Programming Logic and Design, 9th Edition

Chapter 1

Review Questions

1. Computer programs also are known as_____.

   a. data

   b. hardware

   c. software

   d. information

2. The major computer operations include _____.

   a. input, processing, and output

   b. hardware and software

   c. sequence and looping

   d. spreadsheets, word processing, and data communications

3. Visual Basic, C++, and Java are all examples of computer _____.

   a. operating systems

   b. programming languages

   c. hardware

   d. machine languages

4. A programming language's rules are its _____.

   a. syntax

   b. logic

   c. format

   d. options

5. The most important task of a compiler or interpreter is to _____.

   a. create the rules for a programming language

   b. translate English statements into a language such as Java

   c. translate programming language statements into machine language

   d. execute machine language programs to perform useful tasks

6. Which of the following is temporary, internal storage?

   a. CPU

   b. hard disk

   c. keyboard

   d. memory

7. Which of the following pairs of steps in the programming process is in the correct order?

   a. code the program, plan the logic

   b. test the program, translate it into machine language

   c. put the program into production, understand the problem

   d. code the program, translate it into machine language

8. A programmer's most important task before planning the logic of a program is to _____.

   a. decide which programming language to use

   b. code the problem

   c. train the users of the program

   d. understand the problem

9. The two most commonly used tools for planning a program's logic are _____.

a. ASCII and EBCDIC

b. Java and Visual Basic

c. flowcharts and pseudocode

d. word processors and spreadsheets

10. Writing a program in a language such as C++ or Java is known as _____ the program.

a. translating

b. coding

c. interpreting

d. compiling

11. An English-like programming language such as Java or Visual Basic is a _____ programming language.

a. machine-level

b. low-level

c. high-level

d. binary-level

12. Which of the following is an example of a syntax error?

a. producing output before accepting input

b. subtracting when you meant to add

c. misspelling a programming language word

d. all of the above

13. Which of the following is an example of a logical error?

a. performing arithmetic with a value before inputting it

b. accepting two input values when a program requires only one

c. dividing by 3 when you meant to divide by 30

d. all of the above

14. The parallelogram is the flowchart symbol representing _____.

a. input

b. output

c. either a or b

d. none of the above

15. In a flowchart, a rectangle represents _____.

a. input

b. a sentinel

c. a question

d. processing

16. In flowcharts, the decision symbol is a _____.

a. parallelogram

b. rectangle

c. lozenge

d. diamond

17. The term *eof* represents _____.

a. a standard input device

b. a generic sentinel value

c. a condition in which no more memory is available for storage

d. the logical flow in a program

18. When you use an IDE instead of a simple text editor to develop a program, _____.

    a. the logic is more complicated

    b. the logic is simpler

    c. the syntax is different

    d. some help is provided

19. When you write a program that will run in a GUI environment as opposed to a command-line environment, _____.

    a. the logic is very different

    b. some syntax is different

    c. you do not need to plan the logic

    d. users are more confused

20. As compared to procedural programming, with object-oriented programming, _____.

    a. the programmer's focus differs

    b. you cannot use some languages, such as Java

    c. you do not accept input

    d. you do not code calculations; they are created automatically

Programming Exercises

1. `Match the definition with the appropriate term.`

1.	Computer system devices	a.	compiler
2.	Another word for *program*	b.	syntax
3.	Language rules	c.	logic
4.	Order of instructions	d.	hardware
5.	Language translator	e.	software

Answer:

1.	Computer system equipment	→	d.	hardware
2.	Another word for *program*	→	e.	software
3.	Language rules	→	b.	syntax
4.	Order of instructions	→	c.	logic
5.	Language translator	→	a.	compiler

2. In your own words, describe the steps to writing a computer program.

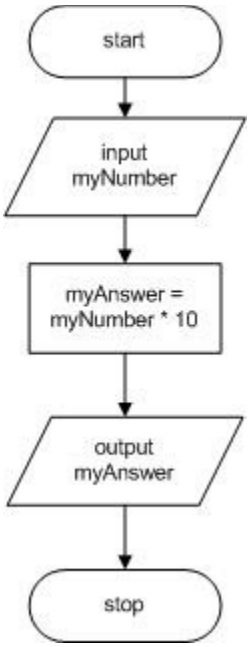
Answer:

The programmer must understand the problem that the user is trying to solve. Next, the programmer plans the logic, often using a flowchart or pseudocode. Then, the program is coded in a language, such as Visual Basic or Java, and translated to machine language using a compiler or interpreter. Finally, the program is tested and then put into production and maintained over the ensuing months or years.

3. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter a value. The program multiplies the value by 10 and outputs the result.

Answer:

Flowchart



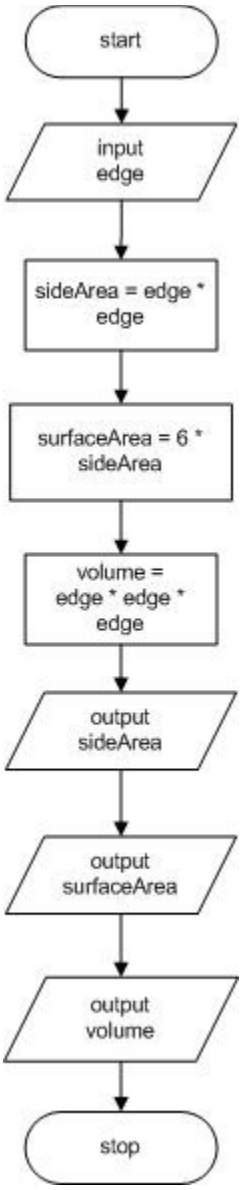
Pseudocode

```
start
   input myNumber
   myAnswer = myNumber * 10
   output myAnswer
stop
```

4. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter a value for one edge of a cube. The program calculates the surface area of one side of the cube, the surface area of the cube, and its volume. The program outputs all the results.

Answer:

Flowchart



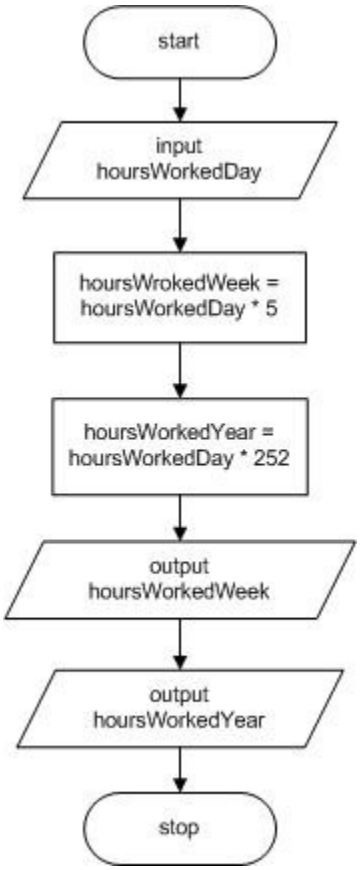
Pseudocode

```
start
   input edge
   sideArea = edge * edge
   surfaceArea = 6 * sideArea
   volume = edge * edge * edge
   output sideArea
   output surfaceArea
   output volume
stop
```

5. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter a value for hours worked in a day. The program calculates the hours worked in a five-day week and the hours worked in a 252-day work year. The program outputs all the results.

Answer:

Flowchart



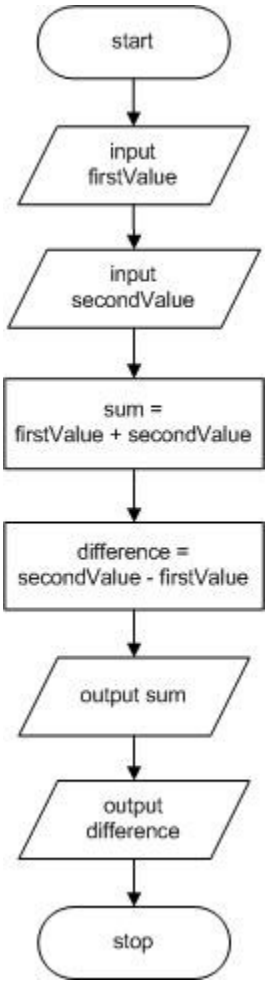
Pseudocode

```
start
   input hoursWorkedDay
   hoursWorkedWeek = hoursWorkedDay * 5
   hoursWorkedYear = hoursWorkedDay * 252
   output hoursWorkedWeek
   output hoursWorkedYear
stop
```

6. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter two values. The program outputs the sum of and the difference between the two values.

Answer:

Flowchart



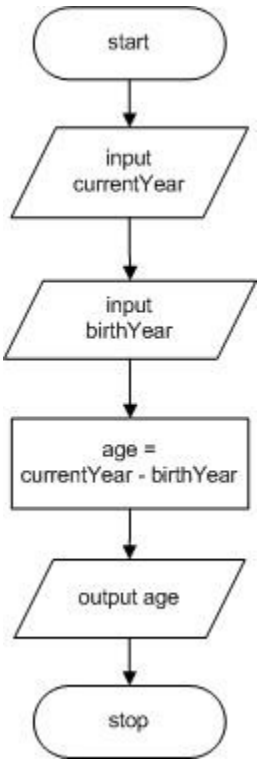
Pseudocode

```
start
   input firstValue
   input secondValue
   sum = firstValue + secondValue
   difference = secondValue - firstValue
   output sum
   output difference
stop
```

7. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter values for the current year and the user's birth year. The program outputs the age of the user this year.

