



Visual Basic :

الفيزياء :

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الرؤيا

ي الى التميز من خلال تقديم مجموعة من المختبرات البرمجية ل الفيزياء بحيث يحقق المستويات المعيارية المرموقة في مجال الحاسبات مما يساعد على إعداد كفاءات وطنية مؤهلة ومدربة. التميز في مجال التعليم والبحث العلمي للتنمية المجتمعية بمعايير .

تتبنى رسالة مختبر الحاسبات من رسالة قسم الفيزياء حيث يهدف قسم الفيزياء إلى إعداد متخصصين متميزين في مجال الح في الفيزياء، وتعزيز البحث العلمي ، والإسهام في خدمة المجتمع محلياً وإقليمياً وفقاً لمعايير الجودة الشاملة والمتطلبات الاخلاقية والمهنية؛ وذلك من خلال اعداد خطط دراسية تتواءم مع المستجدات في تخصص علوم الحاسوب، وتوظيف علوم الحاسوب في عمليتي التعليم والتعلم وتبني احداث استراتيجيات التعل مهارات الطلبة. تطوير الكوادر العلمية المتخصصة في المختبر ليصبح لقسم الفيزياء أنموذجاً أكاديمياً رائداً ومتميزاً من خلال إعداد الطلبة لسوق العمل تنمية قدراتهم على التفاعل والتواصل مع الآخرين وصولاً لمجتمع المعلوماتية.

الأهداف

ان الأهداف الرئيسية للمختبر هي ضمان أن يتخرج الطالب وهو يمتلك المهارات والمعارف التالية:

- مهارات حل المشاكل
- المعرفة الجوهرية لفئة واسعة من تقنيات حل المشاكل (على سبيل المثال: الخوارزميات، الاستدلال، وتقنيات).
- فهم جوهري لأساسيات علوم الحاسبات.
- القدرة على التواصل مع الآخرين بوضوح باستخدام المفاهيم التقنية شفهيًا وخطياً.
- القدرة على العمل مع الآخرين من التخصصات الأخرى.
- التطوير المناسب للمناهج الدراسية بما يضمن دمج التغيرات في تكنولوجيا علوم الحاسبات و الفيزياء.
- تزويد المجتمع المحلي بالكوادر المؤهلة علمياً وعملياً.

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1.1 What is Visual Basic?

The word “Visual” refers to the way the Graphical User Interface (GUI) is designed. With some programming languages you have to design the GUI's by writing lots of code to describe everything about the GUI (for example appearance, location of controls, how to display the controls, etc). But with Visual Basic all you have to do is select the control you want and draw it on the form. This is also known as object orientated programming.

The word basic stands for Beginners All-Purpose Symbolic Instruction Code which refers to the coding section of the software. The actual code is very simple to use as it is just a large section of English word to do a certain task.



1.2 The Importance of Visual Basic Program

Languages like Basic and Pascal depend on variables and procedures to build the applications. This is why it is called procedural languages. The new approach is called object programming for visual programs like Visual Basic and Visual C++ and others. In this programming approach every thing (form, command buttons, controls) is an object.

The reasons for of implementing Visual Basic program are listed as follows:

- 1- It uses integrated development environment (IDE) which is easier for the user to minimize code writing.
- 2- All visual programs follow the same concepts, therefore the user will become more familiar with visual approach for other visual languages.
- 3- It provides Input box and Output box as interactive windows with user.
- 4- It is able to connect to Internet, and to call Explorer.

1.3 Programming applications in physics

1.3.1 Numerical simulations

Numerical simulations have different objectives depending on the nature of the task being simulated:

- Reconstruct and understand known events (e.g., earthquake, tsunamis and other natural disasters).
- Predict future or unobserved situations (e.g., weather, sub-atomic particle behaviour, and primordial explosions).

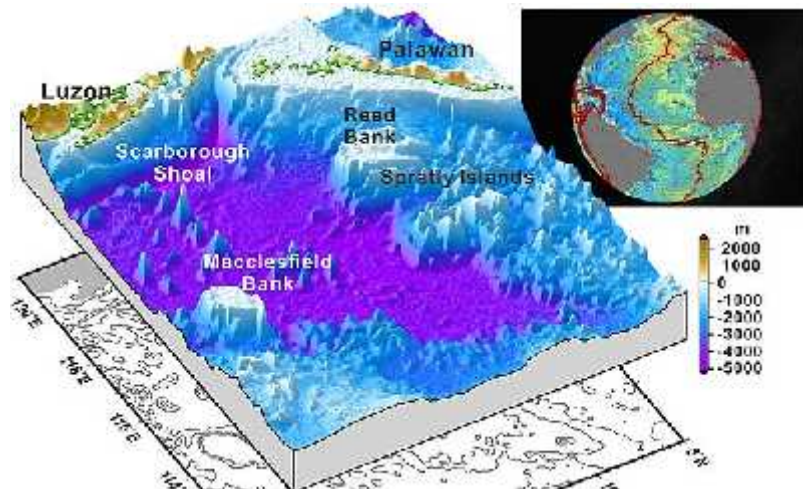


Figure (1): earthquake App

1.3.2 Model fitting and data analysis

Appropriately tune models or solve equations to reflect observations, subject to model constraints (e.g. oil exploration geophysics, computational linguistics).

Use graph theory to model networks, such as those connecting individuals, organizations, websites, and biological systems.

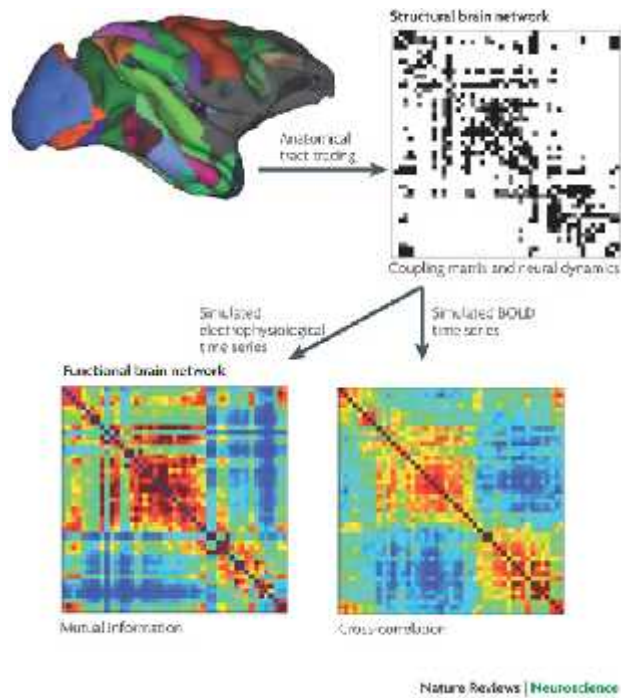


Figure (2): Complex Brain Network

1.3.3 Computational optimization

- Optimize known scenarios (e.g., technical and manufacturing processes, front-end engineering).
- Machine learning



Figure (3): Machine Learning

1.4 Examples of Programming Interface

Programming has many paths of application, one of these sciences is physics; specifically applied physics such as gaming, medical applications, and radio applications. Shown in figures bellow.

