## CHAPTER 4

### EXERCISES 4.1

**1.** `hi`    **3.** `The letter before G is F`

**5.** `"We're all in this alone." - Lily Tomlin`

**7.** True    **9.** True    **11.** True    **13.** True    **15.** False    **17.** False    **19.** True    **21.** True

**23.** False    **25.** False    **27.** False    **29.** True    **31.** Equivalent    **33.** Not Equivalent

**35.** Equivalent    **37.** Not Equivalent    **39.** Equivalent    **41.** `a <= b`

**43.** `(a >= b) Or (c = d)`    **45.** `(a = "") Or (a >= b) Or (a.Length >= 5)`

[In Exercises 46 through 49, execute a statement of the form `txtOutput.Text = Boolean expression`.]

**47.** True    **49.** False    **51.** False    **53.** True    **55.** True    **57.** False    **59.** True

### EXERCISES 4.2

**1.** `Less than ten.`    **3.** `tomorrow is another day.`    **5.** `10`

**7.** `To be, or not to be.`    **9.** `Hi`    **11.** `You are old enough to vote in 7 days.`

**13.** Syntax error. Third line should be `If ((1 < num) And (num < 3)) Then`

**15.** Syntax error. Fourth line should be `If ((major = "Business") Or (major = "Computer Science")) Then`

**17.** `a = 5`

**19.**
```
message = "Is Alaska bigger than Texas and California combined?"
answer = InputBox(message)
If (answer.Substring(0, 1).ToUpper = "Y") Then
  txtOutput.Text = "Correct"
Else
  txtOutput.Text = "Wrong"
End If
```

**21.**
```
Private Sub btnCompute_Click(...) Handles btnCompute.Click
   Dim cost, tip As Double
   cost = CDbl(InputBox("Enter cost of meal:"))
   tip = cost * 0.15
   If tip < 1 Then
     tip = 1
   End If
   txtOutput.Text = "Leave " & FormatCurrency(tip) & " for the tip."
End Sub
```
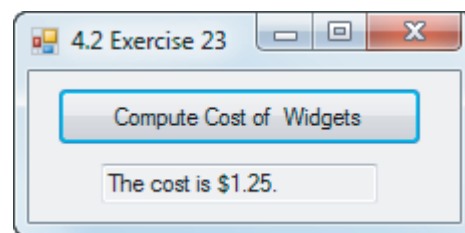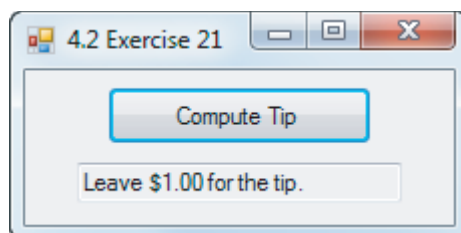
23. ```
Private Sub btnCompute_Click(...) Handles btnCompute.Click
   Dim num, cost As Double
   num = CDbl(InputBox("Number of widgets:"))
   If num < 100 Then
     cost = 0.25 * num   '25 cents each
   Else
     cost = 0.2 * num    '20 cents each
   End If
   txtOutput.Text = "The cost is " & FormatCurrency(cost) & "."
End Sub
```

25. ```
Private Sub btnAskQuestion_Click(...) Handles btnAskQuestion.Click
   Dim name As String
   name = (InputBox("Who was the first Ronald McDonald?")).ToUpper
   If name = "WILLARD SCOTT" Then
     txtOutput.Text = "Correct."
   Else
     txtOutput.Text = "Nice try."
   End If
End Sub
```
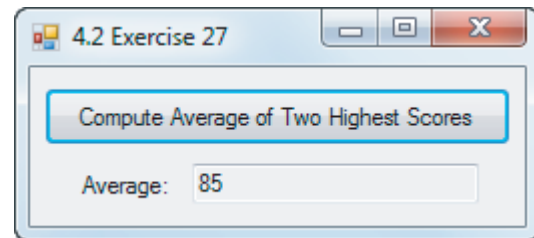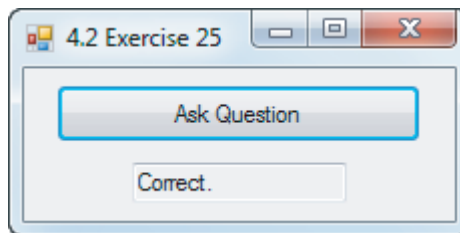


