

## **VISUAL BASIC**

### **COMPUTER PROGRAMMING LANGUAGES:-**

The computer languages can be categorized based upon the following criteria:

1. Low level language
2. Procedural and event oriented
3. High-visual & Low visual
4. Interpreted and compiled

### **LOW LEVEL LANGUAGE:-**

A computer language can be described as a low level or a high level language.

**Low level languages** are close to the machine language. The machine language consists of 0 & 1. The program written in machine language work with great speed. Assembly language is an example of low level languages.

**High level languages** are people oriented. The instructions in these languages are more like human languages. BASIC, FORTRAN, COBOL, PASCAL, etc are examples of high level languages.

### **PROCEDURAL EVENT AND EVENT ORIENTED:-**

The program written in procedural oriented languages are executed without any action by the user. A computer program written in a procedural oriented language is executed, statement by statement until all the code is executed. Procedural languages are high level languages.

### **HIGH-VISUAL & LOW VISUAL LANGUAGES:-**

Computer languages can also be described as low visual and high visual languages. In low visual languages it is often difficult to design computer forms and reports. High visual languages on the other hand support GUI (graphic user interface). These languages provide easy method for designing forms, reports, data entry screens, etc. visual basic language is an example of high visual language.

### **INTERPRETED AND COMPILED LANGUAGES:-**

Visual basic is both an interpreted and a compiled language. When the visual basic program is developed, it is executed in interpreted mode. After completed the program, it is compiled and the compiled program is used.

### **HISTORY OF VISUAL BASIC:-**

Visual basic evolved from BASIC (Beginner's all-purpose symbolic instruction code). Basic was developed in the 1960s by the professor John Kemeny and Thmoas Kurtz of Dartmouth College. It was developed as a language for writing simple programs to help the people learn how to program. BASIC becomes a

popular language. Its new version developed in 1980s and next in 1990s. Since 1991, eight version of visual basic have been released.

Visual basic is a Microsoft windows programmiual basic. These are the learning edition, professional edition and enterprise editionng language. Visual basic greatly simplified writing of window application program. It provides an integrated development environment (IDE) for creating application. The environment in which a programmer can create, run and debug a program is called IDE.

### **VERSIONS OF THE VISUAL BASIC:-**

There are the three basic version of vis. Each edition provides specific features and is suitable for a specific set of environment.

#### **VISUAL BASIC LEARNING EDITION:-**

The learning edition provides basic programming features. This edition used by students in educational institutions for learning the language.

#### **VISUAL BASIC PROFESSIONAL EDITION:-**

Professional edition provides full features of the language. It is used by professional programmers to develop visual basic application programs for commercial purposes.

#### **VISUAL BASIC ENTERPRISE EDITION:-**

Enterprise edition provides features for creating a distributed application program.

### **Some Common Object Properties:-**

#### **1: Name:-**

This property specifies the name of the object. This name is used by

Visual basic refers to the object in the code.

There are certain rules for naming an object in visual basic. These rules are

- The name of an object must begin with alphabetic character.
- It can contain letters and numbers.
- It cannot contain some special characters.
- A name can be in small or capital letters. Any combination of capital and small letters can be used.

A three letter prefix is used with the name of an object. This prefix is used to help identify the type of the object or control just by looking at its name. The

prefix is written in small letters and the name of object is written by the combining capital and small letters.

Control	Default Name	Prefix
Text Box	Text 1	txt
Label	Label 1	lbl
Command Button	Command 1	cmd

**For example:-**

If a form contains three command buttons enter, cancel and exit then these buttons may be named as

**CmdEnter, cmdCancel, cmdExit**

**Caption:-**

The text that is display as title on the object is called its caption. It is used to identify the object on the form.

**For example:-**

If a button is used to exit from the program, its caption is specified End.

**Visual Basic Project Extension and Description:-**

A visual basic object consists of a number of components. Each component is stored in a separate file with a unique file extension.