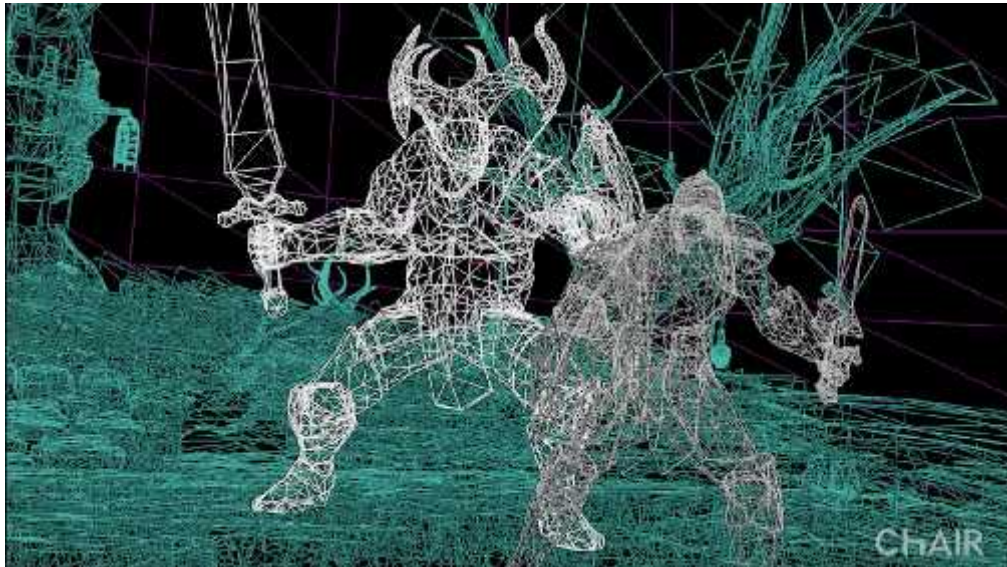


Figure (4): Game Design

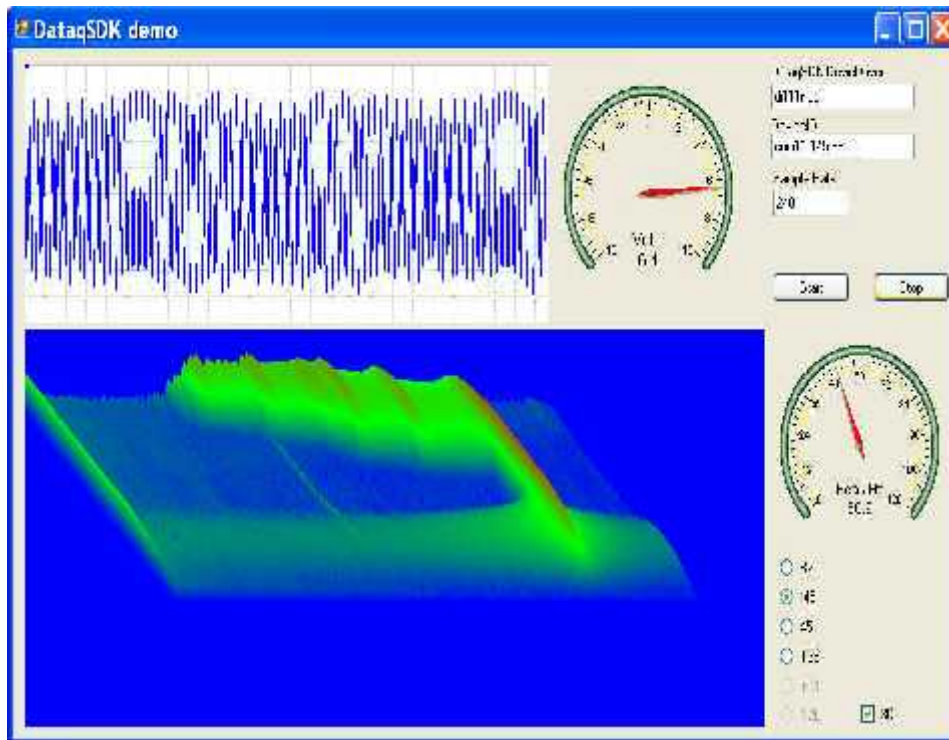


Figure (5): Data Analysis App



Figure (6): Radio App

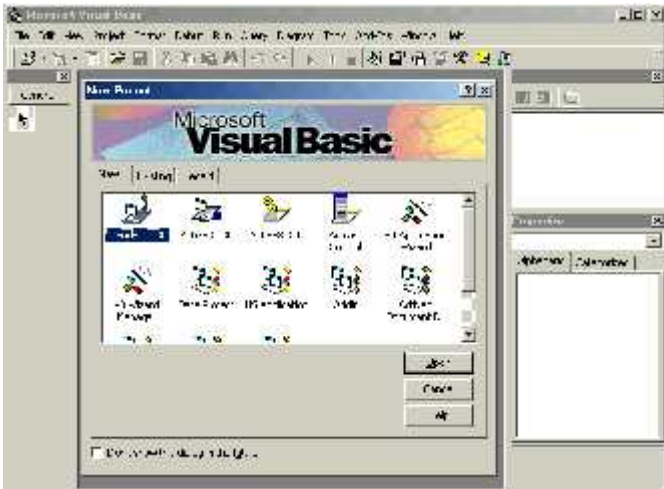
2. Visual Basic Interface

Visual Basic implements graphical user interface that allows the use of graphics for different applications. It provides visual interactive windows with user, like Dialogue box for (color, font ...), Input box, and Output box. Also it is able to create menu to simplify user application.

To run this program on user computer:

Start>programs>Microsoft Visual Studio 6.0>Microsoft Visual Basic 6.0.

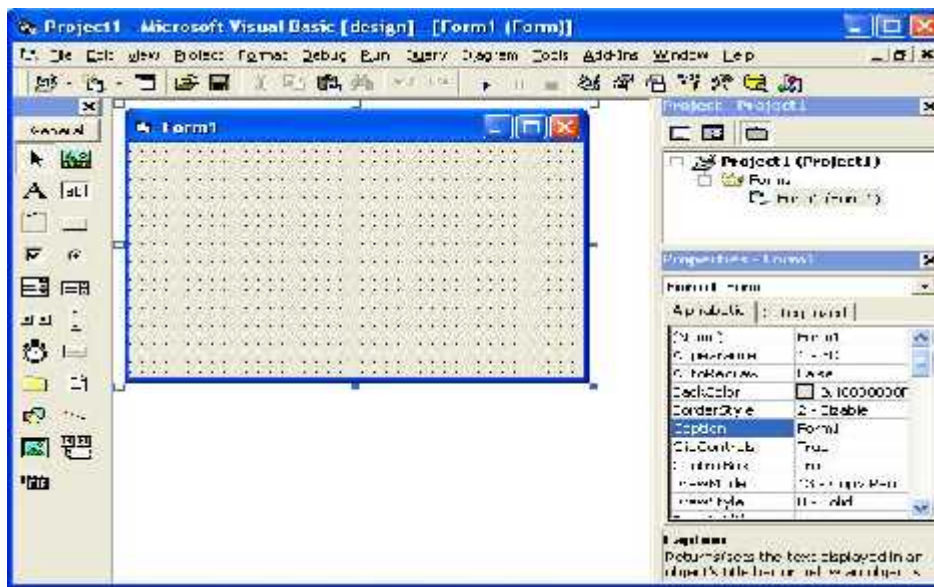
It will appear on the computer screen as in the following picture.



