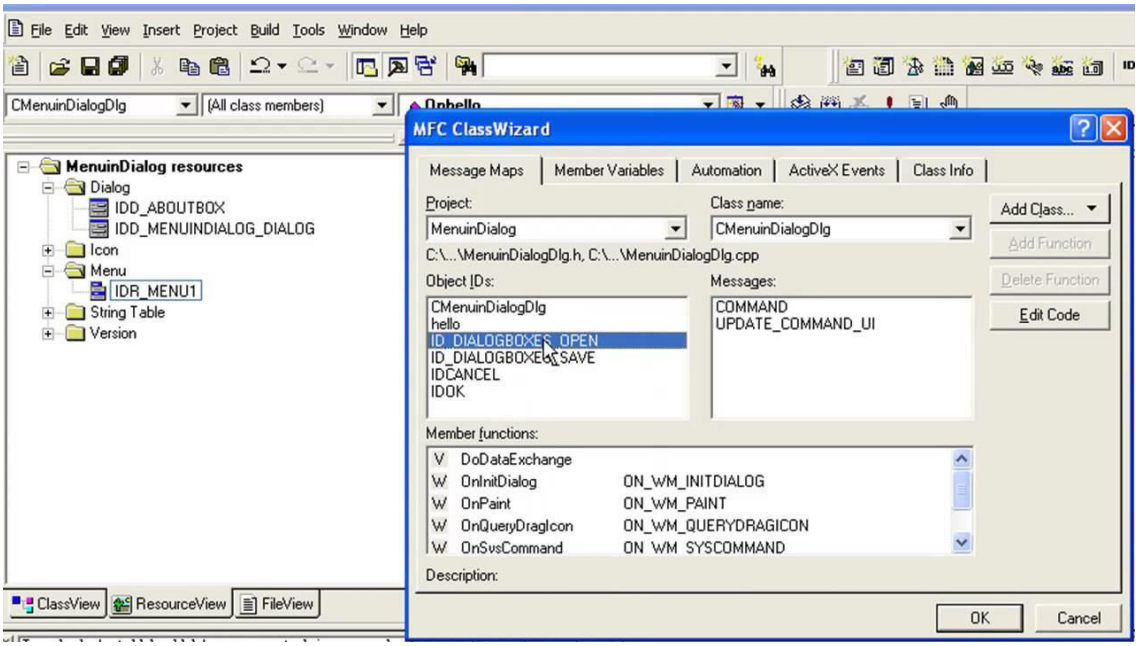
- A resource is a text file that represents data which is included in the executable file of an application.
- Graphic objects such as Icons, Cursors, Message Box, Dialog Boxes, Fonts, Bitmaps, Pens, Brushes etc are all resources.
- VC++ compiler consists of several Resource editors.
- A Windows resource can be added to the resource file(.rc) using the resource editors.
- These resources are compiled using the resource compiler(rc.exe).
- A header file “resource.h” is created and included in code.



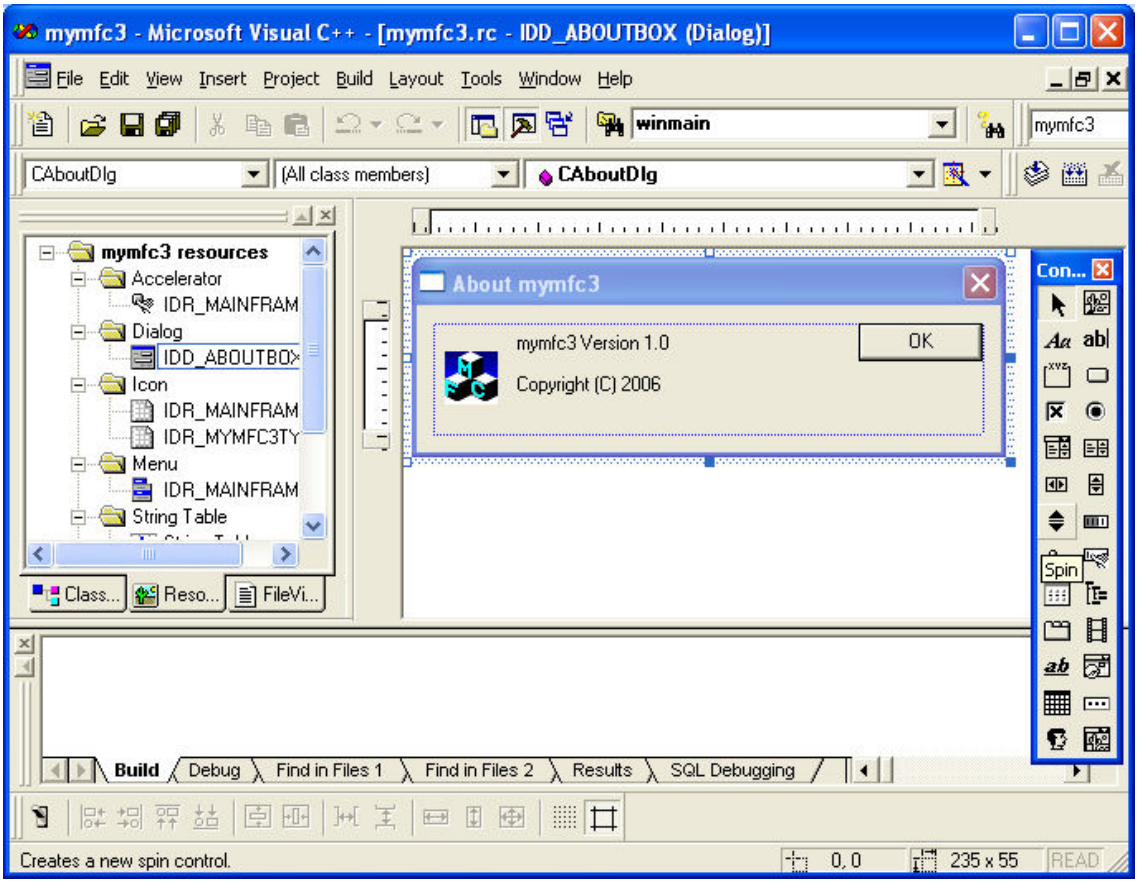
Menus

- Menus allow the users to point and select options that are predefined.
- Each item is uniquely identified by a ID and various properties can be set using the property window.

- MAKEINTRESOURCE macro has to be used to convert the integer value to a resource type compatible with the Win32 function.
- Types are System menu, Popup menu and Drop down menu.



- Dialog Box
- A dialog box is a window that contains controls to handle user input.
- It is the primary user-interface.
- It is normally displayed in response to the selection of menu item and appear as a pop-up window to the user.
- A menu item that is followed by a dialog box has its name ending with an ellipsis(...).



Dialog Box(contd..)

There are 3 types of dialog boxes.

- Modal:
- Require the user to respond before continuing with that application.

- System Modal:
- Similar to modal dialog boxes except that they supersede the entire desktop area.

- Modeless:
- Stay on the screen and are available for use at any time but permit other user activities.

IMPORTING VBX CONTROLS

- ToolBox Controls
- Pointer
- Button
- CheckBox

- EditBox
- ComboBox
- ListBox
- GroupBox
- RadioButton
- Static Text
- Horizontal Scroll Bar

- Vertical Scroll Bar
- Slider
- Spin
- Progress
- Hot Key
- List Control
- Tree
- Tab
- Animation
- Rich Edit 2.0

Special controls in VC++

- Static text control is read only.
- Edit box controls is editable.
- Hot key enables creation of Hot keys.
- Tree control displays a list of data in tree structure.
- Animate controls displays .AVI files
- Custom control allow to create user controls
- Spin control creates two rectangular areas which function like thumb wheel control allowing to click selections up or down.

Microsoft foundation Class Library

- MFC includes classes that helps to write applications quickly and more easily.
- Some of the main category of classes are Applications, Menus, Documents and views, Graphics, Windows, Dialog boxes, etc.
- Object class is derived from the Cobject class.
- Application class derived from CWinApp.
- Windows class from CWnd base class.
- Frame Windows from CFrameWnd class.
- MDI windows from CMDIFrameWnd and
- Dialog box from Cdialog class which includes CcolorDialog, Cfont Dialog, ….

Document-Centric Computing

- Applications on most of the OS require the user to know which applications must be used to create documents of a specific type.
- Earlier it was not feasible to create a document with data from different

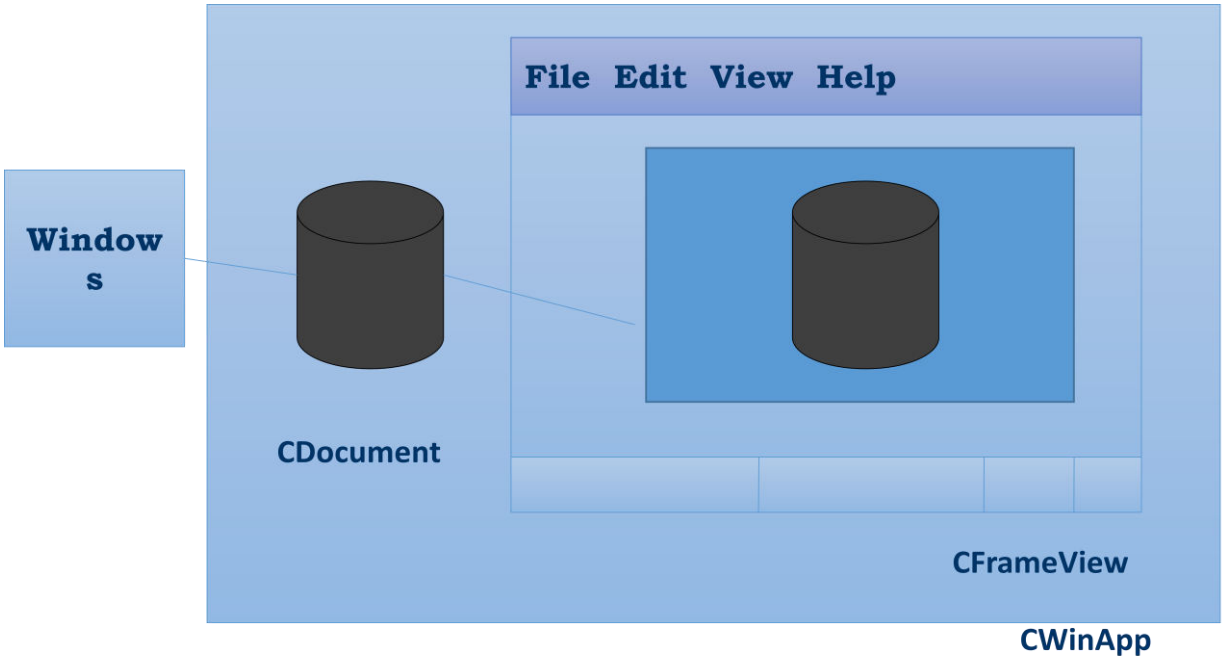
applications like a word document with an excel graph and PowerPoint presentation.

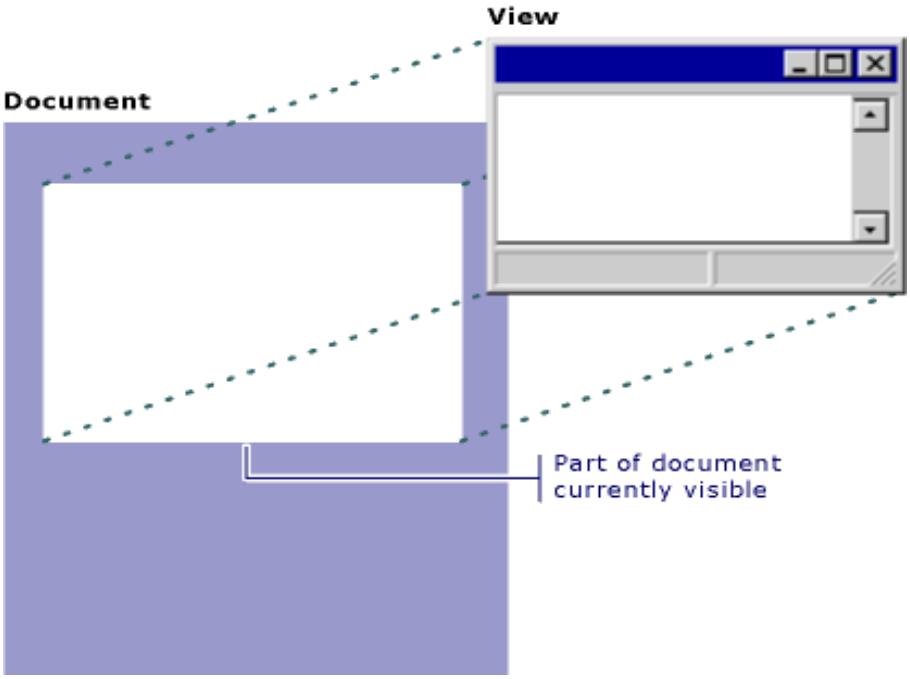
- But now the user instead of concentrating on the type of application , has to worry only about the work to be done.
- The OS maintains a database of information where all applications installed on the system are listed.
- The various types of files that each application can deal with are also listed which makes it easier for the OS to locate the application that should be started when the user needs to work on a particular type of a document.

Document-View Architecture

- MFC's Document-View architecture provides the skeleton framework for developing applications , like editors, file viewers and database query front ends, that manage disk-based data.
- The document and the view together form the basis of the application framework.
- The document stores the data and manages printing the data and coordinates updating multiple views of the data.
- The view displays the data and manages user interaction with it, including selection and editing.

- Document-View Architecture(contd..)





As the name suggests the Doc-View architecture adds two new objects to the MFC programs-document and view.

A document class derived from CDocument.
A view class derived from CView.
A frame class derived from CFrameWnd.
A application class derived from CWinApp.

Document

- The document is a data object.
- All user interaction (like in a word processor) is with the document.
- The document is a non-visual object, it cannot receive messages but can respond to the messages.
- The document is responsible for the application's data. It is a data source and is widely used in word processors , spreadsheets and server to networks providing information to programs.
- Irrespective of the source, data management is encapsulated within the document object.

