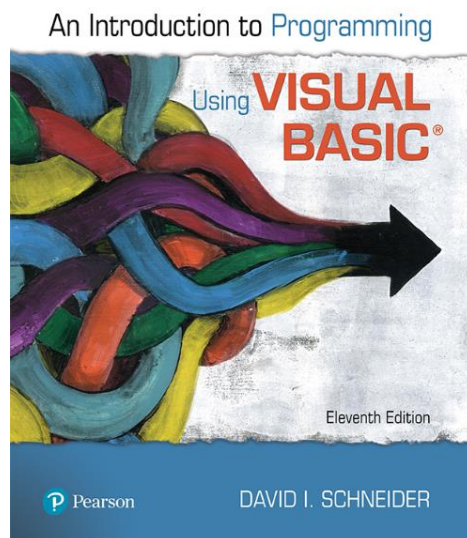


INSTRUCTOR SOLUTIONS MANUAL

to accompany
An Introduction to Programming
Using VISUAL BASIC, 11th Edition

by David I. Schneider



Copyright © 2020 by Pearson Higher Education. All rights reserved.

“Visual Studio 2017 Community Edition” can be installed on PCs running Windows 7 (along with SP 1), Windows 8, or Windows10. It can be downloaded free of charge from the website

<https://docs.microsoft.com/en-us/visualstudio/install/install-visual-studio?view=vs-2017>

CONTENTS

Chapter 2 Visual Basic Controls and Events

Exercises 2.2 Visual Basic Controls 5

Exercises 2.3 Visual Basic Events 11

Chapter 3 Variables, Input, and Output

Exercises 3.1 Numbers 16

Exercises 3.2 Strings 21

Exercises 3.3 Input and Output 29

Programming Projects 36

Chapter 4 Decisions

Exercises 4.1 Relational and Logical Operators 40

Exercises 4.2 If Blocks 41

Exercises 4.3 Select Case Blocks 56

Exercises 4.4 Input via User Selection 65

Programming Projects 79

Chapter 5 General Procedures

Exercises 5.1 Function Procedures 87

Exercises 5.2 Sub Procedures, Part I 95

Exercises 5.3 Sub Procedures, Part II 103

Programming Projects 109

Chapter 6 Repetition

Exercises 6.1 Do Loops 119

Exercises 6.2 For...Next Loops 127

Exercises 6.3 List Boxes and Loops 141

Programming Projects 155

Chapter 7 Arrays

Exercises 7.1 Creating and Using Arrays 165

Exercises 7.2 Using LINQ with Arrays 179

Exercises 7.3 Arrays of Structures 191

Exercises 7.4 Two-Dimensional Arrays 214

Programming Projects 226

Chapter 8 Text Files

Exercises 8.1 Managing Text Files 246

Exercises 8.2 StreamReaders, StreamWriters, Structured Exception Handling 255

Exercises 8.3 XML 266

Programming Projects 274

Chapter 9 Additional Controls and Objects

- Exercises 9.1 List Boxes and Combo Boxes 284
- Exercises 9.2 Eight Additional Controls and Objects 290
- Exercises 9.3 Multiple-Form Programs 300
- Exercises 9.4 Graphics 317
- Programming Projects 333

Chapter 10 Databases

- Exercises 10.1 An Introduction to Databases 351
- Exercises 10.2 Editing and Designing Databases 372
- Programming Projects 375

Chapter 11 Object-Oriented Programming

- Exercises 11.1 Classes and Objects 377
- Exercises 11.2 Working with Objects 390
- Exercises 11.3 Inheritance 415
- Programming Projects 430