To exit from Visual Basic and return to Windows is like exit from most Windows applications. There are three ways to close the Visual Basic as stated below.

- 1- Click on close button icon that appears in the upper-left corner of the screen.
- 2- Press Alt+F4
- 3- Select File >Exit

The main window in Visual Basic will look like:



2.1 The Visual Basic 6.0 programming environment.

The Visual Basic environment consists of seven main windows which are

1. Menu Bar
2. Toolbar
3. Toolbox

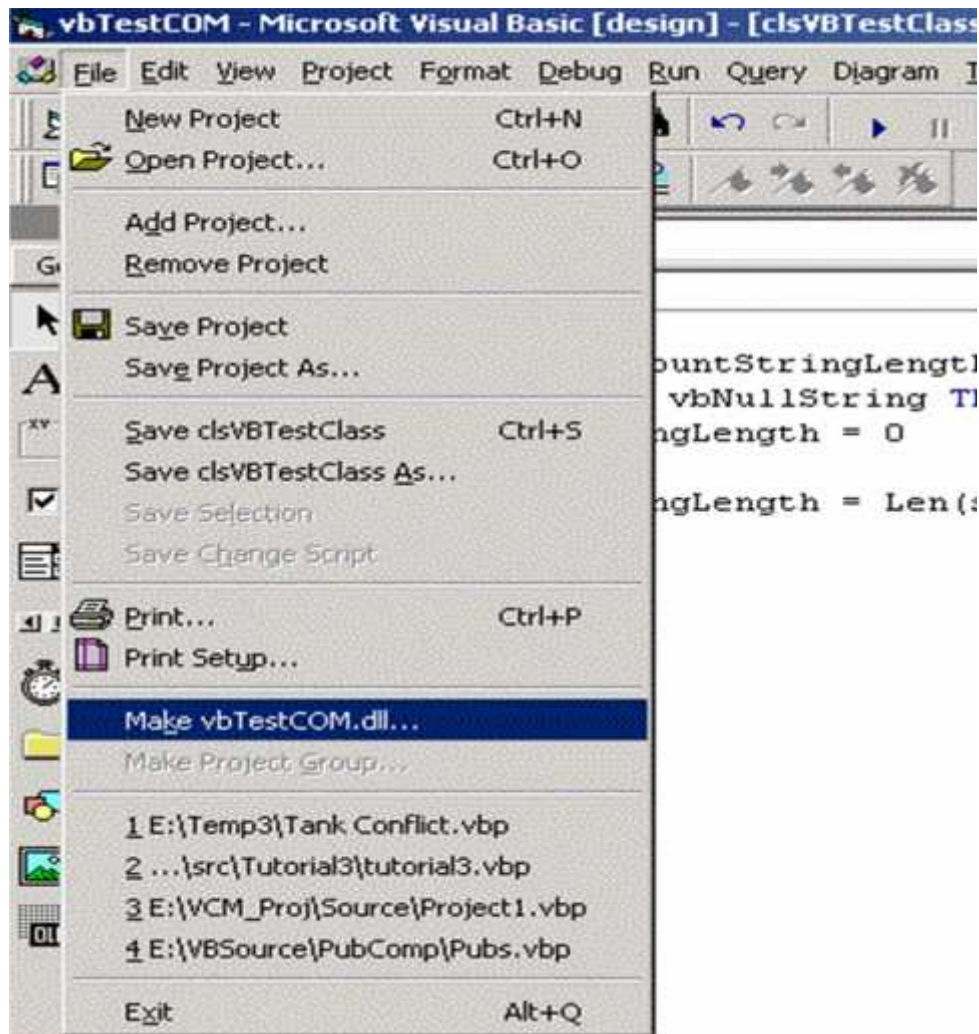
4. Form window
5. Code window
6. Project window/ explorer
7. Properties window

2.1.2 Menu Bar:

It contains a standard command like: File, Edit, View, Window, Help menus, and specific command such as: Project, Format, or Debug menus. Menu Bar displays the commands that are required to build an application. The main menu items have sub menu items that can be chosen when needed. The toolbars in the menu bar provide quick access to the commonly used commands and a button in the toolbar is clicked once to carry out the action represented by it.