View

- The view provides a visual display of the data to the user in a window or on a printed page.
- It handles the interaction between the document and the user.
- All user interaction with the data in the document is through the interface presented by the view. It can receive messages. For eg- word processing.
- It can be a simple window, an SDI, an MDI or a class derived from CFormView having the capabilities of a dialog box.

Frame

- The frame class contains the view and other user-interface elements like tool bars and menus.
- The frame and the view are visual components.

Application

It is a non-visual component like the document.
It is responsible for starting the application and interacting with the windows.

Document-View Architecture

Document and View

Features of Doc-View Architecture

- Data is handled and displayed separately .
- Multiple views of the same document can be obtained, such as both a spreadsheet and a chart view. The document/view model lets a separate view object represent each view of the data, while code common to all views (such as a calculation engine) can reside in the document.
- The document also takes on the task of updating all views whenever the data changes.
- The MFC document/view architecture makes it easy to support multiple views, multiple document types, splitter windows, and other valuable user-interface features.

- Types

There are two basic types of Document-View applications-

Single Document Interface.

SDI applications support a single type of document and a single view.
Only one document can be opened at any point of time.
It focuses on a particular task. The frame window is also the main frame window for the application.

Multiple Document Interface

Supports multiple documents.

Multiple Document Interface(MDI)

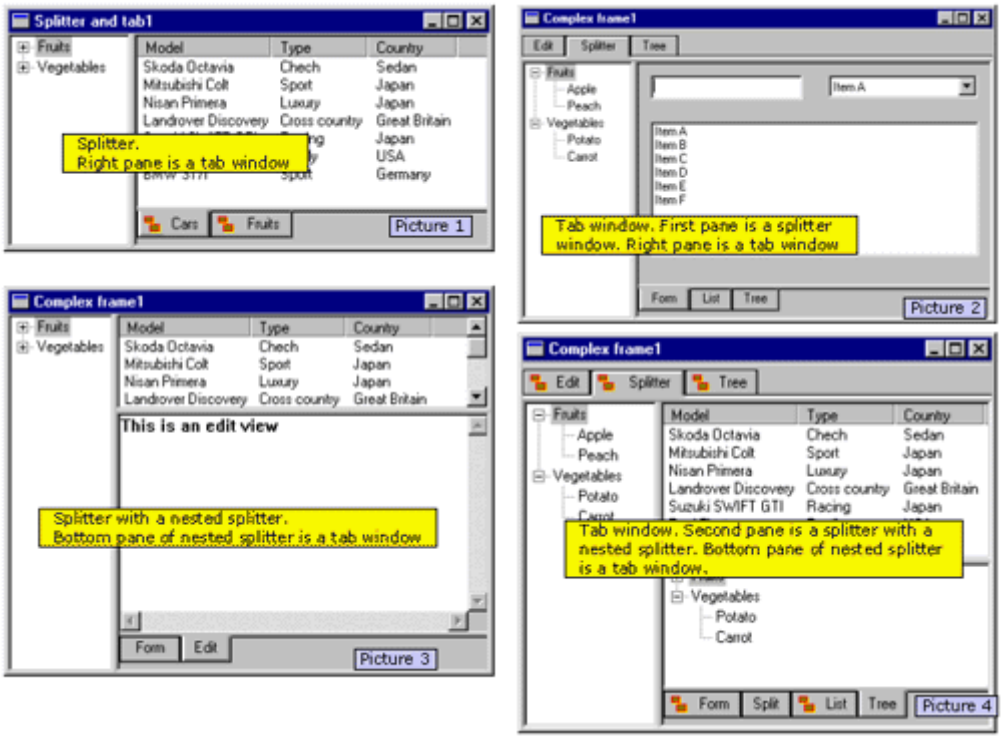
The Multiple Document Interface is a design specification of the Windows OS that defines a user interface for applications that enable the user to work with more than one document at the same time.
MDI applications allow multiple document frame windows to be open in the same instance of an application.
It has a window within which multiple child windows (frame windows themselves) can be opened, each containing a separate document(sometimes of different types)

Differences between MDI and SDI

Some fundamental characteristics distinguish MDI applications from SDI applications

Splitter Windows

SDI applications do not support multiple views of a document. The best way to present two or more concurrent views of a document is to use a splitter window based on MFC‘s CSplitterWnd class.
A splitter window is a window that can be divided into two or more panes horizontally, vertically, or both horizontally and vertically using movable splitter bars.
Each pane contains one view of a document's data.
In an SDI application, the splitter window is a child of the top-level frame window. In an MDI application, the splitter window is a child of an MDI document frame.



Types of Splitter windows

MFC supports two types of splitter windows: static and dynamic.

Exceptions

Exceptions occur when a program executes abnormally because of conditions outside the program's control.
Exception can be defined as an abnormal event that occurs during the execution of a program and disrupts the normal flow of instructions. The abnormal event can also be an error in the program.
Certain operations, including object creation and file input/output, are subject to failures that go beyond errors. Out-of-memory conditions, for example, can occur even when your program is running correctly.

Use of Exceptions

The outcome of a function call during a program execution can be categorized as

Normal Execution

Occurs when a function executes normally and returns to a calling program.
Some functions return a result code to the caller and indicate success or failure (even a particular type of failure).

Erroneous Execution

Occurs when the caller makes a mistake in passing arguments or calls a function out of context.

The error which occurs can be detected by an assertion.

Use of Exceptions(contd..)

Abnormal Execution

Includes situations where conditions outside the program's control, influence the outcome of a function. For eg. Insufficient memory, abnormality in I/O operations-(while opening a file which exists, the device driver for the storage media might fail.)

Exception Handling

Visual C++ supports three kinds of exception handling:

C++ Exception Handling

Although structured exception handling works with C and C++ source files, it is not specifically designed for C++. For C++ programs, C++ exception handling should be used.

Structured Exception Handling

Windows supplies its own exception mechanism, called SEH. It is not recommended for C++ or MFC programming. SEH should be used only in non-MFC C programs.

MFC Exceptions

Since version 3.0, MFC has used C++ exceptions but still supports its older exception handling macros, which are similar to C++ exceptions in form.

Exception Handling(contd..)

The try, throw, and catch statements implement exception handling.

With C++ exception handling, your program can communicate unexpected events to a higher execution context that is better able to recover from such abnormal events. These exceptions are handled by code that is outside the normal flow of control.

The C++ Exception Handling mechanism is flexible, since it can handle exceptions of any type.

The process of raising an exception is called Throwing an exception.

The C++ exception–handling model is non-reusable. Once the

flow of program control has left the try block, it never returns to that block.

Process of Exception Handling

The steps involved in the process of handling exceptions :

Control reaches the try statement by normal sequential execution.
The guarded section(within the try block) is executed.
If exception is not thrown during the execution of the guarded section, the catch clauses that follow the try block are not executed. The statements after the catch block are executed.
If an exception is thrown during the execution of the guarded section , a catch clause that can handle the exception is searched.
If a matching handler is not found, the predefined run-time function terminate is called.
If a matching catch is found, the parameters are initialized, and the instructions in the catch handler are executed.If the program terminates, all the values in the stack are released.

Exception Handling in MFC

MFC provides several predefined exception classes that are derived from CException class.
MFC functions throw exceptions of types derived from the CException class. To catch an exception thrown by a MFC function, a catch block with an argument that is a pointer to a CException object needs to be created.

Exception Handling in MFC(contd..)

Some of the MFC Exception classes are:

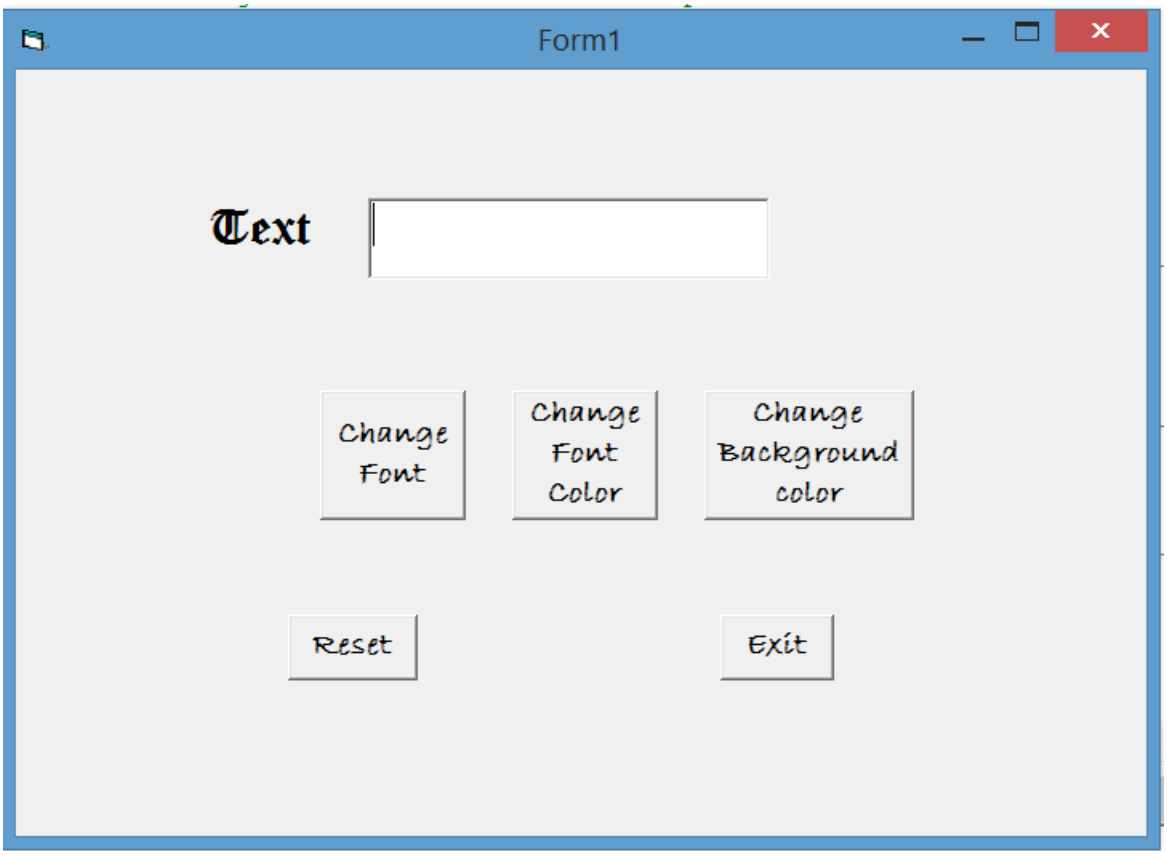
Exception Class	Functionality
CMemoryException	Out-of-memory exception
CFileException	File-specific exception
CArchiveException	Archive/Serialization exception
CDBException	Database exceptions
CResourceException	Windows resource allocation exception

PROGRAMS	SIGN
Part – A 1. Design a User Interface (UI) to accept the students details such as name, department and total marks. Validate the input data and calculate the percentage and division. 2. Design a VB application which has MDI and Child forms. Create a menu having the items such as file (New, Open), Format (Font, Regular, Bold ,Italic) and Exit in the MDI form. Also create a text box and use a Common Dialog Box control for changing the font, fore color and back color of the text box. 3. Design a small alarm clock application.(Using Timer) 4. VB program to create a sequential file containing the fields name, address, city, pin code and phone number. Display the records in a neat format. 5. Design a VB application to record the employee details such as EmpId, EmpName, Designation and Basic pay. Calculate the DA, HRA, Deduction and gross salary. (Make the necessary assumptions). Use Select Case for decision making. 6. Create a vending machine application that displays images for four snacks and corresponding option buttons. When the dispense snack button is clicked, it should display on a label the name of the snack dispensed and print the bill. 7. Write a VB program to validate the username and password from the database and display the appropriate message. (Use ADO Data Control). 8. Create an application which is linked to book database. The application should allow the user to perform a search of the book from the database, when user clicks a button based on its title, ISBN no. or Author name. 9. VC++ program to create a dialog box and display the position of the mouse pointer with the dialog box. 10. VC++ program to create and load a simple menu in a window.	

PROGRAMS	SIGN
Part – B 11. VB program to Encrypt and Decrypt a string. 12. Write a VB Program to design a simple calculator to perform addition, subtraction, multiplication and division. (Use Control Arrays). 13. Design a BMI calculator. 14. Write an application for Airline Reservation System, which allows the user to book ticket on a particular date for a particular type of class. At the end, once the ticket is booked, if should display a boarding pass indication the person's seat no., type of class and total fare. Input validations should be done properly. 15. Create an application to enter the students details (Name, course, semester, subjects) using option button, checkbox, dropdown list box, nested combobox and print the resume. 16. Design an application using Drive box, File Listbox, Directory listbox for loading the selected image. 17. Design an application using MDI form, menus and common dialog control. 18. Design a VB application to change the backcolor of the textbox using Scroll bar control for selection of colors. 19. Design a VB application to accept the Item Details (ItemID, ItemName, MfdDate, UnitofMeasure and RatePerUnit). ItemId should be a system generated id. The application should allow the operations – Add, Modify, Delete, Update and Navigations of the items. Use ADO Data controls and Grid Controls. 20. VC++ program to create a simple Window using MFC.	