File Type	Extension	Description
Basic Module	.BAS	The module code is saved in this file.
Class Module	.CLS	The class module is saved in this file type.
Form	.FRM	Each form is used in the project is saved as a separate file in this file type.
Binary	.FRX	Icon or pictures property values are saved in this file type.
Log	.LOG	The errors are saved in this file type.
Resource	.RES	Binary and string data is stored in a single resource file with RES extension.
Project	.VBP	Each project is saved in this file type.
Work space	.VBW	The workspace of a project is saved in this file type.

**Naming A Project:-**

A new project is started; it is named as project 1 by the visual basic IDE.

This name appears at top of the project window. The name of the project can be changed. It is changed using project properties dialog to change the project name:

- Chose project 1 properties from project menu to display project properties dialog box.

- Type new name of the project in the project name text box and click ok.

### **Saving A Project:-**

New project is saved on a disk with a unique name. The project is saved using save project or save project as command from the file menu. Save project as command is used to save a project for the first time or to save a copy of the project.

When a project is saved, each form and module is saved in a separate file. The visual basic project is saved in a file with an extension .VBP (visual basic project).

### **Running A Project:-**

Visual basic IDE provides facilities to execute or run a project without creating its executable file. There are three ways of doing this

- Using the toolbar icons
- Using the menu options
- Using keyboard shortcuts

### **Executing Project:-**

When a project is running the toolbar changes and the pause and stop icons on the bar become available.

- Click on start icon in the toolbar
- Select start from run menu
- Press F5

### **Stopping Project:-**

To terminate the execution of project:

- Click on end icon in the toolbar
- Select End from run menu

### **Debugging:-**

Errors in program are called “bugs” and tracking and removing these errors is called debugging. These can be three main types of error in a program.

These are

- Syntax errors
- Run time errors
- Logical errors

### **Syntax Errors:-**

Every statement in visual basic has a specific way in which it is written. This is called syntax. Each statement must be written strictly according to its syntax.

If the syntax is even slightly wrong, the program does not work. These errors may be a misspelled command, missing brackets, using commas instead of a period, or using incorrect parameters.

In visual basic code is written in the code window, when a statement is written and the enter key is pressed; the code window checks the syntax of the statement. If there is any syntax errors the statement appears in red color and dialog window appears. The dialog window indicates the compile error and also suggests the possible correction.

To remove the error, click ok on the dialog window and make the required correction.

### **Run Time Errors:-**

These errors occur during the execution of the project. These errors cause the program to stop working.

#### **For example:-**

These errors occur when a value is assigned to a variable that is too large for it or an incorrect data type is assigned to a variable. When such error occurs, the visual basic stops running the project and displays the following dialog box.

Clicking the end button stop the project and return to the code window.

Clicking the debug button pause the execution of the project. It returns to the code window and highlight the line which contain the error. Remove the error and click continue button on the toolbar to resume the execution of the project.

### **Logical Errors:-**

The logical errors are difficult to locate and correct. These are found by running the project line by line and checking the values of variable at every step. The visual basic provides various tools for tracking down these errors. These tools are available in the debug menu or in the debug toolbar.

### **Basic Components of Forms:-**

The form is the most basic object in the visual basic. The basic components of the form are:

- **Border:-**

The four edge of the form are called its border. The border can have different styles. It is used to increase and decrease the size of the form window.

- **Title bar:-**

The colored bar on the top of the form is called the title bar. The bar is used to drag the window on the computer screen. Double clicks on the title bar maximize/restore the window.

- **Caption:-**

The name of the form is display as its caption. It is used to identify the form. The caption is also display the current function of the form.

- **Control menu:-**

It is a simple menu that contains various commands to restore, move, resize, maximize, minimize and close the window.

- **Minimize button:-**

This button is used to minimize the form window. When the window is minimized, it is hidden from the computer screen and is displayed as a button on the taskbar.

- **Maximize/Restore button:-**

This button has two purposes. When the form window is in its normal or original size, this button maximizes the window.

- **Close button:-**

This button is used to close the form window.