27. ```
Private Sub btnCompute_Click(...) Handles btnCompute.Click
   Dim s1, s2, s3 As Double   '3 scores
   Dim avg As Double          'average of the two highest scores
   s1 = CDbl(InputBox("Enter the first of the three scores."))
   s2 = CDbl(InputBox("Enter the second of the three scores."))
   s3 = CDbl(InputBox("Enter the third of the three scores."))
   If (s1 <= s2) And (s1 <= s3) Then      's1 is smallest number
     avg = (s2 + s3) / 2
   ElseIf (s2 <= s1) And (s2 <= s3) Then  's2 is smallest number
     avg = (s1 + s3) / 2
   Else                                   's3 is smallest number
     avg = (s1 + s2) / 2
   End If
   txtAverage.Text = CStr(avg)
End Sub
```

29. ```
Private Sub btnCompute_Click(...) Handles btnCompute.Click
   Dim weight, cost, amount, change As Double
   weight = CDbl(txtWeight.Text)
   amount = CDbl(txtAmount.Text)
   cost = weight * 1.7
   If (amount >= cost) Then
     change = amount — cost
     txtOutput.Text = "Your change is " & FormatCurrency(change) & "."
   Else
     txtOutput.Text = "I need " & FormatCurrency(cost — amount) & " more."
   End If
End Sub
```

**31.**
```
Private Sub btnCompute_Click(...) Handles btnCompute.Click
    Dim wage, hours, grossPay As Double
    wage = CDbl(txtHourlyWage.Text)     'Hourly pay
    hours = CDbl(txtHoursWorked.Text)   'Hours worked
    If hours <= 40 Then
      grossPay = wage * hours
    Else
      grossPay = (wage * 40) + (1.5 * wage * (hours — 40))
    End If
    txtGrossPay.Text = FormatCurrency(grossPay)
End Sub
```

**33.**
```
Dim numLines As Integer = 0  'In Declarations section of Code Editor
  'numLines tells the number of lines that have been displayed.

  Private Sub btnBogart_Click(...) Handles btnBogart.Click
    If numLines = 0 Then
      lstOutput.Items.Add("I came to Casablanca for the waters.")
      numLines += 1
    ElseIf numLines = 2 Then
      lstOutput.Items.Add("I was misinformed.")
      numLines += 1
    End If
  End Sub

  Private Sub btnRaines_Click(...) Handles btnRaines.Click
    If numLines = 1 Then
      lstOutput.Items.Add("But we're in the middle of the desert.")
      numLines += 1
    End If
  End Sub
```

**35.**
```
Dim numGuesses As Integer = 0

Private Sub btnEvaluate_Click(...) Handles btnEvaluate.Click
  'Assume that the Text property of txtNumberOfGuesses
  'was set to 0 in the Form Designer
  numGuesses += 1
  txtNumberOfGuesses.Text = CStr(numGuesses)
  Dim msg As String
  If txtAnswer.Text.ToUpper.IndexOf("COOLIDGE") <> −1 Then
    MessageBox.Show("Calvin Coolidge was born on July 4, 1872.",
                    "Correct")
    Me.Close()
  ElseIf CInt(numGuesses) = 10 Then
    msg = "Calvin Coolidge was born on July 4, 1872."
    MessageBox.Show(msg, "You've Run Out of Guesses")
    Me.Close()
  Else
    If CInt(numGuesses) = 3 Then
      msg = "He once said, 'If you don't say anything," &
      " you won't be called upon to repeat it.'"
    ElseIf CInt(numGuesses) = 7 Then
      msg = "His nickname was 'Silent Cal.'"
    Else
      msg = "Sorry!"
    End If
    MessageBox.Show(msg, "Incorrect")
  End If
  txtAnswer.Clear()
  txtAnswer.Focus()
End Sub
```

