

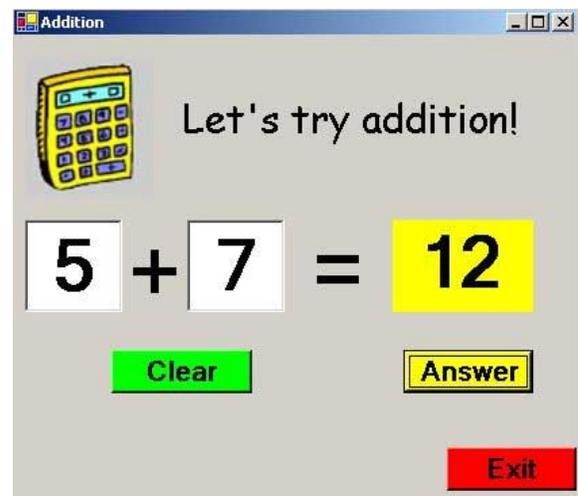
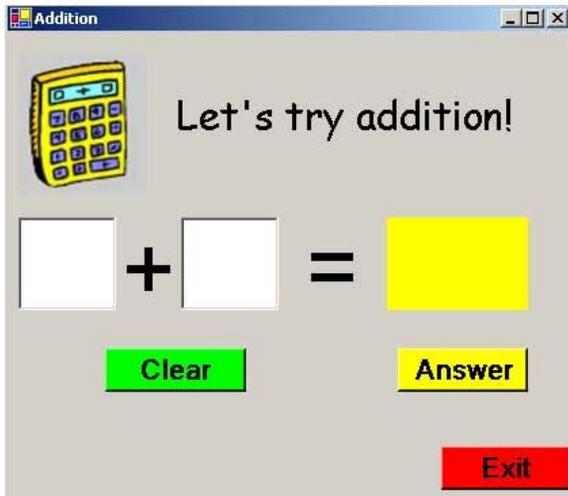
## Assignment 4 – Part 1

An Elementary school teacher is looking for an interactive computer application that her students can use in order to practice single digit (0 – 9) addition.

Create a form that requires the user to enter two numbers (white boxes below). The form will add the two numbers and display the answer (yellow box below). A reset button will allow the user to clear the form and reenter additional numbers.

New statements and functions used with this project include:

- Dim statement – declaring an Integer
- Val( ), Clear( ), Focus( ) functions
- Enabled property
- Tab index



- Required comments are included (Name, Date, Assignment, and description of any sub procedures you write code for).
  - Use meaningful object names.
  - Place the name of the project (Addition) in the title bar.
- Set the start position of your form to the center of the screen.
- Two text boxes are used by the user to enter the numbers to be added.
  - Set font size to 30 or more.
  - Text entered needs to be **centered** in the text box.
  - Cursor needs to appear in first box when the program is run, when the tab key is hit, it should go to the next text box.
  - After the text is entered into the second textbox, the Answer button should be enabled.  
Code the 2<sup>nd</sup> textbox with the following code: `btnAnswer.enabled = true`
- Clear button is used to reset the form.
  - Clear both text boxes and the label containing the sum. Have the focus reset to the first text box and both buttons disabled.
  - Textboxes can be cleared using the clear function: `txtNum1.Clear( )`
- Answer button displays the sum of the two numbers entered by the user.
  - Display the sum of the two numbers entered by the user in a label. The label should be large enough to handle a two-digit number (ex: 3 + 9 equals 12). **Set the auto size to false.**
  - When the Answer button is clicked the button should be disabled and the clear button should be enabled.
- Design should be age appropriate – the only enabled buttons should be the one they need to click next.
- Use of an image is optional.
- An exit button allowing the user to exit the program.

## TextBox

Used for receiving input from the user. The input is assigned to the text property of the TextBox. In the assignment statement section below, you will see how to assign this value to a variable.

## Declaring variable

Variable can be used to hold different types of data. In this project, the numbers entered by the user will be stored in variables names **num1** and **num2**.