Part – A

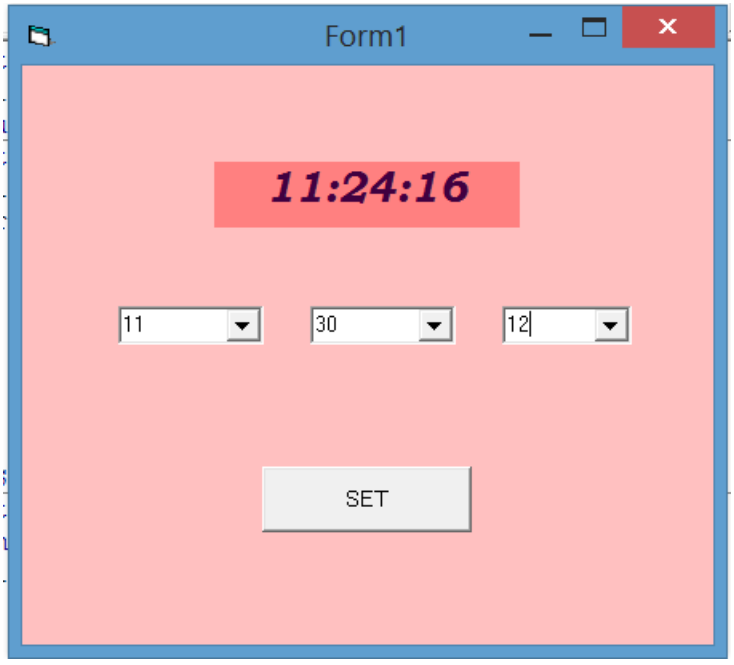
1 **Design a VB application which has MDI and Child forms. Create a menu having the items such as file (New, Open), Format (Font, Regular, Bold ,Italic) and Exit in the MDI form. Also create a text box and use a Common Dialog Box control for changing the font, forecolor and backcolor of the text box.**




```
Private Sub Command1_Click()
'cdlCFBoth causes the dialog box to list the available printer and screen fonts.
CommonDialog1.Flags = cdlCFBoth
CommonDialog1.ShowFont
'The ShowFont method is used to display a list of fonts that are available.
Text1.Font = CommonDialog1.FontName
Text1.FontSize = CommonDialog1.FontSize
Text1.FontItalic = CommonDialog1.FontItalic
Text1.FontBold = CommonDialog1.FontBold
End Sub
Private Sub Command2_Click()
CommonDialog1.ShowColor
```

```
'The ShowColor method is used to display the Colour dialog box.
Text1.ForeColor = CommonDialog1.Color
End Sub
Private Sub Command3_Click()
CommonDialog1.ShowColor
Text1.BackColor = CommonDialog1.Color
End Sub
Private Sub Command4_Click()
Text1.Text = ""
Text1.ForeColor = vbBlack
Text1.BackColor = vbWhite
Text1.SetFocus
End Sub
Private Sub Command5_Click()
End
End Sub
```

2 Design a small alarm clock application.(Using Timer)
AlarmClock

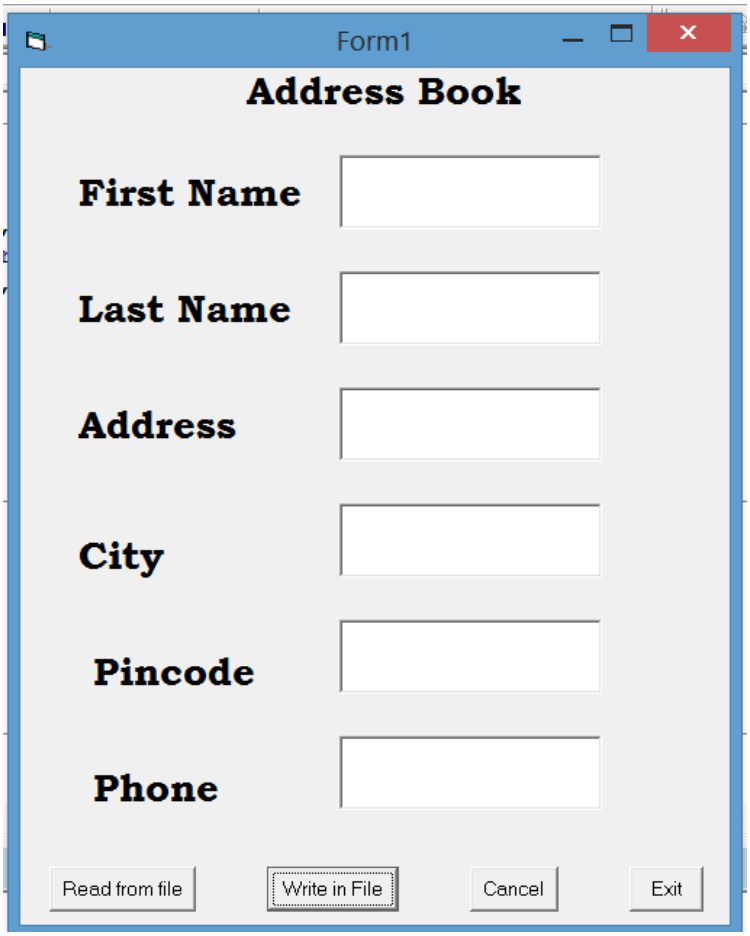



```
Private Sub Command1_Click()
Timer1.Enabled = True
End Sub
Private Sub Form_Load()
 Label1.Caption = Time
 Timer2.Enabled = True
        For i = 0 To 23
            Combo1.AddItem (Format(i, "00"))
        Next i
```

```
        For i = 0 To 59
            Combo2.AddItem (Format(i, "00"))
            Combo3.AddItem (Format(i, "00"))
        Next i
 End Sub
Private Sub Timer1_Timer()
   Dim alarmtime, timenow As String
    alarmtime = Combo1.Text & ":" & Combo2.Text & ":" & Combo3.Text
        timenow = Label1.Caption
        If timenow <> alarmtime Then
          Exit Sub
         Else
         Interaction.Beep
         MsgBox ("beep beep beep")
         End
        End If
End Sub
Private Sub Timer2_Timer()
 Label1.Caption = Time
End Sub
```

4 VB program to create a sequential file containing the fields name, address, city, pin code and phone number. Display the records in a neat format.

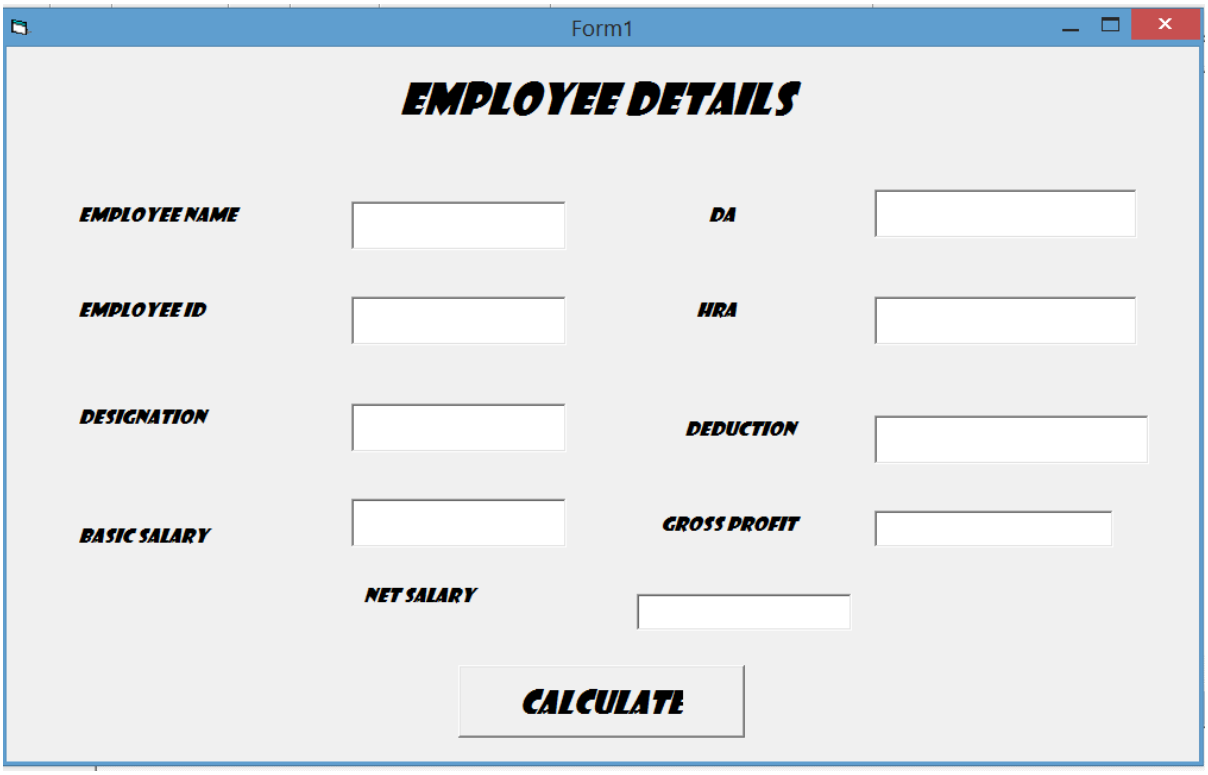
Sequential Files




```
Option Explicit

Private Sub cmd_read_Click()
Dim cnt As Integer
Dim fname, lname, address, city, pincode, phone As String
Open "C:\VB\AddressBook.txt" For Input As #1
Input #1, fname, lname, address, city, pincode, phone
txt_fields(0).Text = fname
txt_fields(1).Text = lname
txt_fields(2).Text = address
txt_fields(3).Text = city
txt_fields(4).Text = pincode
txt_fields(5).Text = phone
End Sub

Private Sub cmdcancel_Click()
Dim cnt As Integer
For cnt = 0 To 5
txt_fields(cnt).Text = ""
Next cnt
txt_fields(0).SetFocus
End Sub
```

```
Private Sub cmdwrite_Click()
Dim cnt As Integer
Dim cnt2 As Integer
Open "C:\VB\Addressbook.txt" For Append As #1
For cnt = 0 To 5
Write #1, txt_fields(cnt).Text
Next cnt
'Write #1, txt_fields(0).Text, txt_fields(1).Text, txt_fields(2).Text,
txt_fields(3).Text, txt_fields(4).Text, txt_fields(5).Text
For cnt2 = 0 To 5
txt_fields(cnt2).Text = ""
Next cnt2
End Sub

Private Sub Command1_Click()
Close #1
End
End Sub

Private Sub Form_Load()
Dim cnt As Integer
For cnt = 0 To 5
txt_fields(cnt).Text = ""
Next cnt
End Sub
```

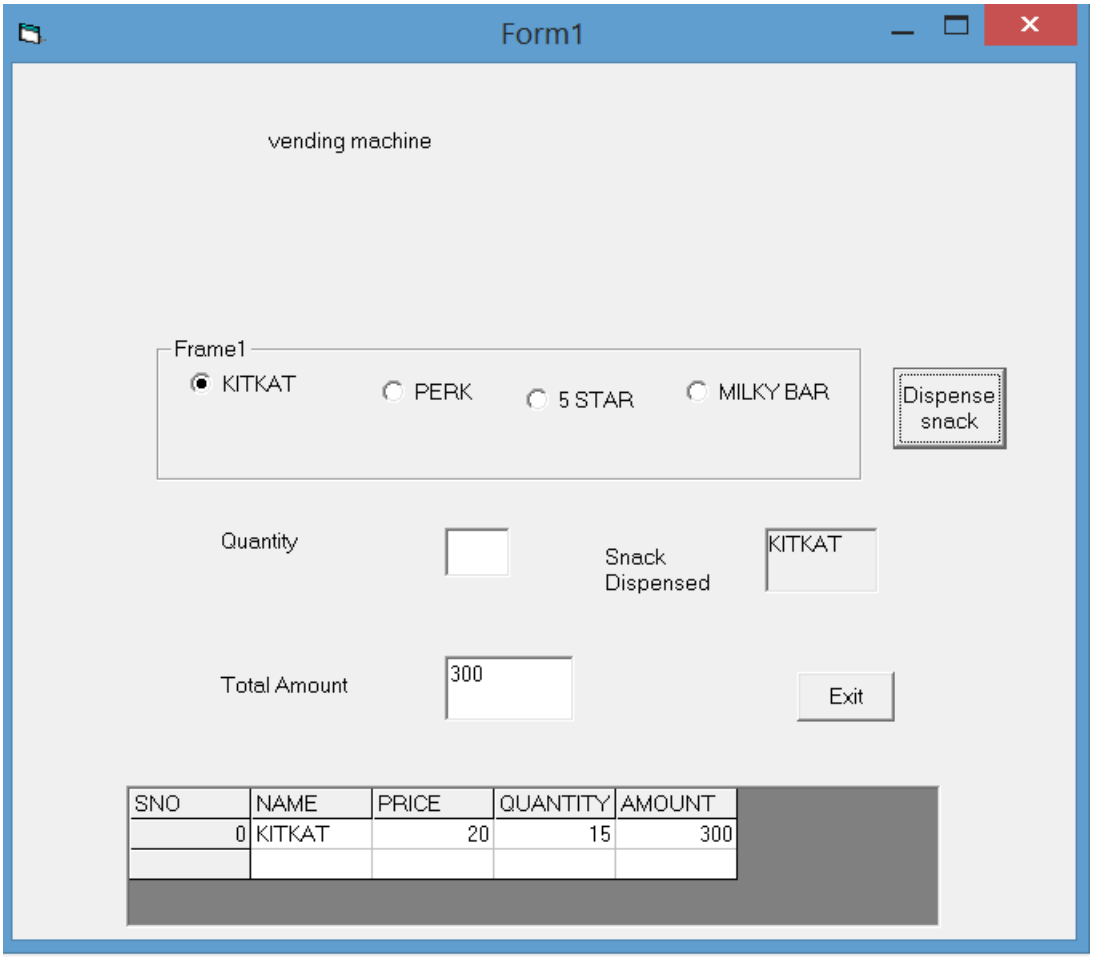
5 **Design a VB application to record the employee details such as EmpId EmpName, Designation and Basic pay. Calculate the DA, HRA, Deduction and gross salary. (Make the necessary assumptions). Use Select Case for decision making.**




```
Private Sub calculate_Click()
bp = Val(bassal.Text)
Select Case bp
 Case 0 To 2000
   da.Text = (2 * bp) / 100
   hra.Text = (3 * bp) / 100
   deduc.Text = 50
   gspay.Text = bp + da.Text + hra.Text
   netsal.Text = (bp + da.Text + hra.Text) - deduc.Text
Case 2001 To 5000
   da.Text = (4 * bp) / 100
   hra.Text = (5 * bp) / 100
   deduc.Text = 100
   gspay.Text = bp + da.Text + hra.Text
   netsal.Text = (bp + da.Text + hra.Text) - deduc.Text
Case 5001 To 10000
   da.Text = (6 * bp) / 100
   hra.Text = (7 * bp) / 100
   deduc.Text = 1000
   gspay.Text = bp + da.Text + hra.Text
   netsal.Text = (bp + da.Text + hra.Text) - deduc.Text
Case Is > 10000
   da.Text = (8 * bp) / 100
   hra.Text = (9 * bp) / 100
   deduc.Text = 1500
   gspay.Text = bp + da.Text + hra.Text
   netsal.Text = (bp + da.Text + hra.Text) - deduc.Text
End Select
```