## **Changing form properties:-**

The appearance and behavior of the form is defined by its attributes or properties. These are specified in the properties window. The property window can be displayed by any one of the following methods.

- By pressing F4 function key.
- By choosing view > properties window
- By right clicking on the form and then selecting properties option from the pop-up menu.

There are more than 50 properties of form that can be specified but some commonly used properties of forms are:

Name , caption , border style , background color , control box , foreground color , font properties.

- **Form Caption:**

The title that appear on the top of the form is called caption. By default the caption of first form is form 1. The caption property is used to add a title to the form.

To change caption , select caption in the property dialog box and type the new title in the box next to the caption property.

- **Form Name:**

Each form has a unique name. This name is used while referring to the form in the visual basic code. The form is identify by its name and not by its title or caption.

To change name of the form , select name of the property dialog box and type the new name.

- **Border Style:**

The appearance of the border of the form is called border style. This property specifies whether or not a form can be maximized, resized, etc  
There are six type of border style that can be used

- To select a border style clicks the drop down arrow and selects any one of the border style.
- To display the border style, click on border style to give it the focus in the properties window and press F<sub>1</sub> function key. Visual basic help will display the six border styles and their effects.

- **Background Color:**

Back color property is used to define the background color of the form. The color setting are defined is hexadecimal number , since it is difficult to remember color code of numbers, visual basic IDE provide a color plate. A color for the plate may be selected. To display the color plate, double click on the back color setting and click plate. Click the color that is to be applied to the form background. When the color is selected its hexadecimal value is appear in the respective text box.

- **Control Box:**

The control box is the box that appear on the top left corner of the form and contain minimize, maximize, restore and close button. There are two settings true and false. When the property is set to true, the control box is displayed. If the control box property to false, disables the control box.

- **Foreground color:**

Fore color property determines the foreground color on a form. The foreground color is the color of text and graphics that are displayed on the form.

- **Font properties:**

The text on a form is displayed in a format that is defined in this property. To specify a font and its attributes:

- Open properties window
- Highlight font property
- Click the ellipsis to display font dialog box
- Set the required set property and click ok

## **Variables:-**

A quantity that might change its value during the execution of a program is called the variable. The value of variable may be numeric or a non-numeric quantity.

A variable name is made up of one or more alphabet or alphanumeric character and is written according to the following rules:

1. A variable name may be a combination of letters, numbers and
2. The uppercase and lowercase alphabet may be used in a variable name.
3. The visual basic reserved words cannot be used as variable names.
4. Maximum length of a variable is 255 characters.
5. The first character must be an alphabetic.
6. Blank spaces are not allowed a variable name.

### **Types of Variable:-**

The types of variable determine the type of data it can hold. These are four major categories of variable types in visual basic. These are

1. Numeric variable
2. String variable
3. Special variable
4. variants

### **Numeric Type Variables:-**

The variables that can hold only the numeric data are called numeric type variable. There are five numeric type variables in visual basic. These are integer, long integer, single, double and currency.

#### **1. Integer Variables:-**

The whole numbers without a decimal part are called integer. In visual basic, an integer takes 16 bits or 2 bytes of memory. Its value can be from -32768 to 32767. Integer type variables are used to hold integer data.

#### **2. Long integer Type Variables:-**

Long integer type data is also an integer type data. A long type integer takes 32 bits or 4 bytes of memory. Its value can be from -2,147,483,648 to 2,147,483,647. Long type variables are used to hold long data.

#### **3. Single Type Variables:-**

Single precision numbers are also called floating-point numbers. They are the numbers that consist of both a whole number and a fractional part. A single precision number takes 32 bits or 4 bytes of memory. For positive numbers its value can be from 1.401298 to 3.402823 and for negative number, its range is from -3.402823 to -1.401298. Single type variable are used to hold single precision data.



#### **4. Double Type Variables:-**

Double precision numbers are also floating point numbers. They take twice as many bytes compare to single precision numbers. They are used to store very large number and very small number. For positive numbers its value can be from 4.94065645841274 to 1.79769313486232 and for negative number, its range is from -1.79769313486232 to -4.94065645841247. Double type variable are used to hold double precision data.

