

EXERCISES 4.4

In Exercises 1 through 8, determine the effect of setting the property to the value shown.

1. `GroupBox1.Text = "Income"`
2. `CheckBox1.Checked = True`
3. `CheckBox1.Checked = False`
4. `CheckBox1.Text = "&Vanilla"`
5. `RadioButton1.Checked = False`
6. `txtOutput.Text = lstBox.Text`
7. `RadioButton1.Text = "Clear &All"`
8. `RadioButton1.Checked = True`

In Exercises 9 through 12, write one or more lines of code to carry out the task.

9. Set the caption for `RadioButton1` to "Yes".
10. Clear the small rectangular box of `CheckBox1`.
11. Guarantee that `CheckBox1` is checked.
12. Turn off `RadioButton2`.

In Exercises 13 and 14, determine the state of the two radio buttons after `Button1` is clicked.

13.

```
Private Sub Button1_Click(...) Handles Button1.Click
    RadioButton1.Checked = True
    RadioButton2.Checked = True
End Sub
```

14.

```
Private Sub Button1_Click(...) Handles Button1.Click
    RadioButton1.Checked = False
    RadioButton2.Checked = False
End Sub
```

15. Suppose that a group box has two radio buttons attached to it. If the statement

```
GroupBox1.Visible = False
```

is executed, will the radio buttons also vanish? Test your answer.

16. Create a form with two group boxes, each having two radio buttons attached to it. Run the program and confirm that the two pairs of radio buttons operate independently of each other.
17. A computer dealer offers two basic computers, the Deluxe (\$1000) and the Super (\$1500). The customer can order any of the following additional options: upgraded video card (\$200), internal modem plus Wi-Fi (\$30), or 1 GB of added memory (\$120). Write a program that computes the cost of the computer system selected. See Fig. 4.13.
18. Write a program to book an airline flight. See Fig. 4.14 on the next page. If the same airport is selected from the two list boxes, the user should be informed immediately that the departure and arrival airports must be different. If no airport has been selected from one or both of the list boxes when the button is clicked, then the user should be told what information must be supplied. Use message boxes to inform the user of problems.

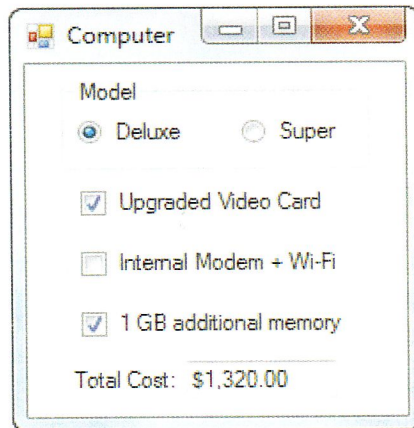


FIGURE 4.13 Possible outcome of Exercise 17.



FIGURE 4.14 Possible outcome of Exercise 18.

19. Write a program that allows you to vote for one of two presidential candidates. See Fig. 4.15. When the *Cast Vote* button is clicked on, the text box should display your vote. In the event that neither radio button is on, the sentence “You voted for neither.” should appear in the text box.

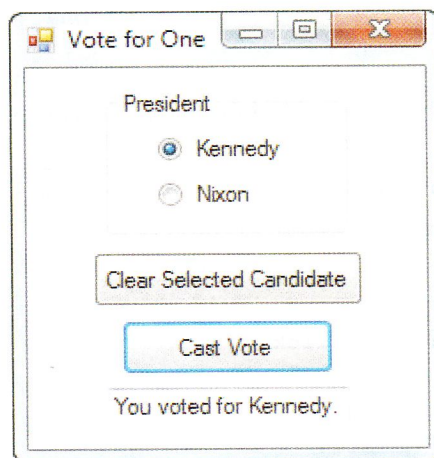


FIGURE 4.15 Possible output for Exercise 19.

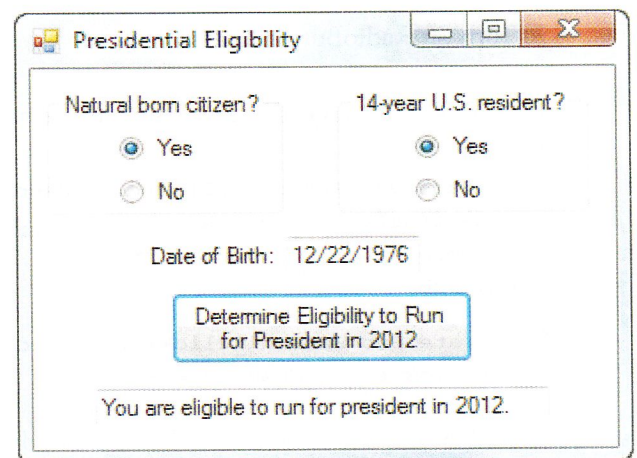


FIGURE 4.16 Possible output for Exercise 20.