**37.**
```
Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
  If lblLanguage.Visible Then
    lblLanguage.Visible = False
    btnDisplay.Text = "Show Name of Language"
  Else
    lblLanguage.Visible = True
    btnDisplay.Text = "Hide Name of Language"
  End If
End Sub
```
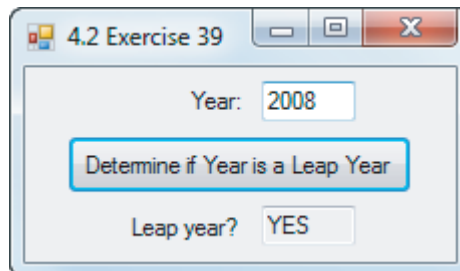


**39.**
```
Private Sub btnCompute_Click(...) Handles lblDetermine.Click
  Dim day As String
  Dim day1, day2 As Date
  Dim numDays As Double
  day = "1/1/" & txtYear.Text
  day1 = CDate(day)
  day2 = day1.AddYears(1)
  numDays = DateDiff(DateInterval.Day, day1, day2)
```

```
      If numDays = 366 Then
         txtLeapYear.Text = "YES"
      Else
         txtLeapYear.Text = "NO"
      End If
   End Sub
```
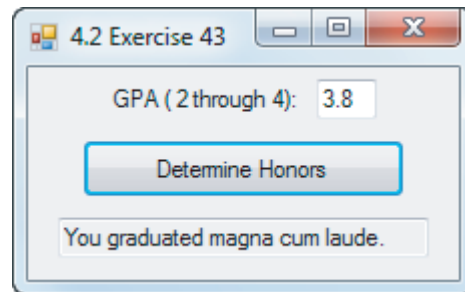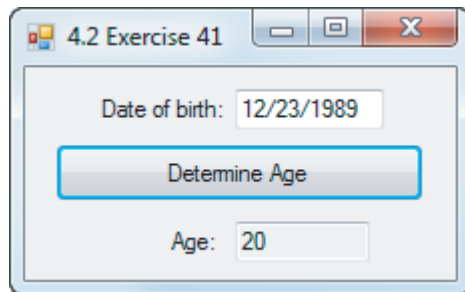
**41.**
```
Private Sub Determine_Click(...) Handles btnDetermine.Click
   Dim dt, dt2 As Date
   Dim approximateAge As Double
   dt = CDate(mtbDate.Text)
   approximateAge = DateDiff(DateInterval.Year, dt, Today)
   dt2 = dt.AddYears(CInt(approximateAge))
   If Today < dt2 Then
      txtAge.Text = CStr(approximateAge − 1)
   Else
      txtAge.Text = CStr(approximateAge)
   End If
End Sub
```

4.2 Exercise 41

Date of birth: 12/23/1989

Determine Age

Age: 20

4.2 Exercise 43

GPA (2 through 4): 3.8

Determine Honors

You graduated magna cum laude.

**43.**
```
Private Sub btnDetermine_Click(...) Handles btnDetermine.Click
   Dim gpa As Double = CDbl(txtGPA.Text)
   Dim honors As String = ""
   If gpa >= 3.9 Then
      honors = " summa cum laude."
   End If
   If (3.6 <= gpa) And (gpa < 3.9) Then
      honors = " magna cum laude."
   End If
   If (3.3 <= gpa) And (gpa < 3.6) Then
      honors = " cum laude."
   End If
   If (2 <= gpa) And (gpa < 3.3) Then
      honors = "."
   End If
   txtOutput.Text = "You graduated" & honors
End Sub
```

## EXERCISES 4.3

**1.** The price is $3.75
   The price is $3.75

**3.** Mesozoic Era
   Paleozoic Era
   ?

**5.** The equation has no real solutions.
   The equation has two solutions.
   The equation has exactly one solution.

**7.** Should have a Case clause before the 4th line.

**9.** `Case nom = "Bob"` should be `Case "Bob"`

**11.** Logic error: `>= "Peach"` should be `>= "PEACH"`.

Syntax error: `"ORANGE TO PEACH"` should be `"ORANGE" To "PEACH"`.