CHAPTER 2**EXERCISES 2.2 Visual Basic Controls**

1. While the mouse cursor is still hovering over the button that was just clicked, the button has a pale blue color. After the cursor leaves the button, the button has a dark blue border.
2. Tabbing to another control, clicking on another control, or pressing Alt plus the access key for another control.
3. Click on the form to make it the selected object.
Click on the Properties window or Press F4 to activate the Properties window.
Select the Text property.
Type "CHECKING ACCOUNT" and press the Enter key.
4. Double-click the TextBox icon in the Toolbox.
Activate the Properties window, and select the ForeColor property.
Click on the down-arrow button to the right of the Settings box.
Click on the Custom tab.
Click on the desired blue in the palette.
Move around the Properties window with the up- and down-arrow keys until the Text property is selected.
Click on the Settings box and then type "PLAY IT, SAM" (without the quotes).
Click on the text box and then widen it slightly to see the words.
5. Double-click the TextBox icon in the Toolbox.
Activate the Properties window.
Select the BackColor property.
Click on the down-arrow to the right of the Settings box.
Click on the Custom tab, and then click on the desired yellow in the palette.
Click on the form to see the yellow text box.
6. Double-click on the TextBox icon in the Toolbox.
Activate the Properties window, and select the Name property.
Type "txtGreeting". (The name will appear in the Settings box.)
Select the Text property.
Type the requested word, "HELLO".
Select the Font property.
Click on the ellipsis to the right of the Settings box.
Click on the Size box.
To increase the size of the word, either type the number for the font size (such as "14") or click on a number in the list below the current size.
Click on Italic in the "Font style" list.
Click OK.
If necessary, widen the text box.

7. Double-click on the Label icon in the Toolbox.
Activate the Properties window, and select the AutoSize property.
Set the AutoSize property to False.
Select the Text property and type the requested sentence.
Select the TextAlign property.
Click on the down-arrow button to the right of the Settings box, and click on one of the center rectangles.
Resize the label so that the sentence occupies three lines.
8. Double-click on the TextBox icon in the Toolbox.
Activate the Properties window, and select the Text property.
Type "Visual Basic" and then press the Enter key.
If the text isn't all visible, drag the text box's right sizing handle to the right until all the text can be seen.
Select the ReadOnly property.
Double-click on the ReadOnly property to change it's setting to True. (Or, go to the Settings box, press the down-arrow button, and click on True.)
Select the Font property.
Click on the ellipsis to the right of the Settings box.
In the Font style box, click on Bold.
Click on the *OK* button.
Select the BackColor property and click on the down-arrow button.
Click on the Custom tab.
Click on the desired red in the palette.
Select the ForeColor property and click on the down-arrow button.
Click on the Custom tab.
Click on the white square in the upper-left corner of the palette.
9. Double-click on the TextBox icon in the Toolbox.
Activate the Properties window.
Set the Name property to txtLanguage.
Select the Text property and type "Visual Basic 2017".
Select the Font property and click on the ellipsis to the right of the Settings box.
Scroll up the Font box, and click on Courier New in the Font box.
Click on the *OK* button.
Widen the text box to accommodate its text.
10. Double-click on the Button icon in the Toolbox.
Activate the Properties window, and select the Text property.
Type "PUSH".
Select the BackColor property and click on the down-arrow button.
Click on the Custom tab.
Click on the yellow square (the third square in the fourth column) in the palette.
Double-click on the setting for the (Name) property, type in "btnPush", and press the Enter key.

