week3

January 31, 2018

1 Variables and Data Types

- We have seen that variables are placeholders for data
- To use them in VB you must declare them
- Decleration is telling the computer to prepare a space in memory to store data and give it a name
- Decleration also tells the computer what the type of data well be

2 Example for Decleration

```
Dim myStr as String
Dim radius as Double
```

3 What Are the Available Data Types?

Type	Short	Description
Boolean	bln	True, False values
Short	srt	-32,768 to 32,767
Integer	int	-2,147,483,648 to 2,147,483,647
Long	lng	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
Double	dbl	Double precision floating point e.g. 10.123423
String	str	Text data

4 These are the main data types that we will need

4.1 But there are more that we will learn along the way

5 Rules For Selecting Variable Name

- Must not start with a number
- Can include only letters and numbers
- Must not include spaces
- Must not match the name of another VB command or variable
- **Recommendation:** Follow VB naming conventions to make your programs more readable

6 Variable Naming Conventions in VB

- Name consists of two parts:

1. Three letter in lower case to reflect the data type or control
    - See the short column from the data type slides
2. Capitalized or Camel Case word to tell us what the data is

7 Examples Of Variable Names that Follow Convention

- strName
- dblTaxRate
- intNumberOfStudents

7.0.1 Can you tell what they contain? and what the data type is?

8 Example of Variable Names NOT Following Convention

- x
- myVar
- nameStr
- int_number_of_students

8.0.1 What is the problem with each?

9 Exercise: Find Name, Data Type, and Errors

```
dim x as String
Dim X as Integer
Dim string as string
y as string
Dim z as Integer
Dim my name as String
Dim myName as String
Dim 1guy as String
```

10 Variable Initialization

- Is to set a value for variable during/after decleration to ensure that it is not in an unknown state

```
Dim intWeekDays as Integer = 7

'Alternatively

Dim intWeekDays as Integer
intWeekDays = 7
```

11 Remember, it is always good practice to initialize variables

12 Variable Assignment

- Can you remember what it is?

13 Variable Assignment

```
variable = expresions or value or variable
```

13.0.1 Assign the result or value of whatever is on the right, to the variable on the left

14 Variable Assignment

What do you expect will happen?

```
Dim x as Integer = "Hello"
```

15 Variable Assignment

What do you expect will happen?

```
Dim x as String = 5
```

16 Variable Assignment

What do you expect will happen?

```
Dim x as String = 5
Dim y as Integer = 5

MsgBox(x+y)
MsgBox(y+x)
```

17 Variables

- When you refer to a variable name in an expression or operation, you are telling the computer to use the data in the variables
- From last slides, x+y actually means 5+5
- Of course it depends on what value is inside x or y

18 Variables Challenge

- Create a variable x and assign the value 10 to it
- output the value of x
- output the letter x
- What is the difference?

```
MsgBox(x) ' displays content of x
MsgBox("x") ' displays the letter x
```

19 Control Properties

- Remember controls? What about their properties?
- Open the HelloWorld windows form project, and add add a Label
- Take note of the text and name labels, what are thier values?
  - What are they used for?

20 Controls Properties

- To access a property of a control, you use dont notation:

  ```
  MsgBox(label.Text)
  ```

Can you explain what is happening? What is the variable name? What is dot notation? What is the datatype?

21 Assigning To Control Properties

- Can you remember what assignment was?
- Use it to change the Text property of the label

```
label.Text = "New Value"
```

21.0.1 Notice the value is a String

22 Things To Remember About Control Properties

- Look at the properties windows to know them
- Access the values and use them like variables using dot notation using: `controlName.propertyName`
  - VB, as part of windows forms, creates the variables for these controls, you do not have to do it
  - Their variable names will match the name property of the control
- Change the values using dot notation and assignment: `controlName.propertyName = newValue`
- Remember to always change the name of the control to follow naming convention

23 Control Naming Convention

Control	Short Label	Example
Label	lbl	lblOutput, lblScore
TextBox	txt	txtName, txtAge
Button	btn	btnSubmit, btnAdd **(Notice buttons are usually operations)**
Radio Button	rdo	rdoGender, rdoMajor
Check Box	chk	chkIsGraduate, chkIsStudent
List	lst	lstItems, lstStudents
ComboBox	cbx	cbxMajors, cbaStudentIds

24 Label Control

- Used to output text within a form
- Used to put labels next to items to describe them
- Always change the name to follow naming convention
- e.g.: lblName, lblOutput, lblStudentGrade

25 TextBox Control

- Use it exactly like a label
- Use the properties name, and label
- Has the added benefit of accepting input from the user

26 User Input from TextBox

- If you double click the TextBox you will override TextChanged
- This sub gets called everytime a user types a letter
- We usually want to perform an action after the user is done with typing. This can be achieved in two methods:

27 Method 1: TextBox Input

- Add a button which the user should click to perform the action after he/she is done with text input
- This is the simplist method and most intuitive

28 Method 2: TextBox Input

- Click once on the TextBox then look for KeyDown even in the properties window
- This event is run every time a button is pressed
- Simply check if the pressed button is **Enter**
- We will get back to this method in the future

29 Simple Challenge

- Create **ImprovedHelloWorld** windows form project
- Project must get the name of the user then gives a greeting with the user name.
- e.g.: Hello mohammad!

30 Constructing Strings

- To complete the challenge you must combine 3 strings together:

1. The greeting message before the name: `"Hello "`
2. The name from the textbox
3. The final part of the greeting message after the name: `"!"`

```
' Assuming that you have an output label called lblOut
lblOut.text = = "Hello " & txtName.Text & "!"
```

31 What is the & part?

- This is known as an operator
- They are used to instruct the computer to perform operations on data and variables
- The operations can be mathematical, string, logical ..etc
- We will discuss operators in detail next week

32 Another Challenge

- improve the last project to ask the user for his/her name and major
- Display a greeting message for the user in the following format:

```
Hello Mohammad!
Your major is MIS
```

- Be sure to display the text over two lines

33 Challenge Hint

- VB and any other language has special constants to be used to display character that cannot be typed in the keyboard or put in a string
- These special characters are:

Character	Description
vbNewLine	New line
vbLf	Line feed
vbCr	Carriage return

Character	Description
vbCrLf	Carriage return then line feed
vbTab	Tab, around 4 spaces
vbBack	The back character, usually clears one charachter
vbVerticalTab	vertical tab

34 Things to think about

- How do we represent a space character?
- With " used to represent the start and end of a string, how do we print it?

35 Quick Challenge

Solve the last challenge as a console project