Before we can use these variables to hold data we must declared them:

```
Dim num1, num2, ans As Integer
```

this will cause the computer to set aside a location in memory with the names num1, num2, and sum to store integer values.

## Assignment statements

```
num1 = Val(txtnum1.text)
```

the numerical value of what was entered into the first textbox will be assigned to the variable num1

```
Sum = num1 + num2
```

the sum of values stored in variables num1 and num2 will be assigned to the variable sum

```
lblsum.text = sum
```

the value stored in sum will be displayed in the label lblsum.

## Tab index requirements and Focus ( ) function

Tab indexes should be set as follows: 0–first textbox, 1–second textbox, 2-Answer button, 3-Clear button

Set the TabIndex property to the values above and the TabStop property will be set to TRUE.

For each control that does not belong in the tabbing sequence, the TabStop property will not be visible.

Focus is the ability to receive input from the user through a mouse or a keyboard. When an object has the focus, it can receive input.

When the CLEAR button is clicked, the focus need to be set back to the first textbox: `txtNum1.Focus()`

## Requirements for enabling buttons for this project:

- The EXIT button should remain enabled throughout.
- Initial state: ANSWER and CLEAR buttons are disabled.
- After a number is entered into the second textbox, the ANSWER button is enabled.
- After the ANSWER button is clicked, it is disabled and the CLEAR button is enabled.
- After the CLEAR button is clicked, both ANSWER and CLEAR buttons are disabled.

To enable a button: `btnAnswer.Enabled = true`

To disable a button: `btnAnswer.Enabled = false`

## Assignment 4 - Part 2

New statements and functions used with this project include:

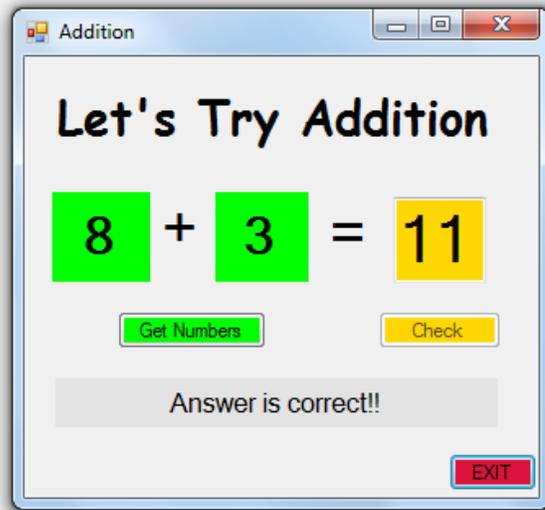
If...Then...Else statement – read pages 5-1 through 5-3 in the textbook

A random number generator.

- Get Numbers button – when clicked, randomly generated numbers should be displayed in the two labels (green) and the textbox must be cleared.
- A textbox will be used for the user to input their answer.
- Check answer button - when clicked, this button should determine the correctness of the student's response and display the appropriate message to the user.
- Focus, tab order and the enabled property should be set for ease of use.



In the initial state, the Check button is enabled and the Get Numbers button is disabled. Focus is set to the textbox.



After clicking the Check button, it becomes disabled and the Get Numbers button is enabled. If the answer is incorrect, do not change the enabled properties – this will allow the user to attempt to resubmit a different answer.

A random number generator.

The following code will generate a random number between 0 and 9 and display it in label1:

```
Dim rand As New Random
```

```
`rand in the variable name and Random is the variable type
```

```
Label1.Text = rand.Next(0, 9)
```

```
`the numbers in parentheses give the range of the integers that are generated
```

Accumulator

To increment a variable named *score* by one, you have a number of options

```
score = score + 1
```

```
score += 1      ` add 1 to the value of score
```

- Rather than having the user enter the two numbers to be added, the numbers will be randomly generated and displayed in two labels when a Get Numbers button is clicked. The user will be prompted for a response.

- The focus should be set to the answer textbox.
- The correctness of the response will be checked and an appropriate message will be displayed.

Extra credit

- A scoreboard can be added. The scoreboard should display the number of correct responses and incorrect responses.
- The scoreboard must also contain a separate Reset button to reset the scoreboard only.