- 11.** Double-click on the Button icon in the Toolbox.
Activate the Properties window, and select the BackColor property.
Click on the down-arrow button to the right of the Settings box.
Click on the Custom tab, and then click on the white square in upper-left corner of the palette.
Select the Text property and type "PUSH".
Select the Font property, and click on the ellipsis.
Click on *Oblique* in the "Font style" list.
Click on 24 in the Size list.
Click on the *OK* button.
Resize the button.
- 12.** Double-click on the Button icon in the Toolbox.
Activate the Properties window, and select the Text property.
Type "&PUSH".
Select the Font property and click on the ellipsis.
Click on Bold in the "Font Style" box.
Click OK.
Click on the form to see the resulting button.
- 13.** Double-click on the Button icon in the Toolbox.
Activate the Properties window.
Select the Text property and type "PUS&H".
Click on the form to see the resulting button.
- 14.** Double-click on the Label icon in the Toolbox.
Activate the Properties window, and select the Text property.
Type "ALIAS".
Select the ForeColor property and click on the down-arrow button.
Click on the Custom tab.
Click on the desired white in the palette.
Select the BackColor property and click on the down-arrow button.
Click on the Custom tab.
Click on the desired shade of blue in the palette.
Click on the form to see the resulting label.
- 15.** Double-click on the Label icon in the Toolbox.
Activate the Properties window.
Select the Name property and type "lblAKA".
Select the Text property and type "ALIAS".
Select the AutoSize property and set it to False.
Select the Font property and click on the ellipsis.
Click on *Oblique* in the "Font style" list.
Click on the *OK* button.
Select the TextAlign property, click on the down-arrow box to the right of the Settings box, and click on one of the center rectangles.

- 16.** Click on the form to make it the selected object.
Activate the Properties window, and select the Text property.
Type "BALANCE SHEET".
Select the BackColor property and click on the down-arrow button.
Click on the Custom tab.
Click on the desired shade of yellow in the palette.
- 17.** Double-click on the Label icon in the Toolbox.
Activate the Properties window, and select the TextAlign property.
Click on the down-arrow box to the right of the Settings box, and click on one of the rectangles on the right.
Select the AutoSize property and set it to False.
Select the Text property, type "VISUAL BASIC", and press Enter.
If the words " VISUAL BASIC " are on one line, resize the label until the words occupy two lines.
- 18.** In the Solution Explorer, right-click on the file Form1.vb.
Select "Rename" from the drop-down list.
Change the filename from Form1.vb to frmHello.vb.
In the Properties window, change the setting of the Text property from Form1 to Hello World.
- 19.** Double-click on the Label icon in the Toolbox.
Activate the Properties window and set the Text property of the label to PROGRAM.
Select the Font property, and click on the ellipsis to the right of its Settings box.
Click on *Oblique* in the "Font style" list, and click on the *Underline* box.
Click on the OK button.
- 20.** Double-click on the Label icon in the Toolbox.
Activate the Properties window, and select the Text property.
Type "ALIAS".
Select the Font property and click on the ellipsis.
Click on Bold in the Font style box.
Click on Courier New in the Font box and press OK.
Click on the form to see the resulting label.
- 21.** Double-click on the ListBox icon in the Toolbox.
Activate the Properties window, and select the BackColor property.
Click on the down-arrow button to the right of the Settings box.
Click on the Custom tab and click on the desired yellow square in the palette.
Click on the form.
- 22.** Double-click on the ListBox icon in the Toolbox.
Activate the Properties window, and select the Visible property.
Double-click on the Visible property to change it's setting to False. (Or, go to the Settings box, press the down-arrow button, and click on False.)

