

## DEITEL

### Exercises Chapter 4 Control Statements: Part 1

**4.11** Identify and correct the error(s) in each of the following:

```
a) if ( age >= 65 );
    cout << "Age is greater than or equal to 65" << endl;
    else
        cout << "Age is less than 65 << endl";
b) if ( age >= 65 )
    cout << "Age is greater than or equal to 65" << endl;
    else;
        cout << "Age is less than 65 << endl";
c) int x = 1, total;

    while ( x <= 10 )
    {
        total += x;
        ++x;
    }
d) While ( x <= 100 )
    total += x;
    ++x;
e) while ( y > 0 )
    {
        cout << y << endl;
        ++y;
    }
```

**4.13 (Gas Mileage)** Drivers are concerned with the mileage obtained by their automobiles. One driver has kept track of several tankfuls of gasoline by recording miles driven and gallons used for each tankful. Develop a C++ program that uses a while statement to input the miles driven and gallons used for each tankful. The program should calculate and display the miles per gallon obtained for each tankful and print the combined miles per gallon obtained for all tankfuls up to this point.

```
Enter miles driven (-1 to quit): 287
Enter gallons used: 13
MPG this tankful: 22.076923
Total MPG: 22.076923
```

```
Enter miles driven (-1 to quit): 200
Enter gallons used: 10
MPG this tankful: 20.000000
Total MPG: 21.173913
```

```
Enter the miles driven (-1 to quit): 120
Enter gallons used: 5
MPG this tankful: 24.000000
Total MPG: 21.678571

Enter the miles used (-1 to quit): -1
```

**4.16 (Salary Calculator)** Develop a C++ program that uses a while statement to determine the gross pay for each of several employees. The company pays “straight time” for the first 40 hours worked by each employee and pays “time-and-a-half” for all hours worked in excess of 40 hours.

You are given a list of the employees of the company, the number of hours each employee worked last week and the hourly rate of each employee. Your program should input this information for each employee and should determine and display the employee’s gross pay.

```
Enter hours worked (-1 to end): 39
Enter hourly rate of the employee ($00.00): 10.00
Salary is $390.00

Enter hours worked (-1 to end): 40
Enter hourly rate of the employee ($00.00): 10.00
Salary is $400.00

Enter hours worked (-1 to end): 41
Enter hourly rate of the employee ($00.00): 10.00
Salary is $415.00

Enter hours worked (-1 to end): -1
```

**4.23 (Dangling-else Problem)** State the output for each of the following when x is 9 and y is 11 and when x is 11 and y is 9. The compiler ignores the indentation in a C++ program. The C++ compiler always associates an else with the previous if unless told to do otherwise by the placement of braces {}. On first glance, you may not be sure which if and else match, so this is referred to as the “dangling-else” problem. We eliminated the indentation from the following code to make the problem more challenging. [Hint: Apply indentation conventions you’ve learned.]

```
a)  if ( x < 10 )
    if ( y > 10 )
        cout << "*****" << endl;
    else
        cout << "#####" << endl;
    cout << "$$$$$" << endl;
```

```

b) if ( x < 10 )
    {
        if ( y > 10 )
            cout << "*****" << endl;
        }
        else
        {
            cout << "#####" << endl;
            cout << "$$$$$" << endl;
        }
    }

```

**4.25 (Square of Asterisks)** Write a program that reads in the size of the side of a square then prints a hollow square of that size out of asterisks and blanks. Your program should work for squares of all side sizes between 1 and 20. For example, if your program reads a size of 5, it should print

```

*****
*       *
*       *
*       *
*       *
*****

```

**4.26 (Palindromes)** A palindrome is a number or a text phrase that reads the same backward as forward. For example, each of the following five-digit integers is a palindrome: 12321, 55555, 45554 and 11611. Write a program that reads in a five-digit integer and determines whether it's a palindrome. [Hint: Use the division and modulus operators to separate the number into its individual digits.]

**4.32 (Sides of a Triangle)** Write a program that reads three nonzero double values and determines and prints whether they could represent the sides of a triangle.

**4.33 (Sides of a Right Triangle)** Write a program that reads three nonzero integers and determines and prints whether they could be the sides of a right triangle.

**4.34 (Factorial)** The factorial of a nonnegative integer

$n$  is written  $n!$  (pronounced " $n$  factorial")

and is defined as follows:

$$n! = n \cdot (n - 1) \cdot (n - 2) \cdot \dots \cdot 1 \text{ (for values of } n \text{ greater than 1)}$$

and

$$n! = 1 \text{ (for } n = 0 \text{ or } n = 1).$$

For example,  $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$ , which is 120.

Write a program that reads a nonnegative integer and computes and prints its factorial. Use a while statement.