Answer:

Flowchart



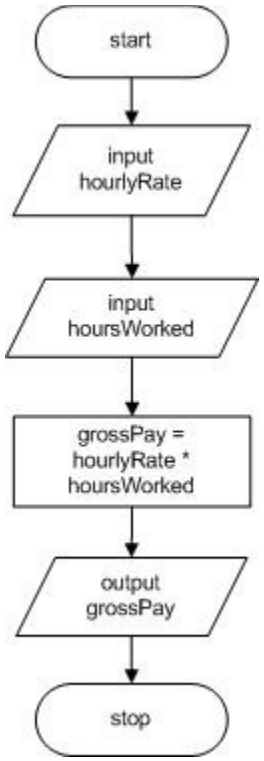
Pseudocode

```
start
   input currentYear
   input birthYear
   age = currentYear - birthYear
   output age
stop
```

8. a. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter an hourly pay rate and hours worked. The program outputs the user's gross pay.

Answer:

Flowchart



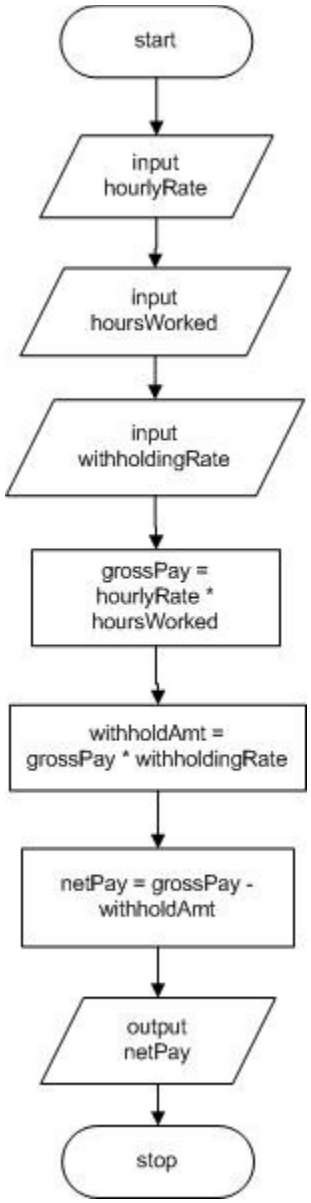
Pseudocode

```
start
   input hourlyRate
   input hoursWorked
   grossPay = hourlyRate * hoursWorked
   output grossPay
stop
```

b. Modify the program that computes gross pay to allow the user to enter the withholding tax rate. The program outputs the net pay after taxes have been withheld.

Answer:

Flowchart



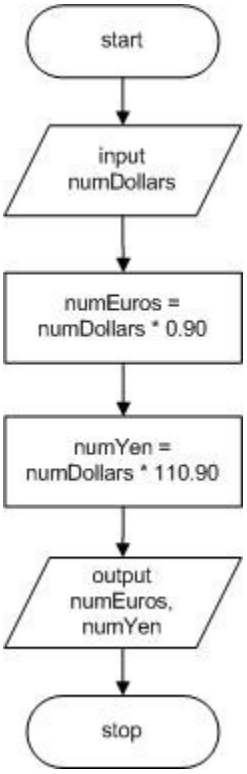
Pseudocode

```
start
   input hourlyRate
   input hoursWorked
   input withholdingRate
   grossPay = hourlyRate * hoursWorked
   withholdAmt = grossPay * withholdingRate
   netPay = grossPay - withholdAmt
   output netPay
stop
```

9. Research current rates of monetary exchange. Draw a flowchart or write pseudocode to represent the logic of a program that allows the user to enter a number of dollars and convert it to Euros and Japanese yen.