- 23.** In the Solution Explorer window, right click on “Form1.vb” and select *Rename* from the context menu that appears.
Change Form1.vb to frmYellow.vb, and click the *No* button in the box that appears.
Right-click on the form in the Form Designer, and click on Properties in the context menu.
Click on BackColor property in the Properties window.
Click on the down-arrow button in the right part of the Settings box, click on the Custom tab, and click on a yellow square.
- 24.** Double-click on the Button icon in the Toolbox.
Activate the Properties window and set the Text property of the button to **BUTTON**.
Select the Font property, and click on the ellipsis to the right of its Settings box.
Click on *Bold* in the "Font style" list.
Place a check mark in the small square to the left of the word "Underline" by clicking on the square.
Click on the *OK* button.
- 25.** Begin a new program.
Change the text in the form's title bar to "Dynamic Duo".
Place two buttons on the form.
Position and resize the buttons as shown.
Enter “Batman” as the text of the first button, and enter “Robin” as the text of the second button.
Increase the font size for both buttons to 14.
- 26.** Begin a new program.
Change the text in the form's title bar to "Enter Names".
Place on the form a label, a text box, and a button in the sizes and locations shown. Change the text on the label to "Name".
Change the text on the button to "Enter".
Increase the Font size for the label and the button to 12.
- 27.** Begin a new program.
Change the text in the form's title bar to "Fill in the Blank".
Place a label, a text box, and another label on the form at appropriate locations.
Change the Text setting of the first label to "I’m the king of the" and the Text setting of the second label to "A Quote by Leonardo DiCaprio".
- 28.** Begin a new program.
Change the text in the form's title bar to "Similarity".
Place a big label and a normal-sized label on the form.
Move the small label to the bottom of the form, and move and resize the big label so that it covers most of the top of the form.
Select the normal-sized label.
Change the setting of the Text property to "A Quote".
Select the big label.
Change the setting of the Text property to the specified sentence.
Increase the font size to 12.
Resize and position the labels as needed.

29. Begin a new program.

Change the text in the form's title bar to "Uncle's Advice".

Place five labels and three buttons on the form at appropriate locations.

Change the Text setting of each label as indicated.

Change the settings of the buttons' Text properties to "1", "2", and "3".

Resize and position the labels and buttons.

30. Begin a new program.

Change the text in the form's title bar "3 Rectangles".

Place a label on the form and increase its size to provide plenty of space.

Change the background color to red.

Place a smaller label inside the red label.

Change its background color to some shade of white.

Finally, place a yet smaller label inside the white box.

Change its background color to blue.

Resize and position the labels as needed.

33. 1 **34.** 0

35. Each arrow key moves the text box in the indicated direction.

36. Pressing the right- and left-arrow keys widen and narrow the text box. The up- and down-arrow keys have no effect.

37. Pressing the right- and left-arrow keys widens and narrows the text boxes, buttons, and list boxes in the group of selected controls. The up- and down-arrow keys shorten and lengthen the buttons and list boxes in the group. The arrow keys have no effect on the labels, and only the left- and right-arrow keys affect the text boxes.

38. Each arrow key moves every control in the group in the indicated direction.

39. Drag a label and a list box onto the form.

Click on the label.

Hold down the Ctrl key and click on the list box. (You have now selected a group of two controls.)

In the Properties window, click on the symbol to the left of the Font property.

Click on the Size property, change the setting to 12, and press the Enter key.

(Alternative: Replace the last two lines with the following steps.)

In the Properties window, select the Font property.

Click on the ellipsis button to the right of the Settings box.

Click on 12 in the Size list and click on the *OK* button.

40. The button moves to a comfortable distance from one of the sides of the form.

41. The label is positioned just to the left of the text box, and the middles of the two controls are aligned.

- 42. The left sides of the buttons are aligned and the two buttons are a comfortable distance apart.
- 43. *Center* refers to the midpoint horizontally, whereas *middle* refers to the midpoint vertically.
- 44. Select the four buttons as a group. Click on the Format menu, click on Make Same Size, and then click on Both. Click on the Format menu again, click on Vertical Spacing, and then click on Make Equal.
- 45. First blue snap line: tops of the two controls are aligned
Purple snap line: texts of the two controls are aligned
Second blue snap line: bottoms of the two controls are aligned
- 46. The setting toggles between True and False.
- 47. The setting is cycling through the different available colors.

EXERCISES 2.3 Visual Basic Events

- 1. The word Hello
- 2. The word Hello in red letters
- 3. The word Hello on an orange-colored background
- 4. The word Hello
- 5. The text box vanishes.
- 6. The word Hello on a yellow background
- 7. The word Hello in green letters
- 8. The word Hello on a white background
- 9. The word Hello on a gold background.
- 10. Nothing, the label cannot be seen.
- 11. `Form1.Text` should be `Me.Text`.
- 12. The word Hello must be surrounded with quotation marks.
- 13. Red should be replaced with `Color.Red`.
- 14. Replace `textBox` with `textBox.Text`.
- 15. `Font.Size` is a read-only property. The statement `txtOutput.Text = textBox.Font.Size` is valid since it is reading the value of `textBox.Font.Size`. However, `textBox.Font.Size = 20` is not valid since it is setting the value of `textBox.Font.Size`.