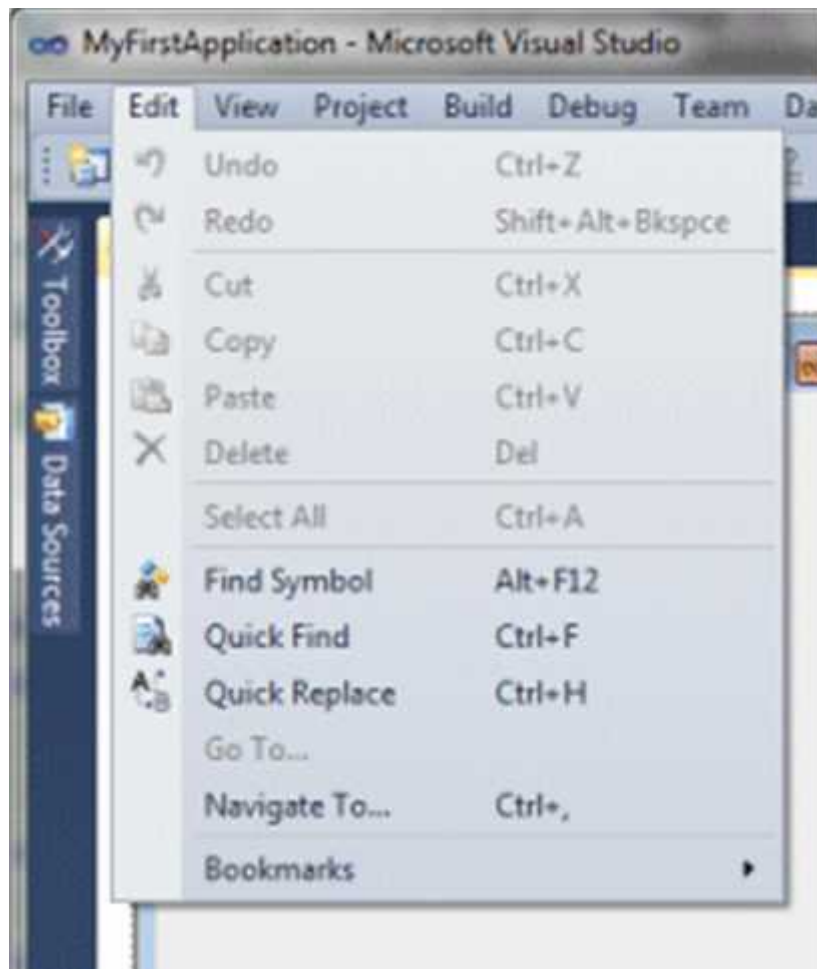


a- File:-



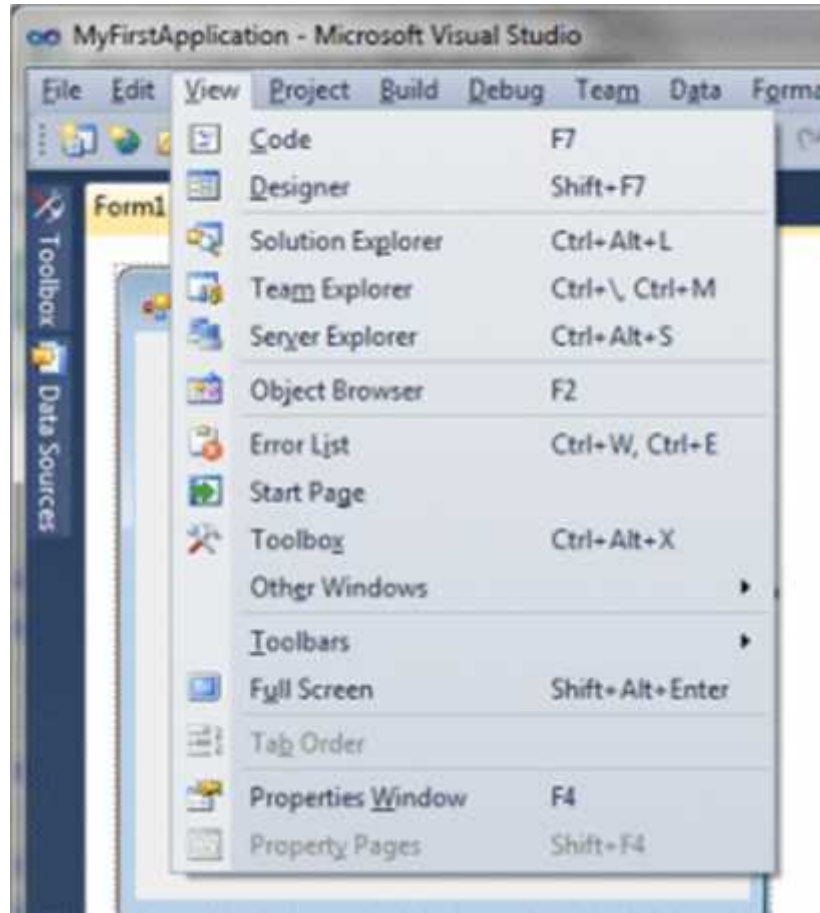
- New Project : to create new project
- Open Project : to open an existing project.
- Add Project : to add another project.
- Remove Project: to delete the current project.
- Save Project: to save your current project.
- Print : to print the project.

b- Edit :



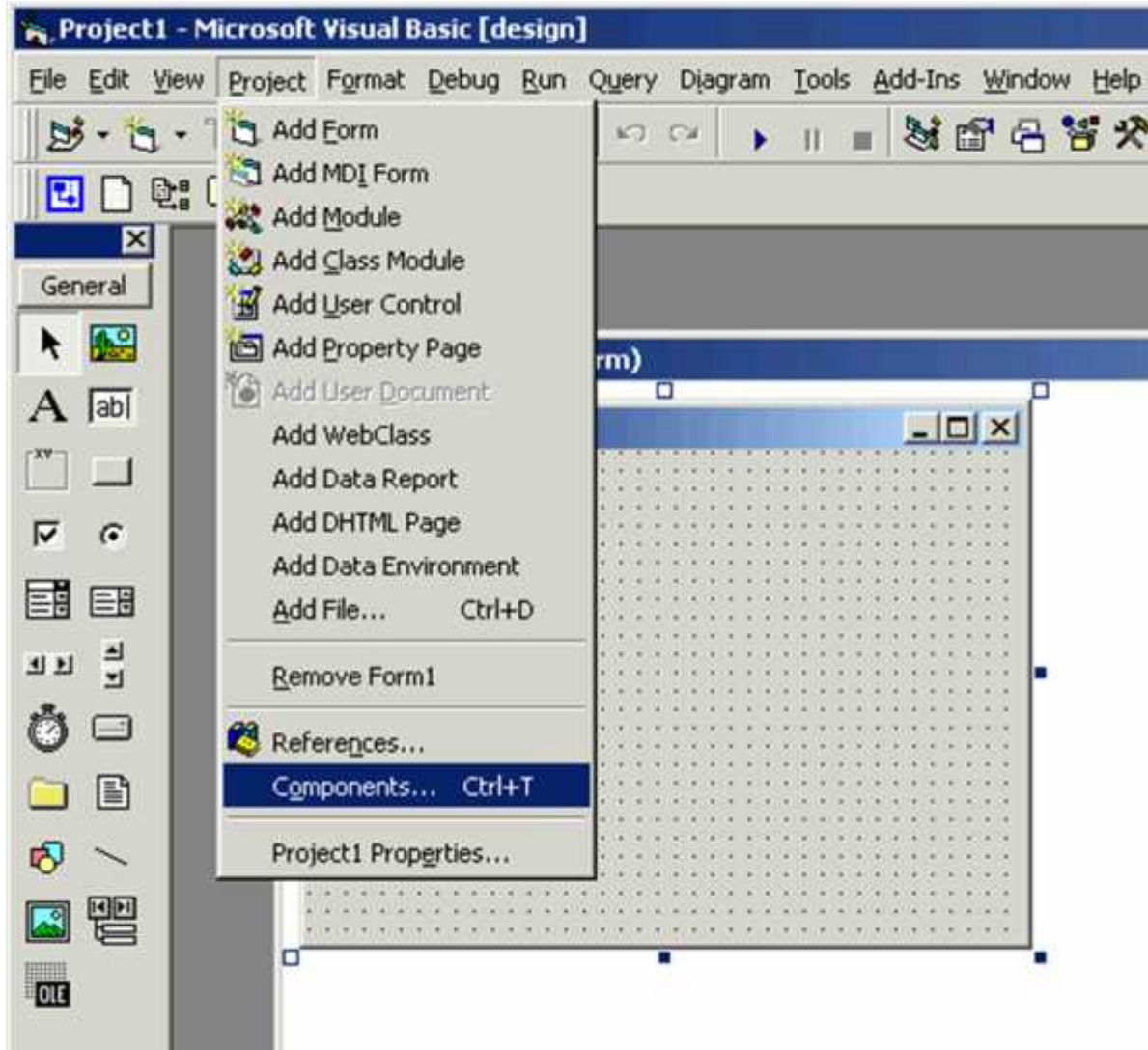
- Undo : to undo n order that you made
- Redo : it's the opposite of Undo ,it's to return back the order you made.
- Cut: to cut a text or anything from the form.
- Paste: to paste a text or anything in the form.
- Delete: to remove a text or anything from the form permanently.

c- View:



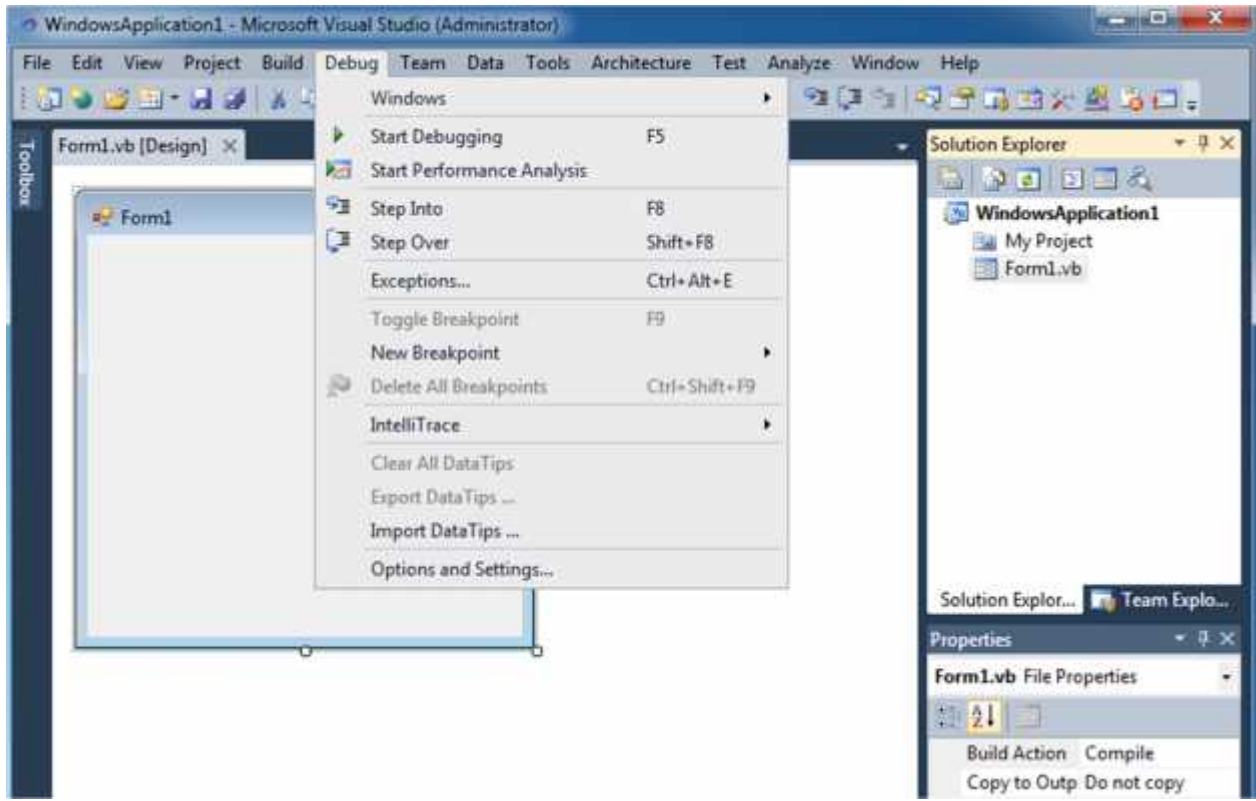
- Code: to view the code that you wrote for your program.
- Solution Explorer: to show it on the main window in Visual Basic.
- Tool Box : to show it on the main window in Visual Basic.
- Properties Window: to show it on the main window in Visual Basic.

d- Project:



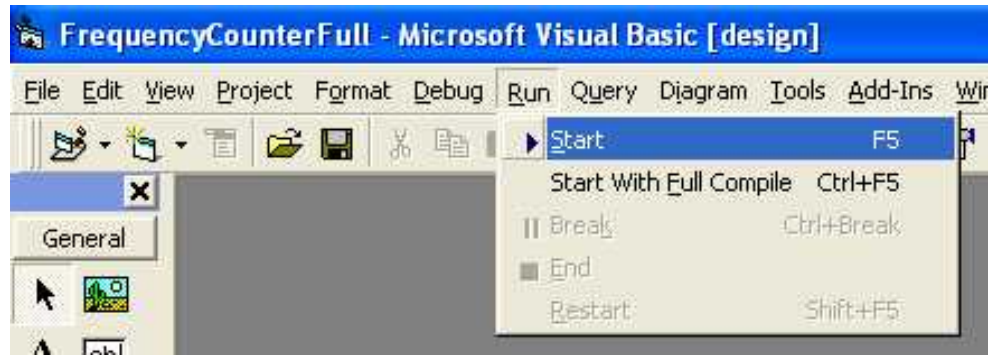
- Add Form: to add new form to your project.
- Add Module: to add new Module.
- Add File: to add new file.
- Project Properties: give the properties and details of your project.

e- Debug:



- Start Debugging: to start testing your code for error before running the program.
- Step into: to debug your program code by code
- Step Over: to debug your program code by code and it used to skip your line of code.

f- Run :



-Start: to start executing your code.it means to show results.

2.1.2 Tool Bar

It contains the most commonly used commands (button), if clicked an action represented by that button is carried out.



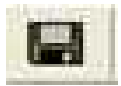
to create new project.



to create a new form.



to open new project.



to save the current project.



to cut , copy and paste.



to undo ,redo .



to run the program.



to stop the program from running.

2.1.3Tool Box :










it contains a collection of tools that are needed for project design. It is a window box that contains tools which could be used^{ox} in the project.

Tools are objects that could be selected from Toolbox to be placed on form.













To show the toolbox, Press toolbox icon > the toolbox 



The toolbox includes many tools and in general they are:

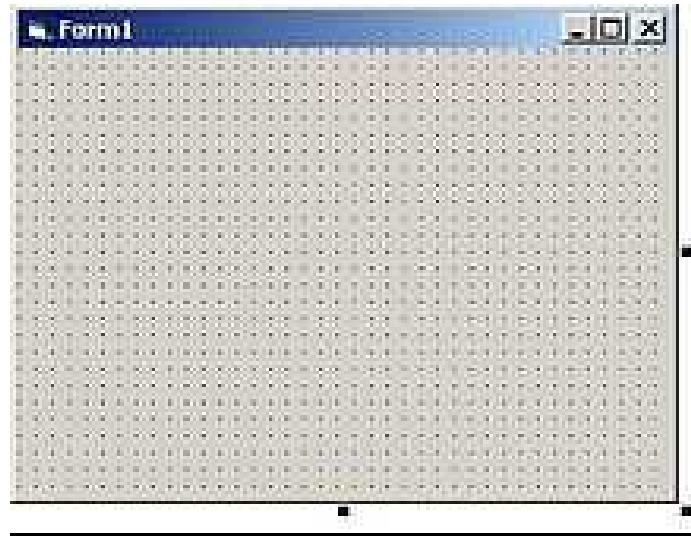
- 1) Pointer (not control)  used to select tools already on form
- 2) Picture box  : Used to display images in any of the following formats: BMP, DIB (bitmap), ICO (icon), CUR (cursor), WMF (metafile), EMF (enhanced metafile), GIF, and JPEG.
- 3) Label  Fixed text appears on form for remark.
- 4) Textbox  For text edit .Like note pad.
- 5) Frame  To group tools together (container).
- 6) Command button  Used as a switch (such as OK and Cancel) buttons. Code is written in the *Click* event procedure of this control
- 7) Check box  For a yes/ no (true /false) selection.
- 8) Option button  : For selection as group. Many options are placed inside container (grouped) (a Frame control). One control is selected from the group all others of the group are automatically deselected.
- 9) Combo box  : consists of (list and arrow when clicked a small a list appears), if user selects item from the list, it will be displayed in

TextBox. Vertical size is fixed.