#### **5. Currency Type Variable:-**

Currency type data is used to represent money calculation involving money. It requires 64 bits or 8 bytes in the memory. It consists of 15 digits to the left of the decimal and 4 digits to the right. Its range is from 922337203685477.5807 to 922337203685477.5808.

#### **String Type Variables:-**

The text type data is also called string or string type data. It consists of alphabets, digits, and special characters. String type variables are used to hold string data. In visual basic there are two types of string variables. These are

##### **1. Variable Length String Variables:-**

The string type variables in which the number of characters of the string is not specified are called variable length string variable. The maximum length of a string is 32 bits.

##### **2. Fixed Length String Variables:-**

String type variables in which the maximum number of characters of string is specified are called fixed length string variables.

#### **Special Variables:-**

Visual basic has several variables to hold special data type. These are

##### **1. Boolean Variables:-**

The data that can have either true or false value is called Boolean data and Boolean type variables are used to hold this data.

##### **2. Date Variables:-**

Date variable is used to hold date and time.

#### **Expressions:**

An expression is used to for calculating the value of a formula. It is a combination of different operands and operators. It gives a single value. The operands may be constants, variable names and/or function.

**For example:** To calculate the volume of box with sides A, B & C the expression is written as A×B×C

Where A,B,C may be a variable name or constant. These are called operands. The multiplication sign “×” is called operators. The combination of operands and operators makes an expression.

There are three types of expression in Visual Basic. These are

- Arithmetic expression
- Relational expression
- Logical expression

**Arithmetic Expression:-**

An arithmetic expression is used for calculating the value of an arithmetic formula. It consists of operands and arithmetic operators. It represents a mathematical formula.

Mathematical operator			
Operation	Symbol	Example	Result
Addition	+	7+6	16
Subtraction	-	9-6	3
Multiplication	*	4*5	20
Division	/	10/2	5
Exponentiation	^	3^2	9
Integer Division	\	5\2	2
Module	Mod	5Mod2	1

An arithmetic expression gives only one value after computing the formula. The type of the calculated value depends on the type of operands used in the expression.

There are seven types of arithmetic operators in visual basic. These are

**Addition:-**

Addition operators are used to add two numbers. The plus sign (+) is used to represent addition operators.

9+18=27

**Subtraction:-**

Subtraction operators are used to subtract one number from the other number. The minus sign is used to represent subtraction operator.

19-7=12

**Multiplication:-**

Multiplication operator is used to multiply two numbers. The asterisk is used to represent multiply operator.

$9*2=18$

**Division:-**

Division operator is used to divide one number by another number. The slash (/) is used to represent division operator.

$10/2=5$

**Exponentiation:-**

Exponentiation operator is used to calculate the power of a number. This is also called hat sign (^) is used to represent exponentiation operators.

$9^2=81$

**Integer Division:-**

Integer division is performed on two integers. The result of the integer division is also an integer. In integer division, the reminder or the decimal part in the result is truncated i-e it is simply dropped

$9\backslash 4=2$

**Modulus operator:-**

The mod operator is used to compute the reminder of division. It can be used only with integer and long integer data type.

$9\text{Mod}4=1$

**Relational expression:-**

An expression which tests the relation between two operands is called relational expression. It gives an answer of true or false after comparing the two operands. The operands may be variables, constant, or arithmetic expression.

Following relation operators are used in visual basic

Operators	Meaning
>	It is used to compare if the first operands is greater than the second operands A>B It will be true otherwise false
<	It is used to compare if the first operands is less than the second operands A<B It will be true otherwise false
>=	It is used to compare if the first operands is greater than or equal to the second operands

	A>=B It will be true otherwise false
<=	It is used to compare if the first operands is less than or equal to the second operands A>=B It will be true otherwise false
=	It is used to compare if the first operands is equal to the second operands A=B It will be true otherwise false
<>	It is used to compare if the first operands is not equal to the second operands A<>B It will be true otherwise false