End Sub

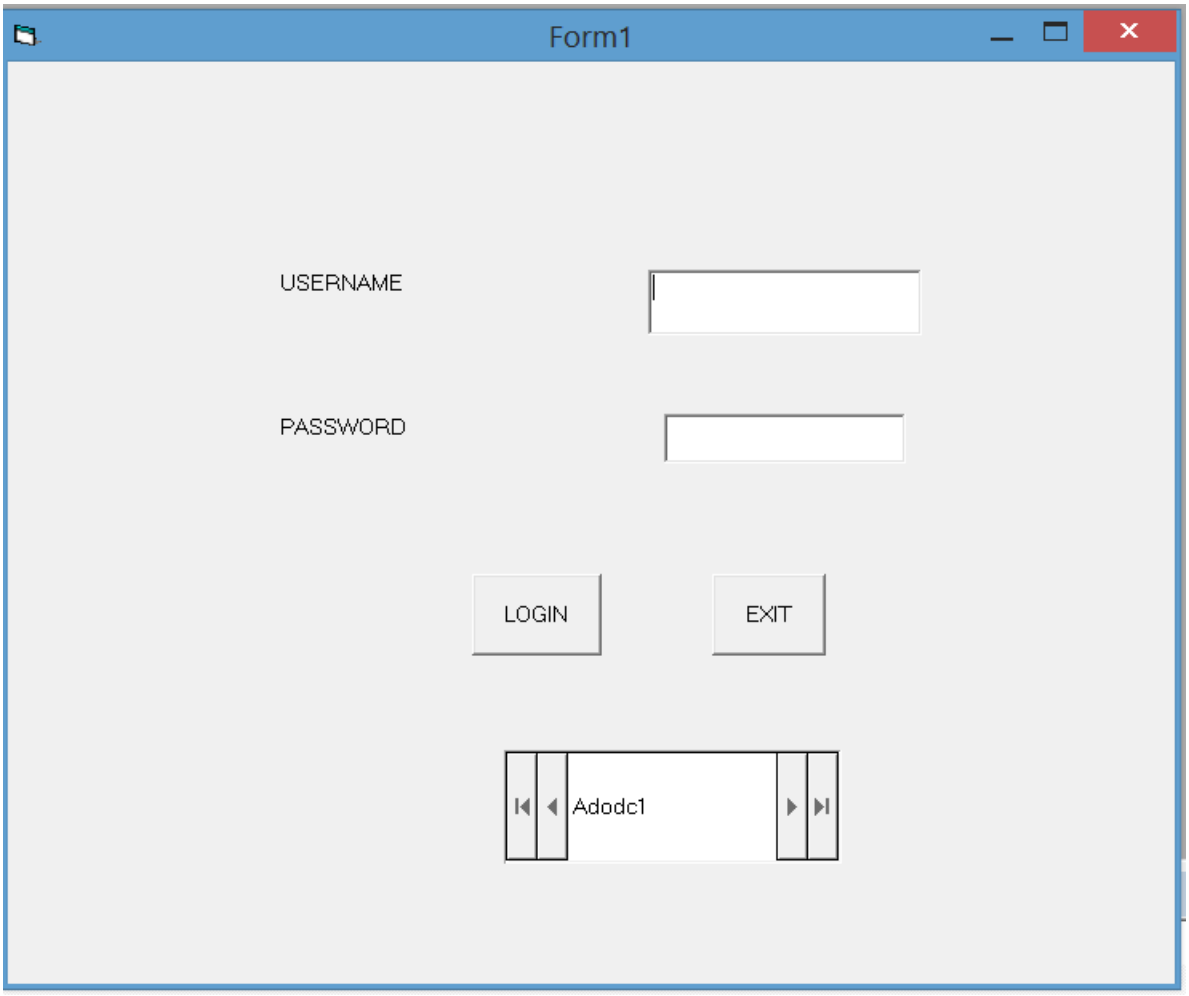
6 Create a vending machine application that displays images for four snacks and corresponding option buttons. The GUI should contain a textbox in which the user specifies the quantity of desired snack. When the dispense snack button is clicked, it should display on a label the name of the snack dispensed. At end it should print (display) the bill of the product.
Vending Machine




```
Dim slno As Integer
Dim rno As Integer
Dim totalbill As Integer


Private Sub Command1_Click()
Dim sname As String
rno = rno + 1
Label4.Caption = ""
If Option1.Value = False And Option2.Value = False And Option3.Value =
False And Option4.Value = False Then
MsgBox " Select one item"
```

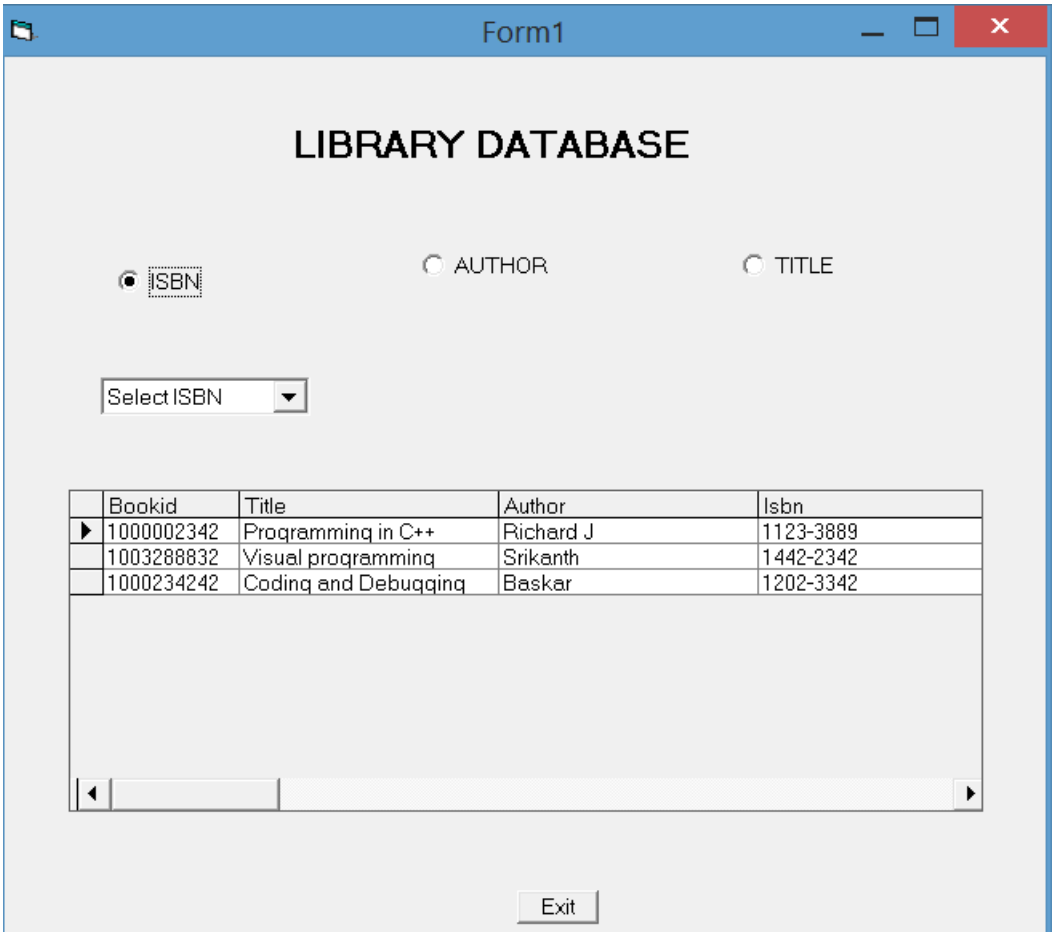
```
Exit Sub
End If
If Option1.Value = True Then
sname = Option1.Caption
sprice = 20
ElseIf Option2.Value = True Then
sname = Option2.Caption
sprice = 25
ElseIf Option3.Value = True Then
sname = Option3.Caption
sprice = 30
ElseIf Option4.Value = True Then
sname = Option4.Caption
sprice = 35
End If
Label4.Caption = sname
MSFlexGrid1.Rows = MSFlexGrid1.Rows + 1
MSFlexGrid1.TextMatrix(rno, 0) = slno
MSFlexGrid1.TextMatrix(rno, 1) = sname
MSFlexGrid1.TextMatrix(rno, 2) = sprice
MSFlexGrid1.TextMatrix(rno, 3) = Text1.Text
MSFlexGrid1.TextMatrix(rno, 4) = Val(Text1.Text) * sprice
totalbill = totalbill + Val(MSFlexGrid1.TextMatrix(rno, 4))
Text2.Text = totalbill
slno = slno + 1
Text1.Text = ""

End Sub

Private Sub Command2_Click()
End
End Sub

Private Sub Form_Load()
rno = 0
MSFlexGrid1.TextMatrix(rno, 0) = "SNO"
MSFlexGrid1.TextMatrix(rno, 1) = "NAME"
MSFlexGrid1.TextMatrix(rno, 2) = "PRICE"
MSFlexGrid1.TextMatrix(rno, 3) = "QUANTITY"
MSFlexGrid1.TextMatrix(rno, 4) = "AMOUNT"

End Sub
```

7 Write a VB program to validate the username and password from the database and display the appropriate message. (Use ADO Data Control).




```
Dim s1 As String
Dim s2 As String

Private Sub cmdexit_Click()
Unload Me
End Sub

Private Sub cmdlogin_Click()
s1 = txtusername.Text
s2 = txtpassword.Text

With Adologin
.RecordSource = "SELECT * FROM LOGIN WHERE USERNAME='" + s1 + "'
and PASSWORD='" + s2 + "'"
.Refresh
If .Recordset.RecordCount = 1 Then
MsgBox "Valid Login"
Else
MsgBox "Invalid Login"
End If
End With
End Sub
```

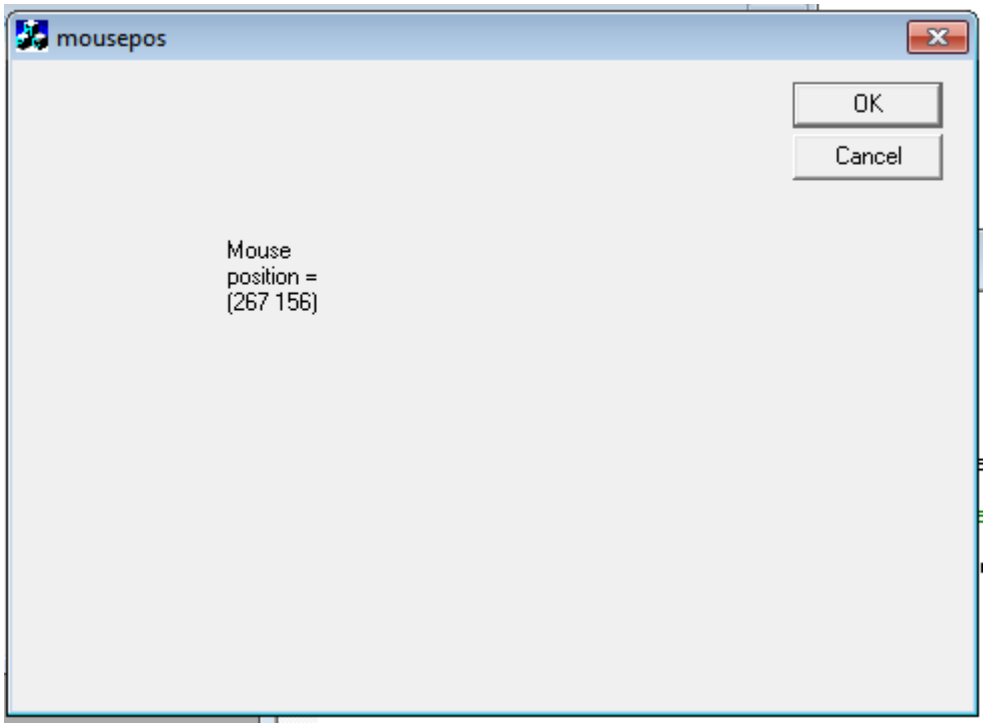
8 Create an application which is linked to book database. The application should allow the user to perform a search of the book from the database, when user clicks a button. User should be able to search any book with its title, ISBN no. or Author name.




```
Private Sub Command1_Click()
End
End Sub

Private Sub DataCombo1_Click(Area As Integer)
If DataCombo1.Text <> "" Then
Adodc2.RecordSource = "select * from books where isbn='" &
DataCombo1.Text & "'"
Adodc2.Refresh
DataGrid1.Refresh
End If
End Sub

Private Sub DataCombo2_Click(Area As Integer)
If DataCombo2.Text <> "" Then
Adodc2.RecordSource = "select * from books where author='" &
DataCombo2.Text & "'"
Adodc2.Refresh
```

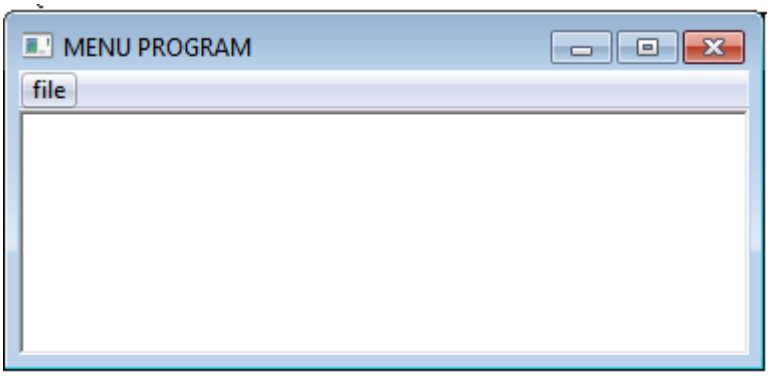
```
DataGrid1.Refresh
End If
End Sub

Private Sub DataCombo3_Click(Area As Integer)
If DataCombo3.Text <> "" Then
Adodc2.RecordSource = "select * from books where title='" &
DataCombo3.Text & "'"
Adodc2.Refresh
DataGrid1.Refresh
End If
End Sub

Private Sub Option1_Click()
If Option1.Value = True Then
DataCombo1.Visible = True
DataCombo2.Visible = False
DataCombo3.Visible = False
End If
End Sub

Private Sub Option2_Click()
If Option2.Value = True Then
DataCombo2.Visible = True
DataCombo1.Visible = False
DataCombo3.Visible = False
End If
End Sub

Private Sub Option3_Click()
If Option3.Value = True Then
DataCombo3.Visible = True
DataCombo2.Visible = False
DataCombo1.Visible = False
End If
End Sub
```