- 10) List box  For a list, user adds to and deletes from this list. It takes any size.
- 11) Horizontal Scrollbar  Create stand-alone Horizontal scroll bars.
- 12) Vertical Scrollbar  Create stand-alone vertical scroll bars.
- 13) Timer  Used to control object movement.
- 14) Drive List Box  is a special ListBox filled automatically with names, of the files in a specified directory. It is a list invariant.
- 15) Dir List Box  is a special ListBox filled with drives (Hard disc, Floppy, CD) in the system. It is an invariant.
- 16) File List Box  It is a special ListBox filled automatically with the names of all DirListBox. It is a list invariant.
- 17) Shape  Used only to display rectangles, circles, and ovals on the forms. Never raises any events
- 18) Line  Used only to display lines on the forms. It never raises any events.
- 19) Image  : Used instead of PictureBox because it consumes fewer system resources.
- 20) Data  used for data base.
- 21) OLE  used for joining with another programs.

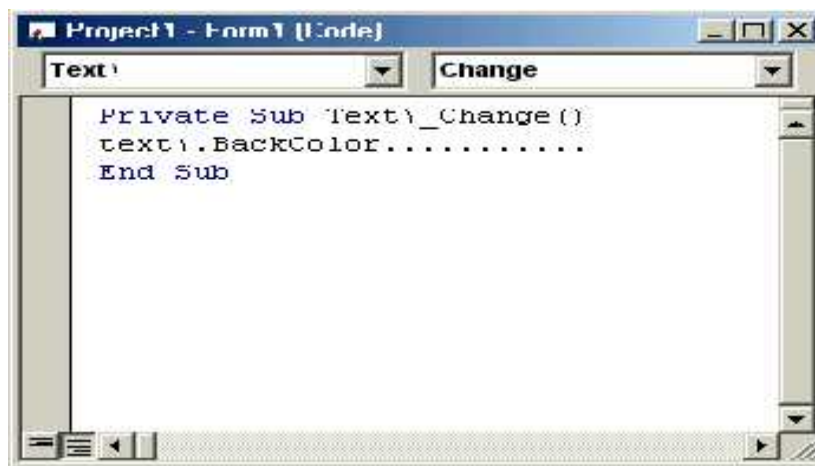
2.1.4Form Window:

form Designer: it is a window for each form to customize the designed interface of the application. Using the form designer, the user can add controls, graphics, and text to create the desired form appearance.



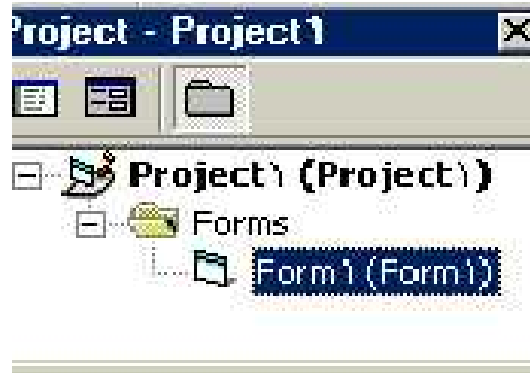
2.1.5 Code Window:

Code Editor Window: Code Editor Window is used to write a VB code for an application. For each form there is a separate code editor window. It is displayed when user clicks on form or object in form.



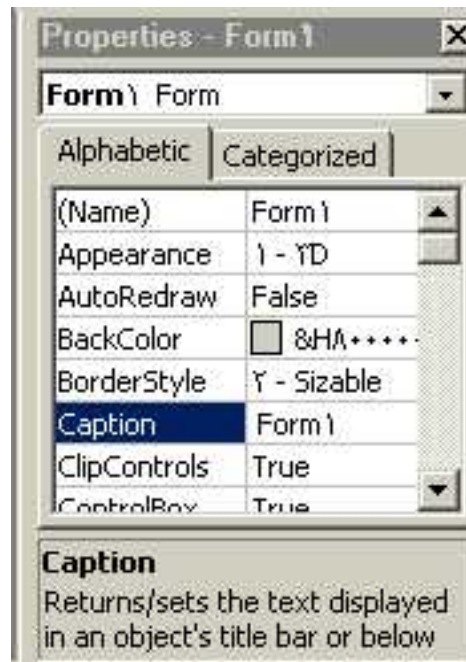
2.1.6 Project window/ explorer

it is a list of the forms and modules for the current projects. It is a hierarchical tree- branch structure, where the project at top of tree and other parts like forms ,modules) descend from this tree.



2.1.7 Properties Window:

it is a List of properties settings for a selected form or a control. These properties are characteristics (such as size, visible, or color) of the selected object it provides an easy way to set properties.



3. Tool Box & Form:

The user can place the tool on form and then work with the tool. To place the tool on form:

Click on tool > Draw tool to Form > the tool appears on Form.

Or: double click on it.

Notes:

a) Each tool has a property window .To see this window: Click on tool on form >

Property window appears.

b) Property can be changed manually or by code and the effect of code appears in the run time (when user runs project).

c) To put code for tool action:

Double click on tool > code sheet of the Form appears (with code of corresponding tool is written) > User write the desired code inside tool event, or outside in Form event.

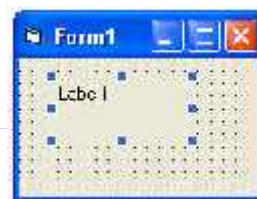
3.1 Working With Tools

The user can work with tool in the design stage.

- **To add tool:** double click on tool. Tool appears on form or drags it to design part of page and draw it in the desired size.
- **To delete:** click on element in page > press delete key of the key board or right click on object for mouse list > choose delete.
- **To display tool properties window:** click on element > properties window appear.
- **To display code form:** double click on tool code form for that element.

3.1.1 Label:

It is used to display fixed text on form

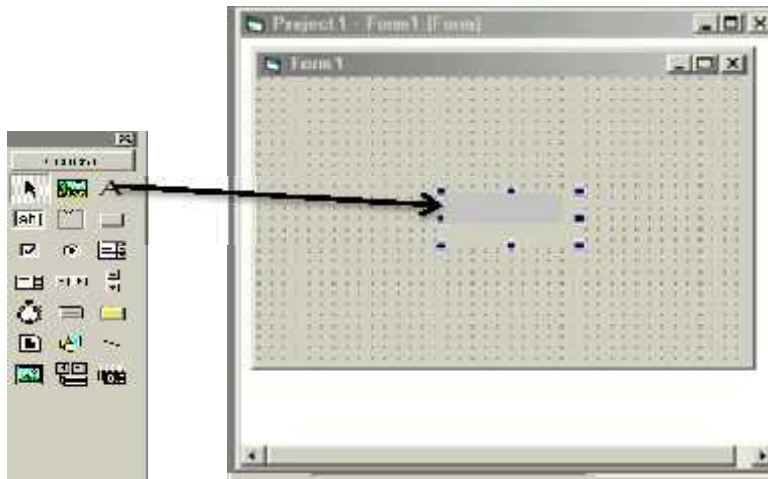


Property name	Objective	Code	Stage of Changing
Caption	String appear on label	labelno..caption= "any name"	Design and run
Autosize	To resize tool to fit text	labelno..autosize= true or	Design and run
BackColor	Background color for	labelno..BackColor=Qbcolor(n	Design and run
ForeColor	Color of text written on	labelno..forecolor=Qbcolor(n	Design and run
Font	Font style, type and size	Size: labelno..fontsize= no. Style: <input type="checkbox"/> <i>italic</i> <input type="checkbox"/> bold <input type="checkbox"/> <u>underline</u> Type: label.FontName =	Design and run
visible	The label appear or	Labelno.visible= true or false	Design and run
Enabled	The label enable or	label no.. Enabled =true or	Design and run

Example(1): Design a form contains label "Applied Science " in size 14.