20. Article II, Section 1, Clause 5 of the Constitution of the United States, states that “No Person except a natural born Citizen, or a Citizen of the United States at the time of the Adoption of this Constitution, shall be eligible to the Office of President; neither shall any Person be eligible to that Office who shall not have attained to the Age of thirty five Years, and been fourteen Years a Resident within the United States.” Write a program that determines if a person is eligible to run for President of the United States in 2012. (**Note:** A natural born citizen is a person who is born within the jurisdiction of the U.S. government. A 2012 candidate for president must achieve age 35 by Inauguration Day, 1/21/2013.) See Fig. 4.16. **Hint:** Use the *AddYears* method.
21. Write a program that uses the form in Fig. 4.8 at the beginning of the section. When the button is clicked, the program should first determine if a selection has been made from both the list box and the group of radio buttons. If not, a message box should appear telling the user which types of selections have not been made. If both selections have been made, the message “Information Processed” should be displayed.

22. Write a program that uses the form in Fig. 4.8 at the beginning of the section. When the button is clicked, the program should print the names of the computer languages studied. If no check boxes have been checked, the sentence “No languages studied.” should be printed.
23. Figure 4.17 shows an item from the 2008 U.S. Individual Income Tax Return. Write a program whose form resembles item 39a. The program should look at the four check boxes and display in the large text box at the right of the item the number of boxes checked.

39a Check You were born before January 2, 1944, Blind. } Total boxes
 if: Spouse was born before January 2, 1944, Blind. } checked ► 39a

FIGURE 4.17 Item 39a from Form 1040 of the 2008 U.S. Individual Income Tax Return.

24. Write a program to specify the foreground and background colors for a label containing the words VISUAL BASIC. See Fig. 4.18. If the same color is selected from the two group boxes, the user should be informed immediately that the two colors must be different. If no color has been selected from one or both of the group boxes when the button is clicked, then the user should be told what information must be supplied. Use message boxes to inform the user of problems.

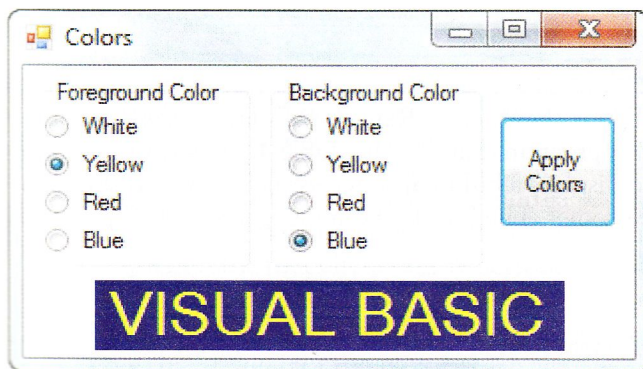


FIGURE 4.18 Possible outcome for Exercise 24.



FIGURE 4.19 Possible outcome of Exercise 25.

25. The basic monthly cost of a membership in a sport and health club is \$100 for adults and \$75 for seniors. Available extras cost \$25 each per month. Write a program that uses the form in Fig. 4.19 to calculate a member’s monthly fee. Before calculating the fee, make sure that a membership category has been selected.

Solutions to Practice Problems 4.4

- With radio buttons, at most one button can be on at any given time, whereas several check boxes can be checked simultaneously.
- With two sets of radio buttons, you would like to make two selections. However if the two sets are in the same group box, then at most one radio button can be on at any time.
 Since several check boxes can be checked at any time, you needn’t have this concern with check boxes. However, the two sets of check boxes are usually placed in separate group boxes to improve the visual effect.
- Method 1: Make one of the radio buttons the default radio button; that is, set its Checked property to True at design time.
 Method 2: Place the code that refers to the radio buttons in an If block that displays a message when no radio button in the group box has been checked.

```
Function Greeting(ByVal x As Integer) As Integer
    Return "hellohi ya".Substring(5 * (x - 1), 5)
End Function
```

12. Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
- ```
 Dim word As String
 word = InputBox("What is your favorite word?")
 txtOutput.Text = "When the word is written twice, " &
 Twice(word) & " letters are used."
End Sub
```

```
Function Twice(ByVal w As String) As Integer
 'Compute twice the length of a string
 Dim len As Integer
 Return len = 2 * w.Length
End Function
```

In Exercises 13 through 23, construct user-defined functions to carry out the primary task(s) of the program.