9. **VC++ program to create a dialog box and display the position of the mouse pointer with the dialog box.**




```
voidCMouseposDlg::OnMouseMove(UINT nFlags, CPoint point)
{
        // TODO: Add your message handler code here and/or call default
        CStringstrMessage;
        strMessage.Format ("Mouse position = (%d %d)",point.x,point.y);
        m_strname=strMessage;
        UpdateData(FALSE);
        CDialog::OnMouseMove(nFlags, point);
}
```

10. VC++ program to create and load a simple menu in a window.

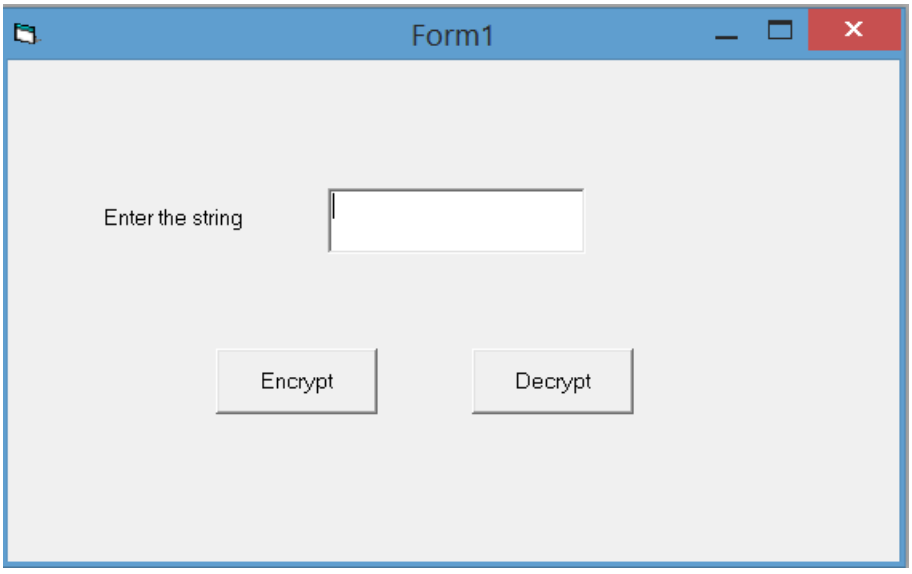



```
# include <afxwin.h>
# include "resource.h"
classmyframe:publicCFrameWnd
{
public:
```

```
        myframe()
        {
                Create(NULL,"MENU PROGRAM",
WS_OVERLAPPEDWINDOW,CRect(20,20,400,200),0,MAKEINTRESOURCE(I
DR_MENU1));
        }
};

classMyapp:publicCWinApp
{
public:
        BOOL InitInstance()
        {
                myframe *bwnd;
                bwnd=new myframe();
                bwnd->ShowWindow(1);
                m_pMainWnd = bwnd;
                return 1;
        }
};

MyapptheApp;
```

Part-B

11 VB program to Encrypt and Decrypt a string. Encryption and Decryption




```
Private Sub Command1_Click()
Dim mainstring, str, ch As String
        Dim i, c As Integer
```

```
    mainstring = Text1.Text
    str = ""
    For i = 1 To Len(mainstring)
       ch = Mid(mainstring, i, 1)
       c = Asc(ch) + 20
       ch = Chr(c)
       str = str & ch
    Next i
    MsgBox ("The Encrypted Text is " & str)
    Text2.Text = str

End Sub

Private Sub Command2_Click()
Dim mainstring, str, ch As String
    Dim i, c As Integer
    mainstring = Text2.Text
    str = ""
    For i = 1 To Len(mainstring)
       ch = Mid(mainstring, i, 1)
       c = Asc(ch) - 20
       ch = Chr(c)
       str = str & ch
    Next i
    MsgBox ("The Decrypted Text is " & str)

End Sub
```

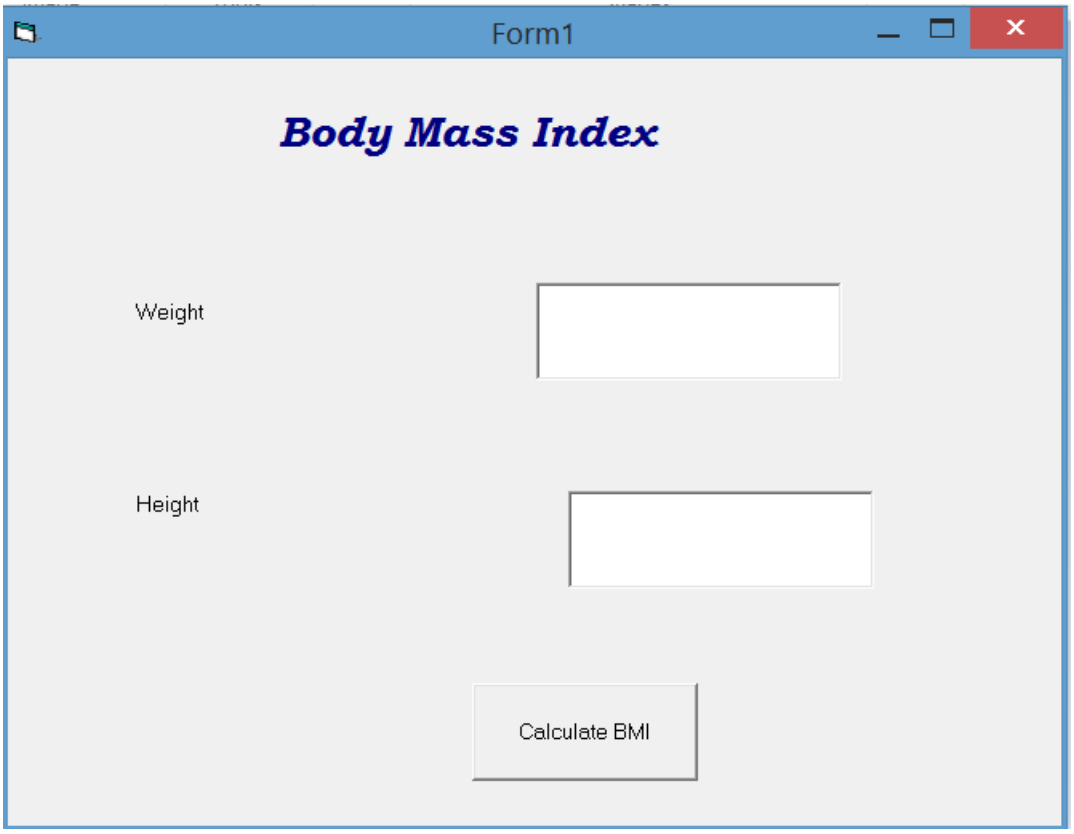
12 Write a VB Program to design a simple calculator to perform addition, subtraction, multiplication and division.


```
Dim oper1, oper2, result As Double
    Dim oper As String
    Dim cleardisp As Boolean


Private Sub cmdadd_Click()
oper1 = Val(txtdisplay.Text)
        oper = "+"
        txtdisplay.Text = ""
        cmdequal.Enabled = True

End Sub

Private Sub cmdclear_Click()
txtdisplay.Text = ""
End Sub

Private Sub cmdclose_Click()
End
End Sub

Private Sub cmddecimal_Click()
        If cleardisp = True Then
            txtdisplay.Text = ""
            cleardisp = False
        End If
        If InStr(txtdisplay.Text, ".") Then
```

```
        'if '.' is already present in txtdisplay
            Exit Sub
        Else
            txtdisplay.Text = txtdisplay.Text & "."
        End If

End Sub

Private Sub cmddiv_Click()
oper1 = Val(txtdisplay.Text)
        oper = "/"
        txtdisplay.Text = ""
        cmdequal.Enabled = True

End Sub

Private Sub cmdequal_Click()
On Error GoTo errormsg
        oper2 = Val(txtdisplay.Text)
        If oper = "+" Then result = oper1 + oper2
        If oper = "-" Then result = oper1 - oper2
        If oper = "*" Then result = oper1 * oper2
        If oper = "/" Then result = oper1 / oper2
        txtdisplay.Text = Format(result, "####0.00")
        txtdisplay.Text = result
        cleardisp = True
        cmdequal.Enabled = False
        Exit Sub
errormsg:
        MsgBox ("The operation resulted in the error : " & Err.Description)
        txtdisplay.Text = "ERROR"
        cleardisp = True

End Sub

Private Sub cmdmul_Click()
oper1 = Val(txtdisplay.Text)
        oper = "*"
        txtdisplay.Text = ""
        cmdequal.Enabled = True

End Sub

Private Sub cmdnum_Click(Index As Integer)
If cleardisp = True Then
            txtdisplay.Text = ""
            cleardisp = False
        End If
        txtdisplay.Text = txtdisplay.Text + cmdnum(Index).Caption
```

```
End Sub


Private Sub cmdsub_Click()
oper1 = Val(txtdisplay.Text)
        oper = "-"
        txtdisplay.Text = ""
        cmdequal.Enabled = True

End Sub

Private Sub Form_Load()
cmdequal.Enabled = False
End Sub
```

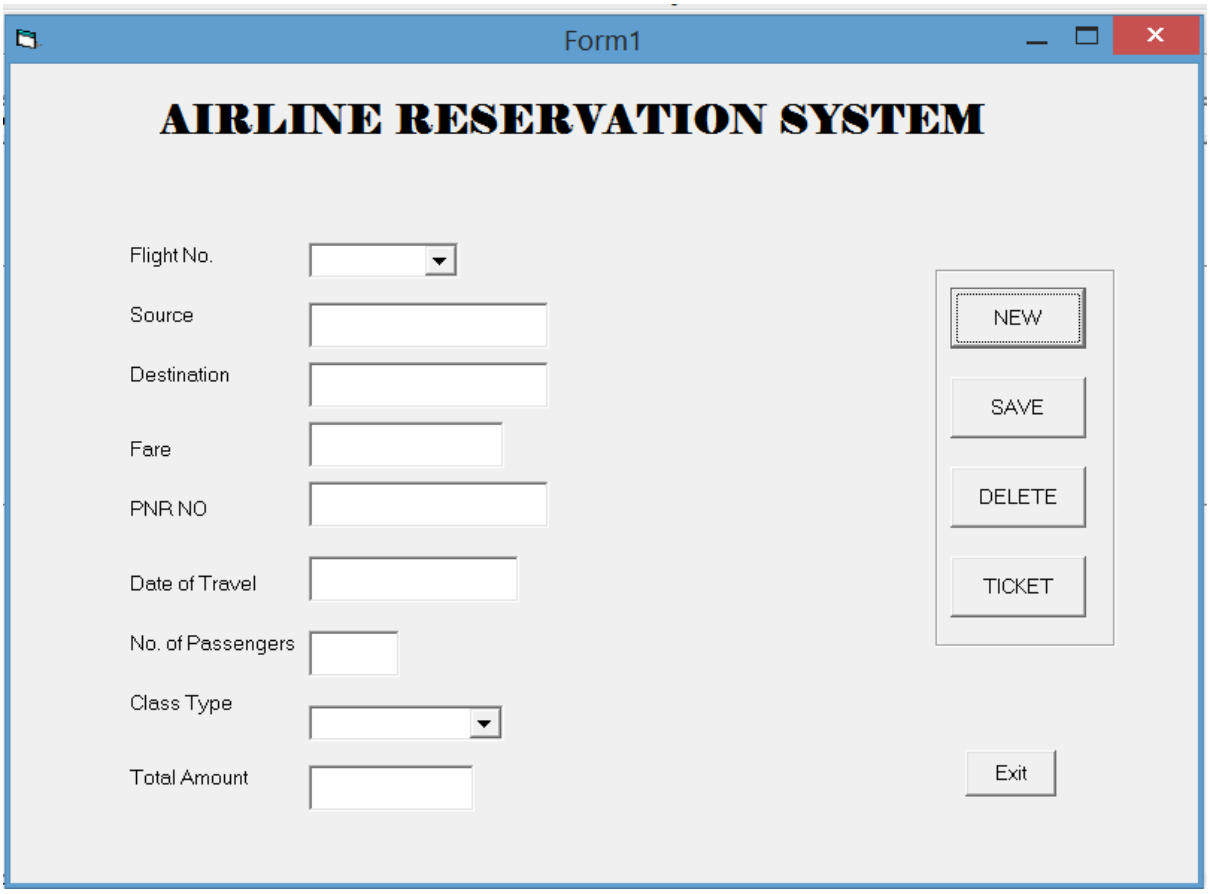
13 BMI Calculator

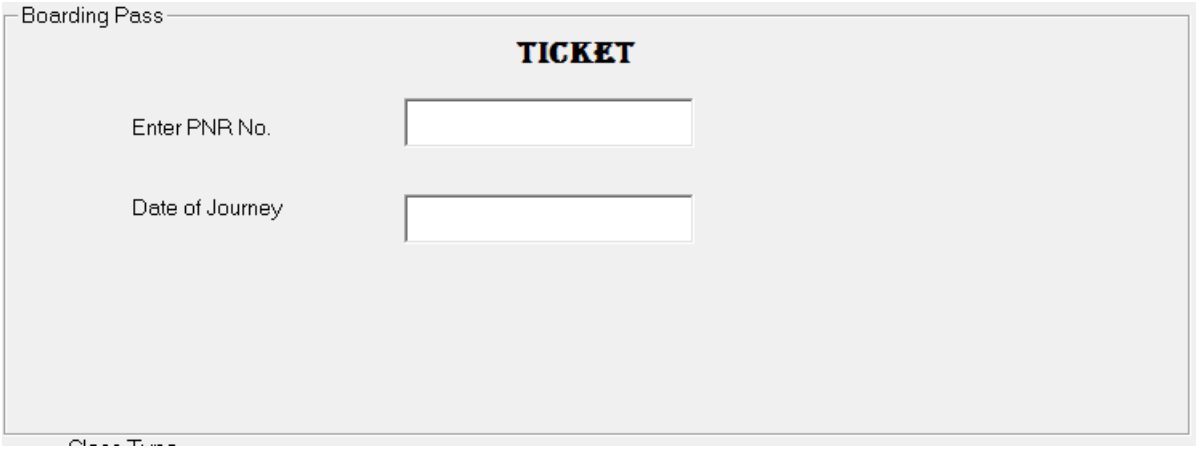



```
Private Sub Command1_Click()
Dim bmi As Single
bmi = Val(Text1.Text) / (Val(Text2.Text) * Val(Text2.Text))
If bmi < 18.5 Then
MsgBox ("Underweight")
ElseIf bmi > 18.5 And bmi < 24.5 Then
MsgBox ("Normal")
ElseIf bmi > 24.5 And bmi < 29 Then
```

```
MsgBox ("Overweight")
Else
MsgBox ("Obese")
End If

End Sub
```

14 Write an application for Airline Reservation System, which allows the user to book ticket on a particular date for a particular type of class. At the end, once the ticket is booked, if should display a boarding pass indication the person's seat no., type of class and total fare. Input validations should be done properly.