Sol: the properties are:

Label1	
caption	Applied science
fontsize	14



3.1.2 Textbox

The textbox is a box for entering and displaying text (characters or values) in user project. This tool is used frequently in most of the application. The textbox has property window, with no caption, but with space for text. The most important property of this tool is the text content which is described in the following:

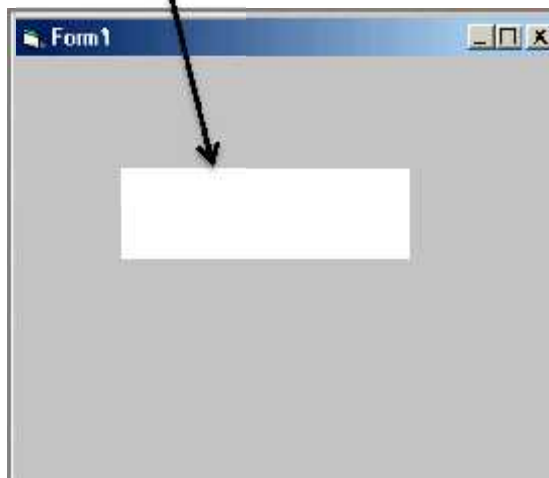
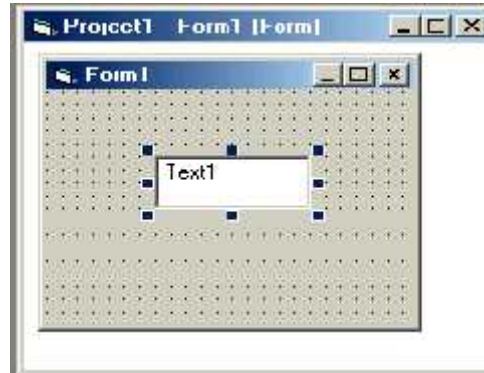
Property name	Objective	Code	Stage of Changing
Text	String appear on textbox	text no.. text = "any name"	Design and run
multiline	To enter more than one line	true or false	Design
BackColor	Background color for textbox.	text no..BackColor=Qbcolor(no.)	Design and run
ForeColor	Color of text written on textbox.	text no..forecolor=Qbcolor(no.)	Design and run
Font	Font style, type and size.	Size: text no..fontsize= no. <input type="checkbox"/> italic	Design and run
visible	The textbox appear or disappear	text no.visible= true or false	Design and run
Enabled	The textbox enable or disable.	text no.. Enabled =true or false	Design and run
passwordchar	A row of symbols appear instead of letters	Textno.passwordchar=(symbol)	Design and run
Setfocus	Put the focus on the specified textbox	Textno.setfocus	Run

Example(2): Design a form contains text " ".

Sol: the

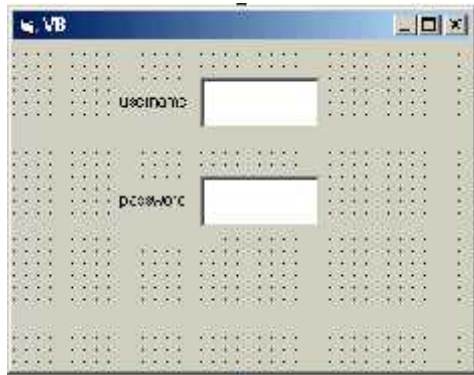
properties are:

Text1



Example (3): Design a form to enter username and password such that the title of the form is VB.

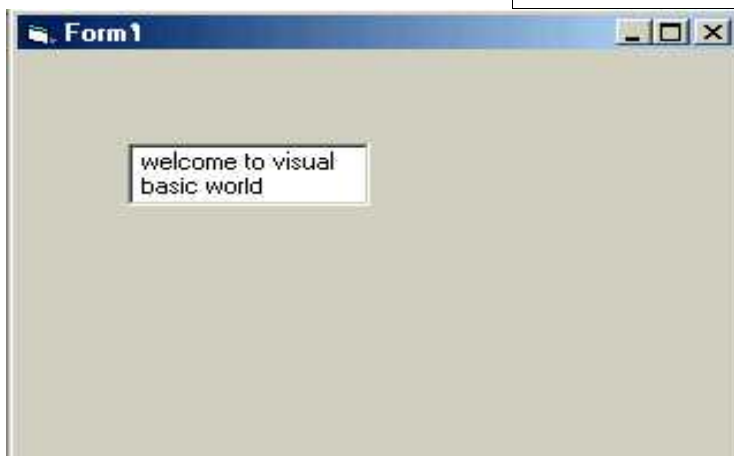
Sol: design stage



Form1	
caption	V.B
Text1	
text	
Text2	
Text	
Label1	
caption	username
Label2	
caption	password

Example (4): Design a form with one textbox, set the text properties so that this message appears when project runs (welcome to visual basic world).

Text1	
Name	Welcome to Visual Basic

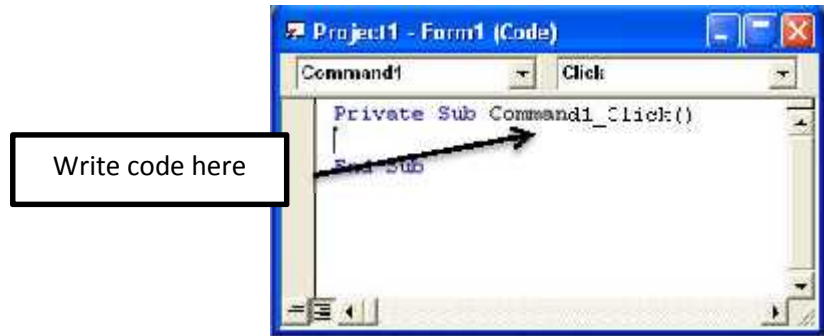


3.1.3 Command button

It acts as a switch. To deal with tool property> click on command button> property window appear> change setting of any desired property. Usually change set its caption property to a suitable string.

To make the button functional, the user should add some code. To do this: click on command tool> code form appears with click event procedure. Write code in this

event or other events like press key event.



The most familiar properties that are needed for the command button are stated in the table below.

Property name	Objective	Code	Stage of Changing
Caption	String appear on command	command _{no.} .caption="any name"	Design and run
style	Determine the style of command	1-graphical 0-standard	Design
BackColor	Background color for command	command _{no.} .BackColor=Qbcolor(no.)	Design and run
ForeColor	Color of text written on command	command _{no.} .forecolor=Qbcolor(no.)	Design and run

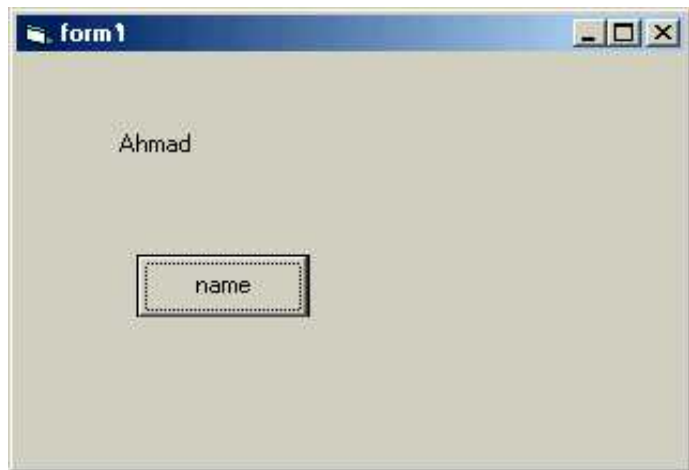
Font	Font style, type and size	Size: <code>command_{no.}.fontsize= no.</code> Style: <i>font</i> { <i>italic</i> <i>bold</i> <i>underline</i> Type: <code>command_{no.}.FontName =</code> "arial"	Design and run
visible	The command appear or disappear	<code>command_{no.}.visible= true or false</code>	Design and run
Enabled	The command enable or disable.	<code>command_{no.}. Enabled =true or false</code>	Design and run

Example (5): Design a form with label, such that when click on the command button

"name" your name appears on label (at running stage).

