**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Exercises 4.3**

In Exercises 1 through 10, determine the output displayed when the button is clicked.

**1.** Private Sub btnConvert\_Click(...) Handles btnConvert.Click

'Convert Celsius to Fahrenheit

Dim temp As Double = 95

txtOutput.Text = CStr(CtoF(temp))

End Sub

Function CtoF(ByVal t As Double) As Double

Return (9 / 5) \* t + 32

End Function

**2.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

Dim acres As Double 'Number of acres in a parking lot

acres = 5

txtOutput.Text = "You can park about "& Cars(acres) & " cars."

End Sub

Function Cars(ByVal x As Double) As Double

'Number of cars that can be parked

Return 100 \* x

End Function

**3.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Rule of 72

Dim p As Double

p = CDbl(txtPopGr.Text) 'Population growth as a percent

txtOutput.Text = "The population will double in "& \_

DoublingTime(p) & " years."

End Sub

Function DoublingTime(ByVal x As Double) As Double

'Estimate time required for a population to double at a growth rate of x percent

Return 72 / x

End Function

(Assume the text box txtPopGr contains the number 3.)

**4.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Calculate max. ht. of a ball thrown straight up in the air

Dim initVel, initHt As Double

initVel = CDbl(txtVel.Text) 'Initial velocity of ball

initHt = CDbl(txtHt.Text) 'Initial height of ball

txtOutput.Text = CStr(MaximumHeight(initVel, initHt))

End Sub

Function MaximumHeight(ByVal v As Double, ByVal h As Double) As Double

Return h + (v ^ 2 / 64)

End Function

(Assume the text boxes contain the values 96 and 256.)

**5.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Compute volume of a cylinder

Dim r As Double = 1 'Radius

Dim h As Double = 2 'Height

DisplayVolume(r, h)

r = 3

h = 4

DisplayVolume(r, h)

End Sub

Function Area(ByVal r As Double) As Double

'Compute area of a circle of radius r

Return 3.14159 \* r ^ 2

End Function

Sub DisplayVolume(ByVal r As Double, ByVal h As Double)

lstBox.Items.Add("Volume of cylinder having base area "& \_

Area(r) & " and height "& h & " is "& (h \* Area(r)))

End Sub

**6.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Determine the day of the week from its number

Dim days As String, num As Integer

days = "SunMonTueWedThuFriSat"

num = CInt(InputBox("Enter the number of the day."))

txtOutput.Text = "The day is "& DayOfWk(days, num) & "."

End Sub

Function DayOfWk(ByVal x As String, ByVal n As Integer) As String

'x String containing 3-letter abbreviations of days n The number of the day

Dim position As Integer

position = 3 \* n - 3

Return x.Substring(position, 3)

End Function

(Assume the response is 4.)

**7.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Demonstrate local variables

Dim word As String = "Choo "

txtOutput.Text = TypeOfTrain()

End Sub

Function TypeOfTrain() As String

'Concatenate the value of word with itself

Dim word As String

word &= word

Return word & "train"

End Function

**8.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Triple a number

Dim num As Double = 5

lstOutput.Items.Add(Triple(num))

lstOutput.Items.Add(num)

End Sub

Function Triple(ByVal x As Double) As Double

Dim num As Double = 3

Return num \* x

End Function

**9.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

Dim word As String

word = "moral"

Negative(word)

word = "political"

Negative(word)

End Sub

Function AddA(ByVal word As String) As String

Return "a"& word

End Function

Sub Negative(ByVal word As String)

lstOutput.Items.Add(word & " has the negative "& AddA(word))

End Sub

**10.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

Dim city As String, pop, shrinks As Double

Dim sr As IO.StreamReader = IO.File.OpenText("DOCS.TXT")

city = sr.ReadLine

shrinks = CDbl(sr.ReadLine)

DisplayData(city, pop, shrinks)

city = sr.ReadLine

pop = CDbl(sr.ReadLine)

shrinks = CDbl(sr.ReadLine)

sr.Close()

DisplayData(city, pop, shrinks)

End Sub

Sub DisplayData(ByVal city As String, ByVal pop As Double, ByVal shrinks As Double)

lstBox.Items.Add(city & " has "& ShrinkDensity(pop, shrinks) & " psychiatrists per 100,000 people.")

End Sub

Function ShrinkDensity(ByVal pop As Double, ByVal shrinks As Double) As Double

Return Int(100000 \* (shrinks / pop))

End Function

(Assume the six lines of the file DOCS.TXT contain the following data: Boston,

2824000, 8602, Denver, 1633000, 3217.)

In Exercises 11 and 12, identify the errors.

**11.** Private Sub btnDisplay\_Click(...) Handles btnDisplay.Click

'Select a greeting

Dim answer As Integer

answer = CInt(InputBox("Enter 1 or 2."))

txtOutput.Text = CStr(Greeting(answer))

End Sub

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

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Exercises 4.3**

**Programming Exercises**

1. According to Plato, a man should marry a woman whose age is half his age plus seven

years. Write a program that requests a man's age as input and gives the ideal age of his

wife.

1. 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.

1. The three ingredients 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.)

1. 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 Ceil(x) = Int(x).(Test the program

1. Write a program to request the name of a United States senator as input and display the

address and greeting for a letter to the senator. Assume the name has two parts, and use a

function to determine the senator's last name. A sample 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,