16. Me.Color must be replaced by Me.ForeColor or Me.BackColor

17. lblTwo.Text = "E.T. phone home."

18. lblTwo.Text = "Play it, Sam."
lblTwo.ForeColor = Color.Red

19. txtBox.ForeColor = Color.Red
txtBox.Text = "The stuff that dreams are made of."

20. txtBox.ForeColor = Color.Blue
txtBox.BackColor = Color.Gold
txtBox.Text = "Life is like a box of chocolates."

21. txtBox.Enabled = False

22. Me.Text = "Hello World"

23. lblTwo.Visible = False

24. lblName.ForeColor = Color.Red

25. btnOutcome.Enabled = True

26. btnCompute.Focus()

27. txtBoxTwo.Focus()

28. Me.BackColor = Color.White

29. The Enter event occurs when a control gets the focus.

30. A control's Leave event occurs when the control loses the focus.

```
31. Private Sub Label1_Click(...) Handles Label1.Click
    lstOutput.Items.Add("Click")
End Sub

Private Sub Label1_DoubleClick(...) Handles Label1.DoubleClick
    lstOutput.Items.Add("Double Click")
End Sub
```

Whenever the DoubleClick event is raised, the Click event is also raised.

```
32. Private Sub Button1_Click(...) Handles Button1.Click
    lstOutput.Items.Add("Click")
End Sub
```

```
33. Private Sub btnLeft_Click(...) Handles btnLeft.Click
    txtBox.Text = "Left Justify"
    txtBox.TextAlign = HorizontalAlignment.Left
End Sub
```

```
Private Sub btnCenter_Click(...) Handles btnCenter.Click
    txtBox.Text = "Center"
    txtBox.TextAlign = HorizontalAlignment.Center
End Sub
```

```

Private Sub btnRight_Click(...) Handles btnRight.Click
    txtBox.Text = "Right Justify"
    txtBox.TextAlign = HorizontalAlignment.Right
End Sub

34. Private Sub btnSmile_Click(...) Handles btnSmile.Click
    lblFace.Text = ":-)"
End Sub

Private Sub btnFrown_Click(...) Handles btnFrown.Click
    lblFace.Text = ":-("
End Sub

35. Private Sub btnRed_Click(...) Handles btnRed.Click
    txtBox.BackColor = Color.Red
End Sub

Private Sub btnBlue_Click(...) Handles btnBlue.Click
    txtBox.BackColor = Color.Blue
End Sub

Private Sub btnWhite_Click(...) Handles btnWhite.Click
    txtBox.ForeColor = Color.White
End Sub

Private Sub btnYellow_Click(...) Handles btnYellow.Click
    txtBox.ForeColor = Color.Yellow
End Sub

36. Private Sub txtOne_Enter(...) Handles txtOne.Enter
    txtOne.ForeColor = Color.Red
    txtTwo.ForeColor = Color.Black
    txtThree.ForeColor = Color.Black
End Sub

Private Sub txtTwo_Enter(...) Handles txtTwo.Enter
    txtOne.ForeColor = Color.Black
    txtTwo.ForeColor = Color.Red
    txtThree.ForeColor = Color.Black
End Sub

Private Sub txtThree_Enter(...) Handles txtThree.Enter
    txtOne.ForeColor = Color.Black
    txtTwo.ForeColor = Color.Black
    txtThree.ForeColor = Color.Red
End Sub

Private Sub btnLeft_Click(...) Handles btnLeft.Click
    txtOne.TextAlign = HorizontalAlignment.Left
    txtTwo.TextAlign = HorizontalAlignment.Left
    txtThree.TextAlign = HorizontalAlignment.Left
End Sub

Private Sub btnRight_Click(...) Handles btnRight.Click
    txtOne.TextAlign = HorizontalAlignment.Right
    txtTwo.TextAlign = HorizontalAlignment.Right
    txtThree.TextAlign = HorizontalAlignment.Right
End Sub