**13.** Valid   **15.** Invalid   **17.** Valid

**19.**
```
Select Case a
  Case 1
    txtOutput.Text = "one"
  Case Is > 5
    txtOutput.Text = "two"
End Select
```

**21.**
```
Select Case a
  Case 2
    txtOutput.Text = "yes"
  Case Is < 5
    txtOutput.Text = "no"
End Select
```

**23.**
```
Private Sub btnDescribe_Click(...) Handles btnDescribe.Click
  Dim percent As Double
  percent = CDbl(InputBox("Percentage of cloud cover:"))
  Select Case percent
    Case 0 To 30
      txtOutput.Text = "Clear"
    Case 31 To 70
      txtOutput.Text = "Partly cloudy"
    Case 71 To 99
      txtOutput.Text = "Cloudy"
    Case 100
      txtOutput.Text = "Overcast"
    Case Else
      txtOutput.Text = "Percentage must be between 0 and 100."
  End Select
End Sub
```
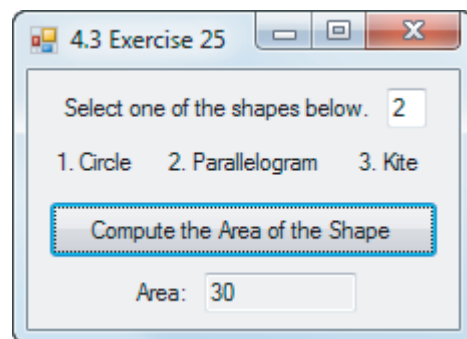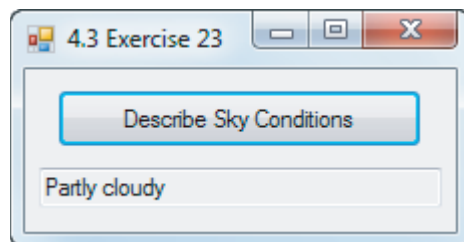


**25.**
```
Private Sub btnCompute_Click(...) Handles btnCompute.Click
  Dim shapeNum As Integer
  Dim radius, length, height, width As Double
  'Input choice of shape and its dimensions
  '1. Circle   2. Parallelogram   3. Kite
  shapeNum = CInt(mtbSelection.Text)     'Mask is 0
  Select Case shapeNum
    Case 1
      radius = CDbl(InputBox("Input the radius of the circle: "))
      txtArea.Text = CStr(3.141593 * radius ^ 2)
```

```
      Case 2
        length = CDbl(InputBox("Input the length of the parallelogram: "))
        height = CDbl(InputBox("Input the height of the parallelogram: "))
        txtArea.Text = CStr(length * height)
      Case 3
        length = CDbl(InputBox("Input the length of the kite: "))
        width = CDbl(InputBox("Input the width of the kite: "))
        txtArea.Text = CStr((length * width) / 2)
      Case Else
        MessageBox.Show("Your choice is not valid.", "Try Again.")
        mtbSelection.Clear()
    End Select
    mtbSelection.Focus()
  End Sub
```
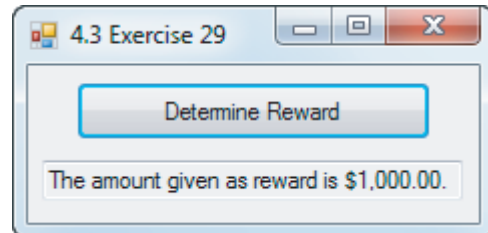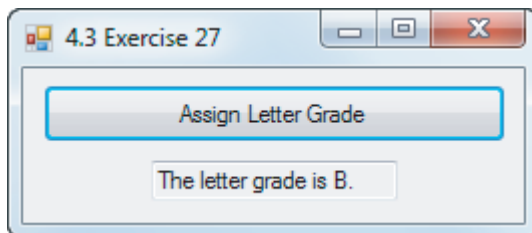
**27.**
```
Private Sub btnAssign_Click(...) Handles btnAssign.Click
  Dim score As Integer, letterGrade As String
  score = CInt(InputBox("What is the score?"))
  Select Case score
    Case 90 To 100
      letterGrade = "A"
    Case 80 To 89
      letterGrade = "B"
    Case 70 To 79
      letterGrade = "C"
    Case 60 To 69
      letterGrade = "D"
    Case 0 To 59
      letterGrade = "F"
    Case Else
      letterGrade = "Invalid"
  End Select
  txtOutput.Text = "The letter grade is " & letterGrade & "."
End Sub
```