Sol:

Label1	
caption	
Command1	
caption	name



```
Private Sub  
Command1_Click()  
Label1.Caption =  
"Ahmad"  
End  
Sub
```

Example (6): Design a form contains two textbox so that when click on command button

"copy" the text copied from first textbox to the second textbox but in size (28).

Sol:

Text1	
text	
Text2	
Text	
Command1	
caption	copy

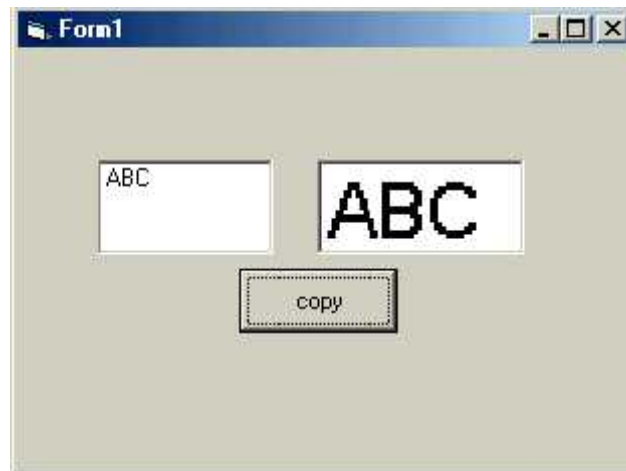
```
Private Sub Command1_Click()
```

```
Text2.Text = Text1.Text
```

```
Text2.FontSize = 28
```

```
End Sub
```

If the user enter by example the text (ABC) in first textbox and click on command (copy) the same text appear on the second textbox but in size 28.



Example (7) : Design a form that has a label when click on button it show the text and when we click on the other button it hide the text.

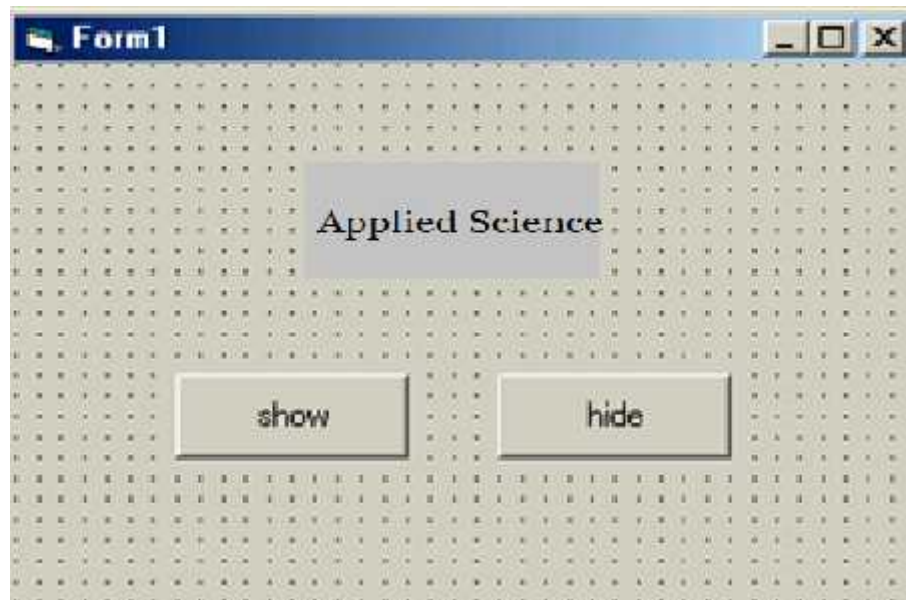
Sol:

Form1

Label1: caption="applied science"

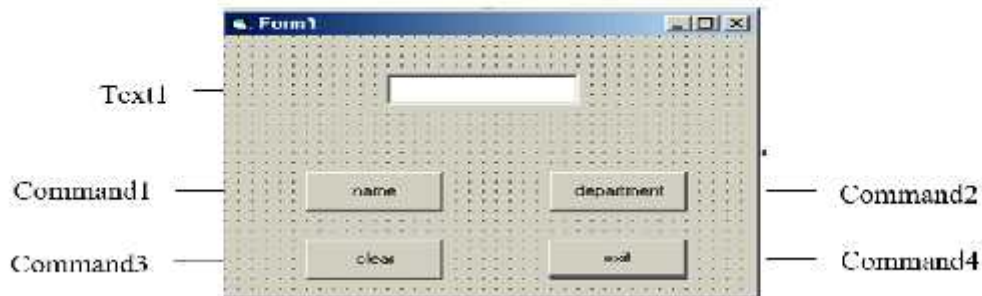
Command1: caption="show"

Command2: caption="hide"



Example (8): Design a form to appear your name and department in textbox, when click on command button "name" and "department" respectively so that you can clear these information when click on command "clear" and stop project when click on command "exit".

Sol:



Text1	
text	
Command1	
caption	name
Command2	
caption	department
Command3	
caption	Clear
Command4	
caption	exit

```
Private Sub Command1_Click()
Text1.text="Muna"
End Sub
```

```
Private Sub Command2_Click()
Text1.text="Science"
End Sub
```

```
Private Sub Command3_Click()
Text1.text=" "
End Sub
```

```
Private Sub Command4_Click()
end
End Sub
```

Exercises

Q1/design a form contains specific title such that when we click on command1 the color of the font will change and we click on command2 the size of the font will be change.

Q2/design a form contains shape and command buttons "what is this" such that when click on the command button the name of this shape appears in message box.

Q3/enter a text in label1 such that this text copied to label2 after click on command button "copy" and delete from label2 after click on command button "delete".

Q4/ design a form contain command button such that when we click on command, form2 will be appear and form1 will be disappear.

Q5/design a form "at run stage" the title of form1 will be change to "visual basic" and the back color of form1 will change too.

Q6/design a form with two shapes, red and blue ,write code to replace the color every between two shapes.

Q7/ design a form contain list box and two command buttons:

- 1- add: to add the element to the list from input box
- 2- delete: to delete the list elements

References

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- Root, Randal; Romero Sweeney, Mary (2006). *A tester's guide to .NET programming*. [Apress](#). p. 3. [ISBN 978-1-59059-600-5](#). You can choose a language based on how easy it is to learn. For beginners, Visual Basic is a good choice. [~snip] A big advantage of Visual Basic is that it is a popular language because it is easy to learn.

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