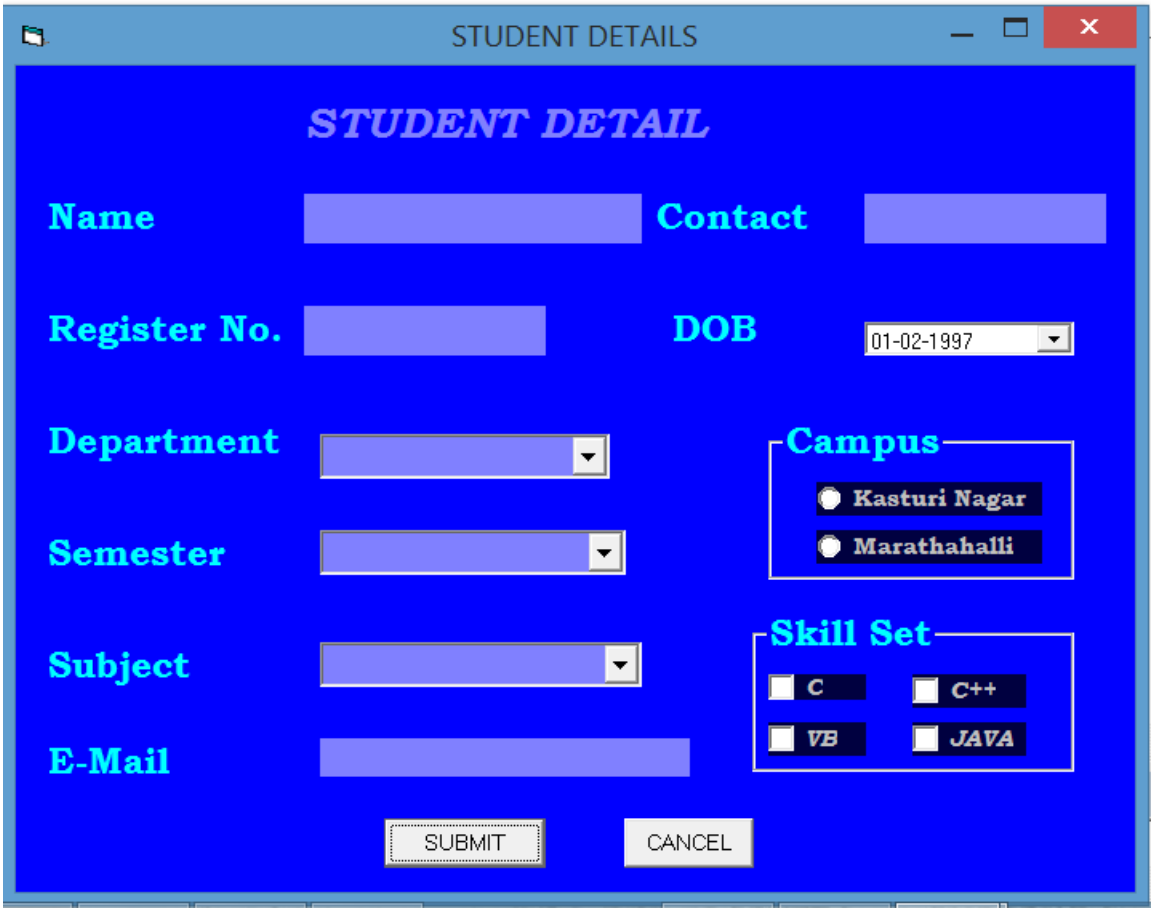


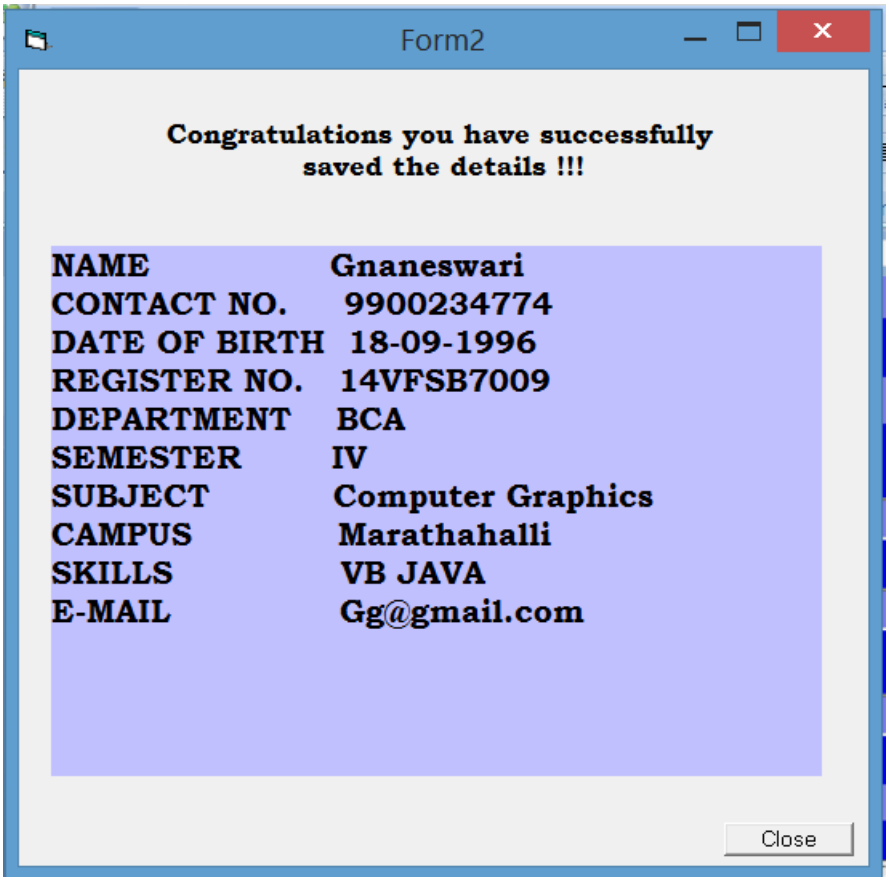

```
Dim conn As New ADODB.Connection
Dim rs As New ADODB.Recordset
Dim rs1 As New ADODB.Recordset
Dim str As String

Private Sub cboclasstype_LostFocus()
If cboclasstype.Text = "ECONOMY" Then
txttotamt = txtnoofpassenger * (txtfare + 1000)
ElseIf cboclasstype.Text = "BUSINESS" Then
txttotamt = txtnoofpassenger * (txtfare + 5000)
End If
End Sub

Private Sub cboflightno_LostFocus()
If cboflightno = "1001" Then
txtsource = "Bangalore"
txtdestination = "Chennai"
txtfare = 3000
ElseIf cboflightno = "1002" Then
txtsource = "Bangalore"
txtdestination = "Delhi"
txtfare = 8000
ElseIf cboflightno = "1003" Then
txtsource = "Bangalore"
txtdestination = "Mangalore"
txtfare = 2500
Else
txtsource = "Bangalore"
txtdestination = "Puducherry"
txtfare = 3000
End If
End Sub

Private Sub cmddelete_Click()
rs.Delete
rs.MoveNext
```

```
If rs.EOF Then
rs.MoveLast
End If
cboflightno.Text = rs("fno")
txtsource.Text = rs("src")
txtdestination.Text = rs("dest")
txtfare.Text = rs("fare")
txtpnrno.Text = rs("pnr")
txttraveldate.Text = rs("fdt")
txtnoofpassenger.Text = rs("nopass")
cboclasstype.Text = rs("class")
txttotamt.Text = rs("tot")
rs.Requery
End Sub

Private Sub cmdnew_Click()
cboflightno.Text = ""
txtsource.Text = ""
txtdestination.Text = ""
txtfare.Text = ""
txtpnrno.Text = ""
txttraveldate.Text = ""
txtnoofpassenger.Text = ""
cboclasstype.Text = ""
txttotamt.Text = ""
rs.AddNew
rs1.Open "select * from reservation", conn, adOpenDynamic
rs1.MoveLast
txtpnrno = Val(rs1(4)) + 1
End Sub

Private Sub cmdsave_Click()
rs("fno") = cboflightno.Text
rs("src") = txtsource.Text
rs("dest") = txtdestination.Text
rs("fare") = txtfare.Text
rs("pnr") = txtpnrno.Text
rs("fdt") = txttraveldate.Text
rs("nopass") = txtnoofpassenger.Text
rs("class") = cboclasstype.Text
rs("tot") = txttotamt.Text
rs.Update
MsgBox "Record saved"
rs.Requery
End Sub

Private Sub cmdticket_Click()
Frame2.Visible = True
Text1.Text = rs("pnr")
```

```
Text2.Text = rs("fdt")
End Sub

Private Sub Command1_Click()
End
End Sub

Private Sub Form_Load()
conn.Open "Provider=Microsoft.Jet.OLEDB.4.0;Data
Source=C:\Users\Gnaneswari\Documents\VBDATA.mdb;Persist
Security Info=False"
str = "select * from reservation"
rs.Open str, conn, adOpenDynamic, adLockOptimistic, adCmdText
End Sub
```

15 Create an application to enter the students details (Name, course, semester, subjects)using the controls such as option button, checkbox, dropdown list box, nested combobox and print (display) the resume.





Form1

```
Dim digits As Integer
Dim textval As String
Dim numval As String

Private Sub Combo2_Click()
Select Case Combo1.ListIndex
        Case 0
            Select Case Combo2.ListIndex
                Case 0

                    Combo3.Clear
                    Combo3.AddItem ("Linux")
                    Combo3.AddItem ("C")
                    Combo3.AddItem ("Computer Fundamentals")
                    Combo3.AddItem ("Maths")

                Case 1
                    Combo3.Clear
                    Combo3.AddItem ("Datastructures")
                    Combo3.AddItem ("Operating System")
                    Combo3.AddItem ("Statistics")
                    Combo3.AddItem ("Microprocessor")
```

```
        Case 2
           Combo3.Clear
           Combo3.AddItem ("DBMS")
           Combo3.AddItem ("VB")
           Combo3.AddItem ("SE")
           Combo3.AddItem ("AFM")

        Case 3

           Combo3.Clear
           Combo3.AddItem ("Computer Graphics")
           Combo3.AddItem ("Algorithms")
           Combo3.AddItem ("RDBMS")
           Combo3.AddItem ("EComerce")

        Case 4
           Combo3.Clear
           Combo3.AddItem ("IIT")
           Combo3.AddItem ("Unix")
           Combo3.AddItem ("Java")
           Combo3.AddItem ("SP")
        Case 5
           Combo3.Clear
           Combo3.AddItem ("AI")
           Combo3.AddItem ("OOAD")
           Combo3.AddItem ("Multimedia")
           Combo3.AddItem ("Embedded Systems")
     End Select

Case 1
     Select Case Combo2.ListIndex
        Case 0
           Combo3.Clear
           Combo3.AddItem ("Cost Accounts1")
           Combo3.AddItem ("Management Accounts1")
           Combo3.AddItem ("Computer Fundamentals")
           Combo3.AddItem ("Maths")
        Case 1
           Combo3.Clear
           Combo3.AddItem ("Cost Accounts2")
           Combo3.AddItem ("Management Accounts2")
           Combo3.AddItem ("Statistics")
           Combo3.AddItem ("Ledger")
        Case 2

           Combo3.Clear
           Combo3.AddItem ("Cost Accounts3")
           Combo3.AddItem ("Management Accounts3")
           Combo3.AddItem ("Enterprenership")
```