13. To determine the number of square centimeters of tin needed to make a tin can, add the square of the radius of the can to the product of the radius and height of the can, and then multiply this sum by 6.283. Write a program that requests the radius and height of a tin can in centimeters as input and displays the number of square centimeters of tin required to make the can.
14. Table 5.2 gives the Saffir-Simpson scale for categorizing hurricanes. Write a program that requests a wind speed in miles/hour and displays the category of the storm.

**TABLE 5.2** Rating of hurricanes.

| Wind Speed (in mph) | Rating         |
|---------------------|----------------|
| 74 to 95            | Category One   |
| 96 to 110           | Category Two   |
| 111 to 130          | Category Three |
| 131 to 155          | Category Four  |
| Over 155            | Category Five  |

15. The federal government developed the body mass index (BMI) to determine ideal weights. Body mass index is calculated as 703 times the weight in pounds, divided by the square of the height in inches, and then rounded to the nearest whole number. Write a program that accepts a person's weight and height as input and gives the person's body mass index. **Note:** A BMI of 19 to 25 corresponds to a healthy weight.
16. In order for exercise to be beneficial to the cardiovascular system, the heart rate (number of heart beats per minute) must exceed a value called the *training heart rate*, THR. A person's THR can be calculated from their age and resting heart rate (pulse rate when first awakening) as follows:
- Calculate the maximum heart rate as  $220 - \text{age}$ .
  - Subtract the resting heart rate from the maximum heart rate.
  - Multiply the result in step (b) by 60%, and then add the resting heart rate.

Write a program to request a person's age and resting heart rate as input and display their THR. (Test the program with an age of 20 and a resting heart rate of 70, and then determine *your* training heart rate.)



17. The three components for a serving of popcorn at a movie theater are popcorn, butter substitute, and a bucket. Write a program that requests the cost of these three items and the price of the serving as input and then displays the profit. (Test the program where popcorn costs 5 cents, butter substitute costs 2 cents, the bucket costs 25 cents, and the selling price is \$5.)
18. Write a program that requests the numeric grades on a midterm and a final exam and then uses a Function procedure to assign a semester grade (A, B, C, D, or F). The final exam should count twice as much as the midterm exam, the semester average should be rounded up to the nearest whole number, and the semester grade should be assigned by the following criteria: 90–100 (A), 80–89 (B), . . . . Use a function called Ceil that rounds noninteger numbers up to the next integer. The function Ceil can be defined by  $\text{Ceil}(x) = -\text{Int}(-x)$ .
19. The original cost of airmail letters was 5 cents for the first ounce and 10 cents for each additional ounce. Write a program to compute the cost of a letter whose weight is given by the user in a text box. Use a function called Ceil that rounds noninteger numbers up to the next integer. The function Ceil can be defined by  $\text{Ceil}(x) = -\text{Int}(-x)$ . (Test the program with the weights 4, 1, 2.5, and .5 ounces.)
20. Suppose a fixed amount of money is deposited at the beginning of each month into a savings account paying 6% interest compounded monthly. After each deposit is made,  $[\text{new balance}] = 1.005 * [\text{previous balance one month ago}] + [\text{fixed amount}]$ . Write a program that requests the fixed amount of the deposits as input and displays the balance after each of the first four deposits. Shown below is the outcome when 1000 is typed into the text box for the amount deposited each month.

```
Month 1: $1,000.00
Month 2: $2,005.00
Month 3: $3,015.03
Month 4: $4,030.10
```

21. Write a program to request the name of a United States senator as input and display the address and salutation for a letter to the senator. Assume the name has two parts, and use a function to determine the senator's last name. The outcome when Robert Smith is typed into the input dialog box requesting the senator's name follows.

```
The Honorable Robert Smith
United States Senate
Washington, DC 20001
```

```
Dear Senator Smith,
```

22. Write a program that requests a date as input and then gives the spelled-out day of the week for that date as output. The program should use a function with the following header.

```
Function DayOfWeek(ByVal d As Date) As String
```

23. Write a program that requests a year as input and then tells whether or not the year is a leap year. The program should use a Boolean-value function named IsLeapYear. **Hint:** Use the DateDiff function.

#### Solutions to Practice Problems 5.1

1. The first argument,  $n$  takes a value of type Double and the second argument,  $x$ , takes a String value; therefore, the input consists of a number and a string. From the two lines shown here, there is no way to determine the type of the output. This can be determined only by looking at the definition of the function.