| 4.3 Exercise 27 | 4.3 Exercise 29 |
|---|---|
| Assign Letter Grade | Determine Reward |
| The letter grade is B. | The amount given as reward is $1,000.00. |

**29.**
```
Private Sub btnDescribe_Click(...) Handles btnDetermine.Click
  Dim amountRecovered, payment As Double
  amountRecovered = CDbl(InputBox("How much was recovered?"))
  Select Case amountRecovered
    Case Is <= 75000
      payment = 0.1 * amountRecovered
    Case Is <= 100000
      payment = 7500 + 0.05 * (amountRecovered — 75000)
    Case Is > 100000
      payment = 8750 + 0.01 * (amountRecovered — 100000)
      If payment > 50000 Then
        payment = 50000
      End If
  End Select
```

```
        txtOutput.Text = "The amount given as reward is " &
                         FormatCurrency(payment) & "."
    End Sub

31. Private Sub btnDisplay_Click(...) Handles btnDisplay.Click
      Dim pres, state, trivia, whichBush As String
      pres = txtLastName.Text
      Select Case pres.ToUpper
        Case "CARTER"
          state = "Georgia"
          trivia = "The only soft drink served in the Carter " &
                   "White House was Coca-Cola."
        Case "REAGAN"
          state = "California"
          trivia = "His secret service code name was Rawhide."
        Case "BUSH"
          state = "Texas"
          whichBush = InputBox("Are his middle initials HW or W?")
          Select Case whichBush.ToUpper
            Case "HW"
              trivia = "He celebrated his 85th birthday by parachuting " &
                       "out of an airplane."
            Case "W"
              trivia = "He once owned the Texas Rangers baseball team."
          End Select
        Case "CLINTON"
          state = "Arkansas"
          trivia = "In college he did a good imitation of Elvis Presley."
        Case "OBAMA"
          state = "Illinois"
          trivia = "He was the eighth left-handed president."
        Case Else
          state = ""
          trivia = ""
      End Select
      If state <> "" Then
        lstOutput.Items.Clear()
        lstOutput.Items.Add("President " & pres & "'s" &
                            " home state was " & state & ".")
        lstOutput.Items.Add(trivia)
      End If
    End Sub
```
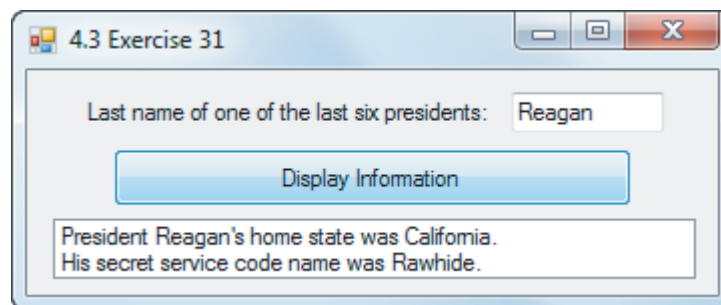