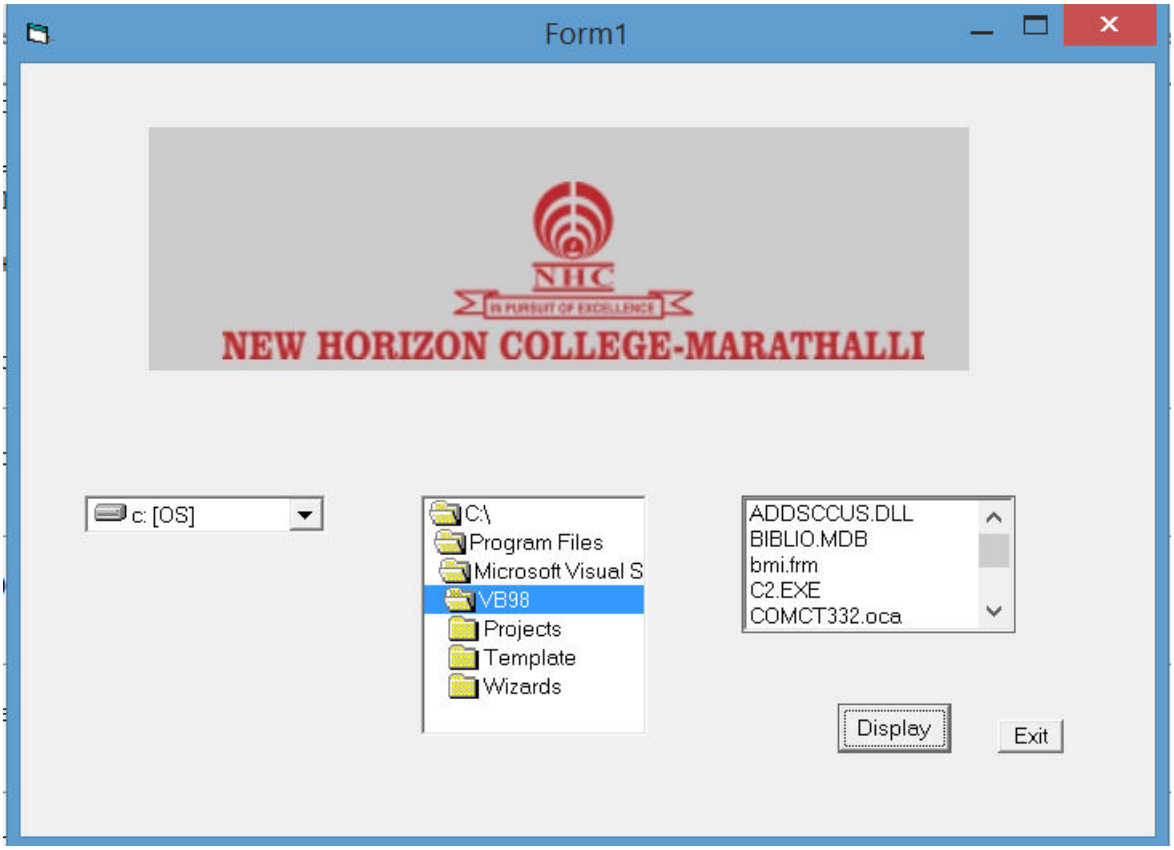
```
            Combo3.AddItem ("Business analytics")
        Case 3

            Combo3.Clear
            Combo3.AddItem ("Tally")
            Combo3.AddItem ("Law")
            Combo3.AddItem ("Marketing")
            Combo3.AddItem ("EComerce")
        Case 4

            Combo3.Clear
            Combo3.AddItem ("Accounts1")
            Combo3.AddItem ("Accounts2")
            Combo3.AddItem ("Accounts3")
            Combo3.AddItem ("Accounts4")
        Case 5
            Combo3.Clear
            Combo3.AddItem ("Accounts5")
            Combo3.AddItem ("Accounts6")
            Combo3.AddItem ("Accounts7")
            Combo3.AddItem ("Accounts8")
    End Select
Case 2
    Select Case Combo2.ListIndex
        Case 0
            Combo3.Clear
            Combo3.AddItem ("BCom Cost Accounts1")
            Combo3.AddItem ("BComManagement Accounts1")
            Combo3.AddItem ("BComComputer Fundamentals")
            Combo3.AddItem ("BComMaths")
        Case 1
            Combo3.Clear
            Combo3.AddItem ("BComCost Accounts2")
            Combo3.AddItem ("BComManagement Accounts2")
            Combo3.AddItem ("BComStatistics")
            Combo3.AddItem ("BComLedger")
        Case 2

            Combo3.Clear
            Combo3.AddItem ("BComCost Accounts3")
            Combo3.AddItem ("BComManagement Accounts3")
            Combo3.AddItem ("BComEnterprenership")
            Combo3.AddItem ("BComBusiness analytics")
        Case 3

            Combo3.Clear
            Combo3.AddItem ("BComTally")
            Combo3.AddItem ("BComLaw")
            Combo3.AddItem ("BComMarketing")
```

```
                Combo3.AddItem ("BComEComerce")
            Case 4

                Combo3.Clear
                Combo3.AddItem ("BComAccounts1")
                Combo3.AddItem ("BComAccounts2")
                Combo3.AddItem ("BComAccounts3")
                Combo3.AddItem ("BComAccounts4")
            Case 5
                Combo3.Clear
                Combo3.AddItem ("BComAccounts5")
                Combo3.AddItem ("BComAccounts6")
                Combo3.AddItem ("BComAccounts7")
                Combo3.AddItem ("BComAccounts8")
        End Select
    End Select
End Sub
Private Sub Command1_Click()
If InStr(Text4.Text, "@") = 0 Then
MsgBox ("Email should be in a format of jonson@ymail.com")
Else
Form2.Show
Unload Form1
End If
End Sub
Private Sub Command2_Click()
End
End Sub
Private Sub Form_Load()
Dim i As Integer
Combo1.AddItem ("BCA")
Combo1.AddItem ("BBA")
Combo1.AddItem ("B.Com")
Combo2.AddItem ("I")
Combo2.AddItem ("II")
Combo2.AddItem ("III")
Combo2.AddItem ("IV")
Combo2.AddItem ("V")
Combo2.AddItem ("VI")
End Sub

Private Sub Text1_Change()
  textval = Text1.Text
  If IsNumeric(textval) Then
    numval = textval
  Else
    Text1.Text = CStr(numval)
  End If
End Sub
```

Form2

```
Private Sub Command1_Click()
End
End Sub

Private Sub Form_Load()
Text3.Text = ""
If Form1.Option1 = True Then
Text2.Text = Form1.Option1.Caption
Else
Text2.Text = Form1.Option2.Caption
End If
If Form1.Check1 Then
Text3.Text = Text3.Text + Form1.Check1.Caption + " "
End If
If Form1.Check2 Then
Text3.Text = Text3.Text + Form1.Check2.Caption + " "
End If
If Form1.Check3 Then
Text3.Text = Text3.Text + Form1.Check3.Caption + " "
End If
If Form1.Check4 Then
Text3.Text = Text3.Text + Form1.Check4.Caption + " "
End If
Text1.Text = "NAME                " & Form1.Text2.Text & vbCrLf & "CONTACT
NO.     " & Form1.Text1.Text & vbCrLf & "DATE OF BIRTH  " &
Form1.DTPicker1.Value & vbCrLf & "REGISTER NO.   " & Form1.Text3.Text
& vbCrLf & "DEPARTMENT    " & Form1.Combo1.Text & vbCrLf &
"SEMESTER        " & Form1.Combo2.Text & vbCrLf & "SUBJECT          " &
Form1.Combo3.Text & vbCrLf & "CAMPUS             " & Text2.Text & vbCrLf
& "SKILLS              " & Text3.Text & vbCrLf & "E-MAIL               " &
Form1.Text4.Text
End Sub
```

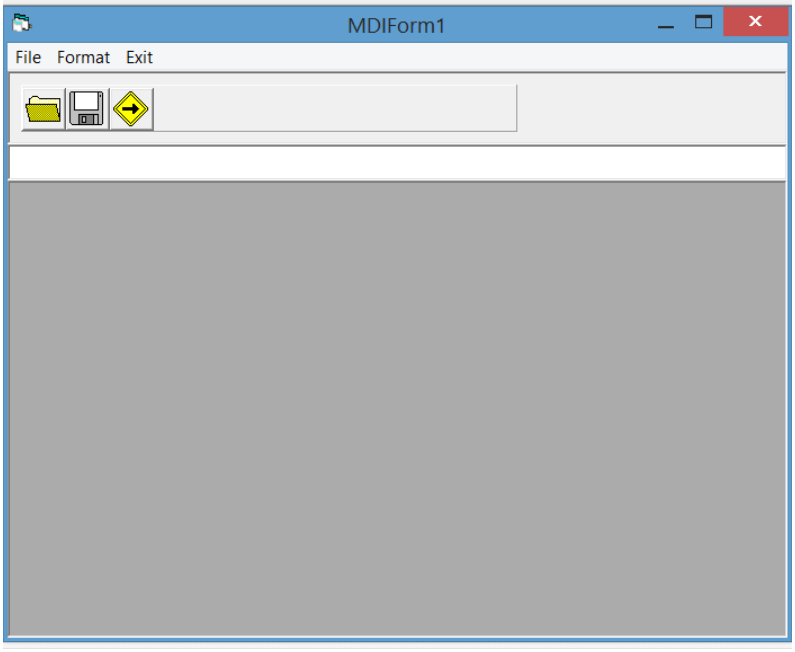
16 Design an application using Drive box, File Listbox, Directory listbox for loading the selected image.

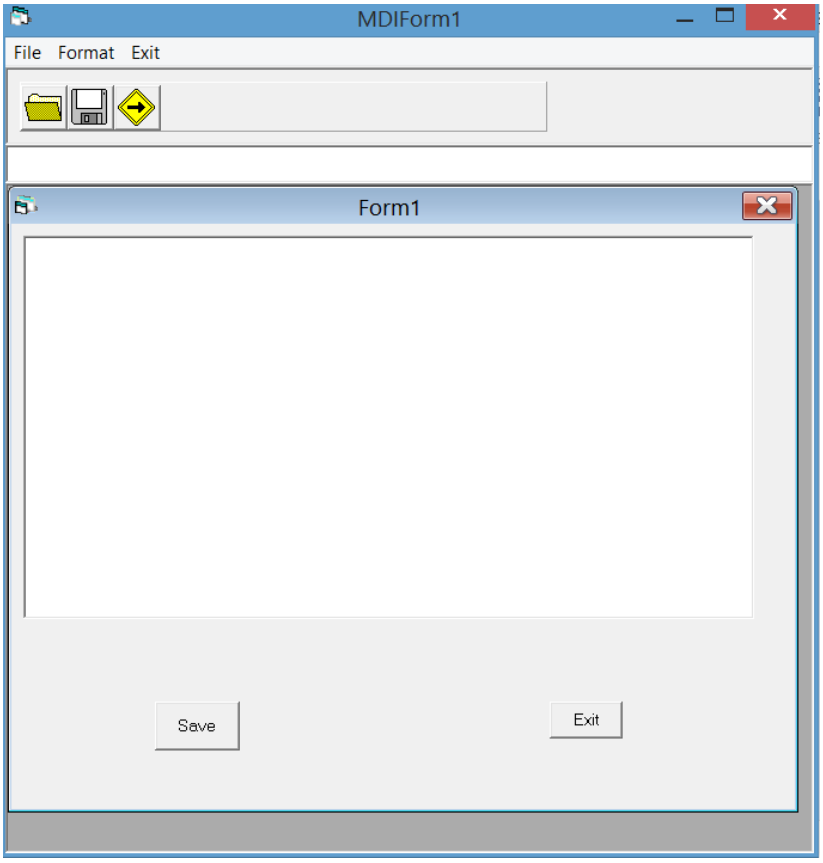


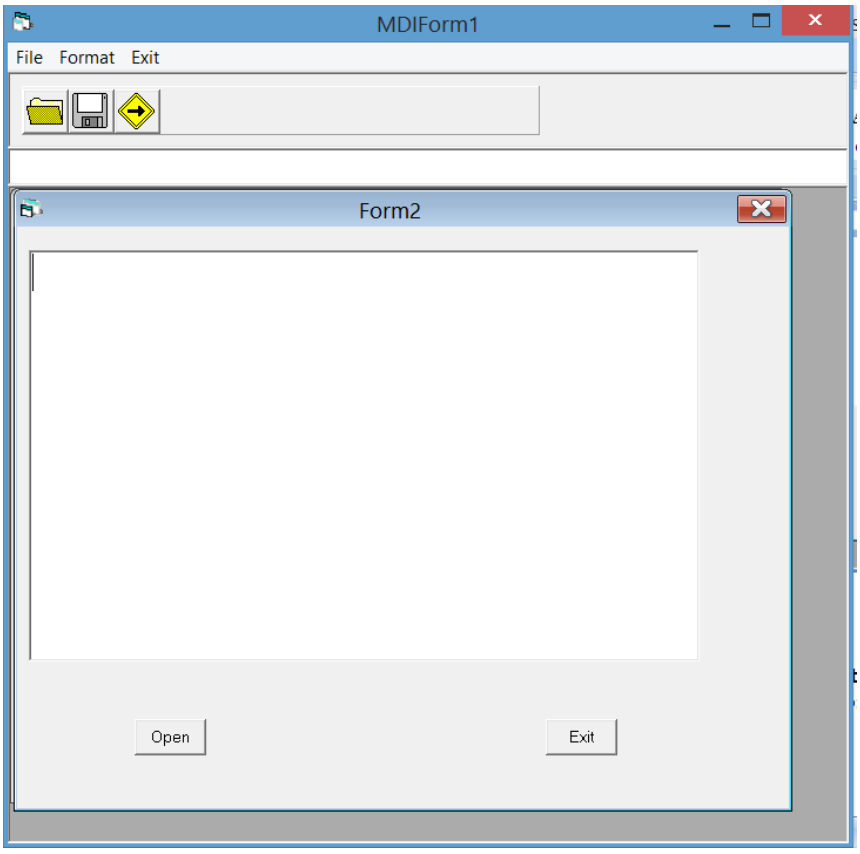

```
Private Sub Command1_Click()
Dim img1 As String
If Right(File1.Path, 1) = "\" Then
img1 = File1.Path + File1.FileName
Else
img1 = File1.Path + "\" + File1.FileName
End If
Label1.Caption = img1
Image1.Picture = LoadPicture(img1)
End Sub

Private Sub Command2_Click()
End
End Sub

Private Sub Dir1_Change()
File1.Path = Dir1.Path
End Sub

Private Sub Drive1_Change()
Dir1.Path = Drive1.Drive
End Sub

Private Sub File1_DblClick()
Dim img1 As String
If Right(File1.Path, 1) = "\" Then
```

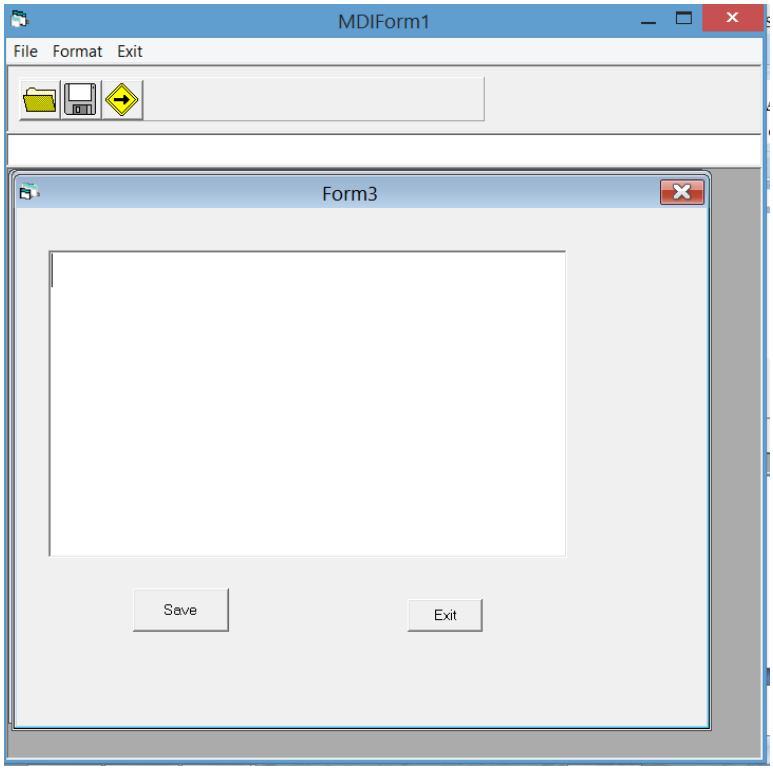
```
img1 = File1.Path + File1.FileName
Else
img1 = File1.Path + "\" + File1.FileName
End If
Label1.Caption = img1
Image1.Picture = LoadPicture(img1)
End Sub
```