```

37. `Private Sub txtLife_Enter(...) Handles txtLife.Enter`
 `txtQuote.Text = "I like life, it's something to do."`
`End Sub`
- `Private Sub txtFuture_Enter(...) Handles txtFuture.Enter`
 `txtQuote.Text = "The future isn't what it used to be."`
`End Sub`
- `Private Sub txtTruth_Enter(...) Handles txtTruth.Enter`
 `txtQuote.Text = "Tell the truth and run."`
`End Sub`
38. `Private Sub btnDisable_Click(...) Handles btnDisable.Click`
 `txtBox.Enabled = False`
`End Sub`
- `Private Sub btnEnable_Click(...) Handles btnEnable.Click`
 `txtBox.Enabled = True`
 `txtBox.Focus()`
`End Sub`
39. `Private Sub btnOne_Click(...) Handles btnOne.Click`
 `btnOne.Visible = False`
 `btnTwo.Visible = True`
 `btnThree.Visible = True`
 `btnFour.Visible = True`
`End Sub`
- `Private Sub btnTwo_Click(...) Handles btnTwo.Click`
 `btnOne.Visible = True`
 `btnTwo.Visible = False`
 `btnThree.Visible = True`
 `btnFour.Visible = True`
`End Sub`
- `Private Sub btnThree_Click(...) Handles btnThree.Click`
 `btnOne.Visible = True`
 `btnTwo.Visible = True`
 `btnThree.Visible = False`
 `btnFour.Visible = True`
`End Sub`
- `Private Sub btnFour_Click(...) Handles btnFour.Click`
 `btnOne.Visible = True`
 `btnTwo.Visible = True`
 `btnThree.Visible = True`
 `btnFour.Visible = False`
`End Sub`

```

40. Private Sub txtGreen_Enter(...) Handles txtGreen.Enter
    txtGreen.BackColor = Color.Green
    txtYellow.BackColor = Color.DarkGray
    txtRed.BackColor = Color.DarkGray
End Sub

Private Sub txtYellow_Enter(...) Handles txtYellow.Enter
    txtGreen.BackColor = Color.DarkGray
    txtYellow.BackColor = Color.Yellow
    txtRed.BackColor = Color.DarkGray
End Sub

Private Sub txtRed_Enter(...) Handles txtRed.Enter
    txtGreen.BackColor = Color.DarkGray
    txtYellow.BackColor = Color.DarkGray
    txtRed.BackColor = Color.Red
End Sub

41. Private Sub btnVanish_Click(...) Handles btnVanish.Click
    lblFace.Visible = False
End Sub

Private Sub btnReappear_Click(...) Handles btnReappear.Click
    lblFace.Visible = True
End Sub

42. Private Sub txtName_Enter(...) Handles txtName.Enter
    lblInstructions.Text = "Enter your full name."
End Sub

Private Sub txtPhone_Enter(...) Handles txtPhone.Enter
    lblInstructions.Text = "Enter your phone number, including area code."
End Sub

43. Private Sub btnAny_Click(...) Handles btnOne.Click, btnTwo.Click
    txtOutput.Text = "You just clicked on a button."
End Sub

44. Private Sub txtBox1_Click(...) Handles txtBox1.Click
    txtBox2.Text = txtBox1.Text
    txtBox1.Clear()
End Sub

Private Sub txtBox2_Click(...) Handles txtBox2.Click
    txtBox1.Text = txtBox2.Text
    txtBox2.Clear()
End Sub

```