### Exercises 4.4

**1.** The word "Income" becomes the caption embedded in the top of GroupBox1.

**3.** The `CheckBox1` check box becomes (or remains) unchecked.

**5.** The radio button becomes (or remains) unselected.

**7.** The radio button's caption becomes "Clear <u>A</u>ll".

**9.** `RadioButton1.Text = "Yes"`    **11.** `CheckBox1.Checked = True`

**13.** `RadioButton2` is on and `RadioButton1` is off.    **15.** Yes

**17.**
```
Private Sub CheckedChanged(...) Handles _
      radDeluxe.CheckedChanged, radSuper.CheckedChanged,
      chkUpgradedVideo.CheckedChanged, chkModem.CheckedChanged,
      chkMemory.CheckedChanged
   If radDeluxe.Checked Or radSuper.Checked Then
     Dim cost As Double = 0
     'Add amounts to the cost based upon selections.
     If radDeluxe.Checked Then
       cost += 1000
     Else    'Super model
       cost += 1500
     End If
     If chkUpgradedVideo.Checked Then
       cost += 200
     End If
     If chkModem.Checked Then
       cost += 30
     End If
     If chkMemory.Checked Then
       cost += 120
     End If
     txtTotalCost.Text = FormatCurrency(cost)
   Else
     MessageBox.Show("You must first select a model!")
   End If
 End Sub
```

**19.**
```
Private Sub btnVote_Click(...) Handles btnVote.Click
   If radCandidate1.Checked Then
     txtVote.Text = "You voted for Kennedy."
   ElseIf radCandidate2.Checked Then
     txtVote.Text = "You voted for Nixon."
   Else
     txtVote.Text = "You voted for neither."
   End If
 End Sub

 Private Sub btnClear_Click(...) Handles btnClear.Click
   radCandidate1.Checked = False
   radCandidate2.Checked = False
 End Sub
```

**21.**
```
Private Sub btnRecord_Click(...) Handles btnRecord.Click
   Dim majorSelected As Boolean
   Dim yearSelected As Boolean
   If lstMajors.Text = "" Then
     majorSelected = False
   Else
     majorSelected = True
   End If
```

```
      If (radFrosh.Checked Or radSoph.Checked Or radJunior.Checked Or
                        radSenior.Checked) Then
        yearSelected = True
      Else
        yearSelected = False
      End If
      If majorSelected And yearSelected Then
        MessageBox.Show("Information Processed")
      ElseIf Not majorSelected Then
        If Not yearSelected Then
          MessageBox.Show("You must select a Major and a Year.")
        Else
          MessageBox.Show("You must select a Major.")
        End If
      Else
        MessageBox.Show("You must select a Year.")
      End If
    End Sub
```

23. ```
    Private Sub CheckedChanged(...) Handles _
                  chkSenior.CheckedChanged, chkBlind.CheckedChanged,
                  chkSpouse.CheckedChanged, chkSpouseBlind.CheckedChanged
      Dim count As Integer = 0
      If chkSenior.Checked Then
        count += 1
      End If
      If chkBlind.Checked Then
        count += 1
      End If
      If chkSpouse.Checked Then
        count += 1
      End If
      If chkSpouseBlind.Checked Then
        count += 1
      End If
      txtOutput.Text = CStr(count)
    End Sub
    ```

25. ```
    Private Sub btnCalculate_Click(...) Handles btnCalculate.Click
      Dim fee As Double = 0
      If radAdult.Checked Or radSenior.Checked Then
        Dim numExtras As Integer = 0
        If chkTennis.Checked Then
          numExtras += 1
        End If
        If chkLocker.Checked Then
          numExtras += 1
        End If
        If chkLaundry.Checked Then
          numExtras += 1
        End If
        If radAdult.Checked Then
          fee = 100 + numExtras * 25
        Else
          fee = 75 + numExtras * 25
        End If
        txtFee.Text = FormatCurrency(fee)
      Else
        MessageBox.Show("You must select a membership category.")
      End If
    End Sub
    ```