17 Design an application using MDI form, menus and common dialog control.




MDIForm1
File Format Exit
Form1
Save
Exit


MDIForm1
File Format Exit
Form2
Open
Exit



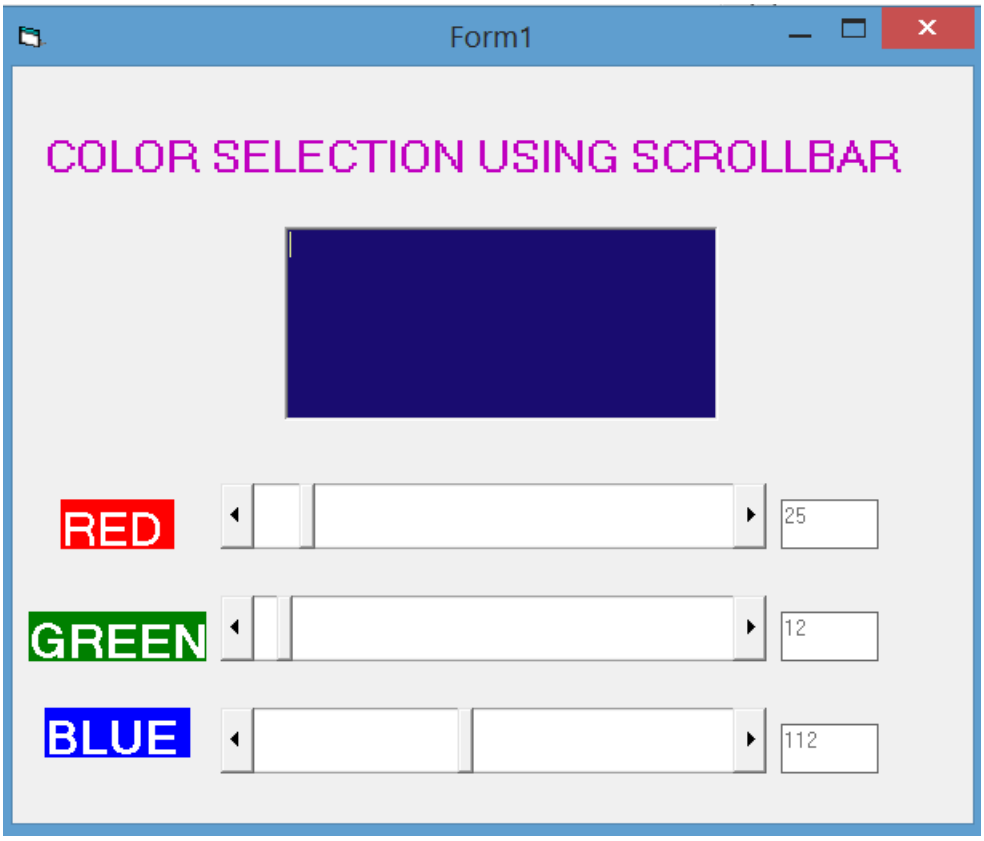

```
Private Sub mnuarial_Click()
frmch3.txtdemo.FontName = "arial"
End Sub

Private Sub mnubold_Click()
frmch3.txtdemo.FontBold = True
End Sub

Private Sub mnuexit_Click()
Unload Me
End Sub

Private Sub mnuformat_Click()
frmch3.Show
End Sub

Private Sub mnugaramond_Click()
frmch3.txtdemo.FontName = "garamond"
End Sub

Private Sub mnuimpact_Click()
frmch3.txtdemo.FontName = "impact"
End Sub
```

```
Private Sub mnuitalic_Click()
frmch3.txtdemo.FontItalic = True
End Sub

Private Sub mnulucida_Click()
frmch3.txtdemo.FontName = "lucida sans"
End Sub

Private Sub mnunew_Click()
frmch1.Show
End Sub

Private Sub mnuopen_Click()
frmch2.Show
End Sub

Private Sub mnuregular_Click()
frmch3.txtdemo.FontBold = False
frmch3.txtdemo.FontItalic = False
End Sub

Private Sub Toolbar1_ButtonClick(ByVal Button As ComctlLib.Button)
If Button.Index = 1 Then
frmch2.Show
ElseIf Button.Index = 2 Then
frmch1.Show
Else
Unload Me
End If
End Sub

Form1
Private Sub cmdexit_Click()
Unload Me
End Sub

Private Sub cmdsave_Click()
Dim fileloc As String
If Text1.Text <> "" Then
CommonDialog1.ShowSave
fileloc = CommonDialog1.FileName
Open fileloc For Append As #1
Print #1, Text1.Text
```

```
Close #1
End If
End Sub

Form2
Private Sub cmdexit_Click()
Unload Me
End Sub

Private Sub cmdopen_Click()
Dim fileloc As String
CommonDialog1.Filter = "Text files{*.txt)|*.txt"
CommonDialog1.ShowOpen
fileloc = CommonDialog1.FileName
Open fileloc For Input As #1
Do Until EOF(1)
 Input #1, Data
 Text1.Text = Text1.Text + Data + vbNewLine
Loop
Close #1
End Sub

Form3
Private Sub cmdexit_Click()
Unload Me
End Sub

Private Sub cmdsave_Click()
Dim fileloc As String
If txtdemo.Text <> "" Then
CommonDialog1.ShowSave
fileloc = CommonDialog1.FileName
Open fileloc For Append As #1
Print #1, txtdemo.Text
Close #1
End If
End Sub
```

18 Design a VB application to change the backcolor of the textbox using Scroll bar control for selection of colors.

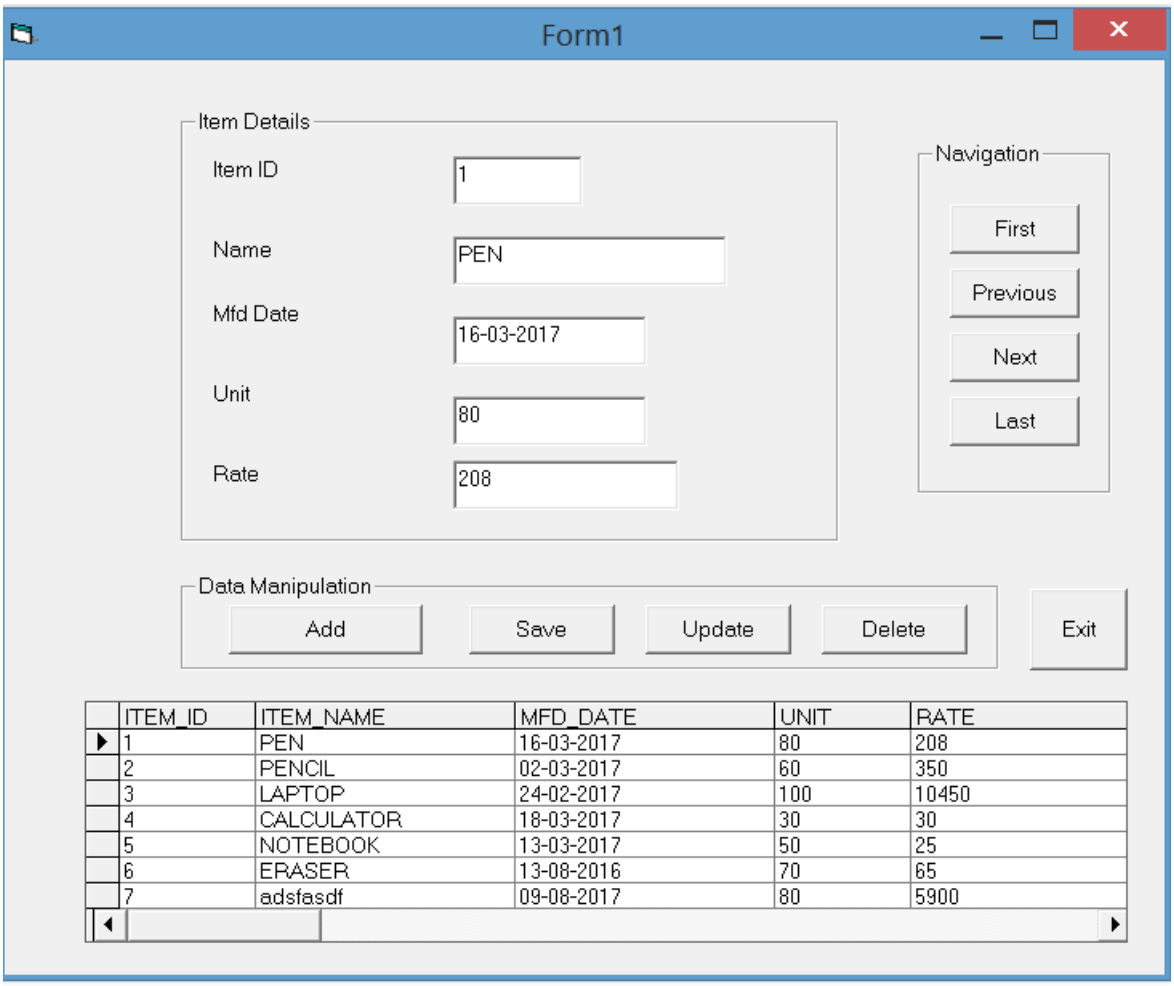
Horizontal Scroll Bar




```
Private Sub Form_Load()
Text2.Text = HScroll1.Value
Text3.Text = HScroll2.Value
Text4.Text = HScroll3.Value
Text1.BackColor = RGB(HScroll1.Value, HScroll2.Value, HScroll3.Value)
End Sub

Private Sub HScroll1_Change()
Text2.Text = HScroll1.Value
Text1.BackColor = RGB(HScroll1.Value, HScroll2.Value, HScroll3.Value)
End Sub

Private Sub HScroll2_Change()
Text3.Text = HScroll2.Value
Text1.BackColor = RGB(HScroll1.Value, HScroll2.Value, HScroll3.Value)
End Sub

Private Sub HScroll3_Change()
Text4.Text = HScroll3.Value
Text1.BackColor = RGB(HScroll1.Value, HScroll2.Value, HScroll3.Value)
End Sub
```

19 Design a VB application to accept the Item Details (ItemID, ItemName, MfdDate, UnitofMeasure and RatePerUnit). ItemId should be a system generated id. The application should allow

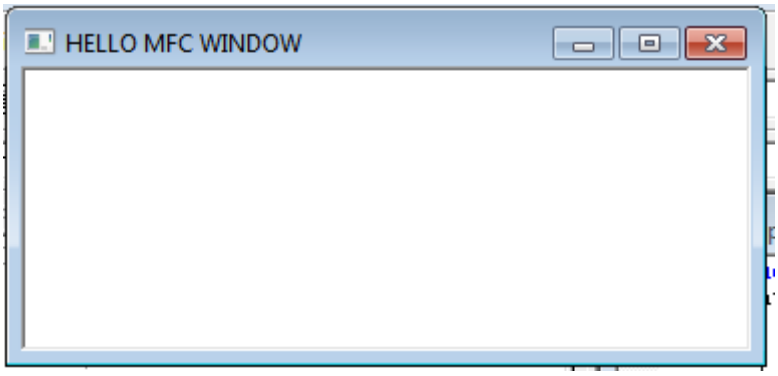
the operations – Add, Modify, Delete, Update and Navigations of the items. Use ADO Data controls and Grid Controls.




```
Private Sub cmdadd_Click()
Dim id As Integer
Adodc1.Refresh
Adodc1.Recordset.MoveLast
id = Adodc1.Recordset("ITEM_ID") + 1
Adodc1.Recordset.AddNew
txtitemid.Text = id
txtname.SetFocus
End Sub

Private Sub cmddelete_Click()
Adodc1.Recordset.Delete
Adodc1.Recordset.MoveNext
If Adodc1.Recordset.EOF Then
Adodc1.Recordset.MoveLast
End If
MsgBox "Item Deleted !"

End Sub
```

```
Private Sub cmdexit_Click()
Unload Me
End Sub

Private Sub cmdfirst_Click()
Adodc1.Recordset.MoveFirst
End Sub

Private Sub cmdlast_Click()
Adodc1.Recordset.MoveLast
End Sub

Private Sub cmdnext_Click()
Adodc1.Recordset.MoveNext
If Adodc1.Recordset.EOF Then
Adodc1.Recordset.MoveLast
MsgBox "No more records after this !"
End If
End Sub

Private Sub cmdprevious_Click()
Adodc1.Recordset.MovePrevious
If Adodc1.Recordset.BOF Then
Adodc1.Recordset.MoveFirst
MsgBox "No more records before this !"
End If
End Sub

Private Sub cmdsave_Click()
Adodc1.Recordset.Update
MsgBox "Record Saved !"
End Sub

Private Sub cmdupdate_Click()
Adodc1.Recordset.Update
MsgBox "Record Modified !"
End Sub
```

20. VC++ program to create a simple Window using MFC.




```
# include <afxwin.h>
classmyframe:publicCFrameWnd
{
public:
	myframe()
	{
		Create(NULL,"HELLO MFC WINDOW",
WS_OVERLAPPEDWINDOW,CRect(20,20,400,200));
	}
};
classMyapp:publicCWinApp
{
	intInitInstance()
	{
		myframe *bwnd;
		bwnd=new myframe();
		bwnd->ShowWindow(1);
		m_pMainWnd = bwnd;
		return 1;
	}
};

MyapptheApp;
```