Answer:

Flowchart



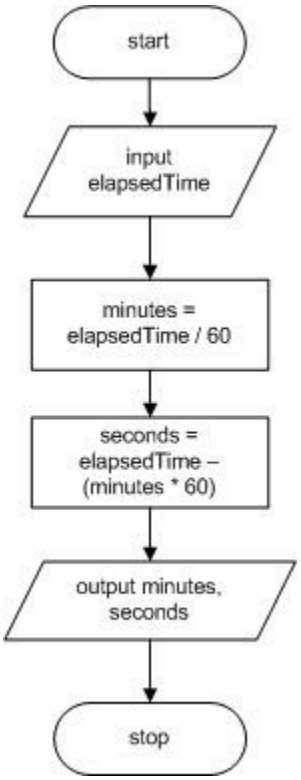
Pseudocode

```
start
   input numDollars
   numEuros = numDollars * 0.90
   numYen = numDollars * 110.90
   output numEuros, numYen
stop

(Please note that these exchange rates are valid as of the
time of this writing)
```

10. A mobile phone app allows a user to press a button that starts a timer that counts seconds. When the user presses the button again, the timer stops. Draw a flowchart or write pseudocode that accepts the elapsed time in seconds and displays the value in minutes and remaining seconds. For example, if the elapsed time was 130 seconds, the output would be 2 minutes and 10 seconds.

Answer: (Please note this solution assumes *minutes* is an integer and has been truncated.)

Flowchart



Pseudocode

```
start
   input elapsedTime
   minutes = elapsedTime / 60
   seconds = elapsedTime – (minutes * 60)
   output minutes, seconds
stop
```

Performing Maintenance

1. In this chapter you learned that some of the tasks assigned to new programmers frequently involve maintenance—making changes to existing programs because of new requirements. A file named MAINTENANCE01-01.txt is included with your downloadable student files. Assume that this program is a working program in your organization and that it needs modifications as described in the comments (lines that begin with two slashes) at the beginning of the file. Your job is to alter the program to meet the new specifications.

Answer:

```
// This program accepts a user's monthly pay
// and rent, utilities, and grocery bills
// and displays the amount available for discretionary spending
// (which might be negative)
// Modify the program to output the pay and the total bills
// as well as the remaining discretionary amount

start
   input pay
   input rent
   input utilities
   input groceries
   bills = rent + utilities + groceries
   discretionary = pay - bills
   output pay
   output bills
   output discretionary
stop
```

Find the Bugs

1. Your downloadable files for Chapter 1 include DEBUG01-01.txt, DEBUG01-02.txt, and DEBUG01-03.txt. Each file starts with some comments (lines that begin with two slashes) that describe the program. Examine the pseudocode that follows the introductory comments, then find and correct all the bugs.

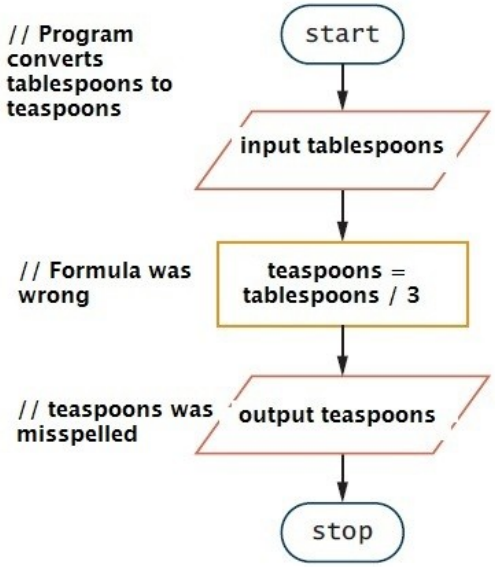
Answer:

```
DEBUG01-01
// This pseudocode is intended to describe
// computing the price of an item on sale for 10% off
start
   input origPrice
   discount = origPrice * 0.10
   finalPrice = origPrice - discount
   output finalPrice
stop

DEBUG01-02
// This pseudocode is intended to compute the number
// of miles per gallon you get with your automobile.
start
   input milesTraveled
   input gallonsOfGasUsed
   milesPerGallon = milesTraveled / gallonsOfGasUsed
```

```
    // milesPerGallon is computed using division
  output milesPerGallon
    // miles is misspelled, and the P in milesPerGallon should be uppercase
stop
  // Program should end with stop

DEBUG01-03
// This pseudocode is intended to describe
// computing the per day cost of your rent
// in a 30-day month
start
  input rent
  costPerDay = rent / 30
    // Comment indicates 30-day month
  output costPerDay
    // output should be costPerDay
stop
```

2. Your downloadable files for Chapter 1 include a file named DEBUG01-04.jpg that contains a flowchart that contains syntax and/or logical errors. Examine the flowchart and then find and correct all the bugs.

Answer:



Game Zone

1. Create the logic for a Mad Lib program that accepts five words from input, then creates and displays a short story or nursery rhyme that uses them.

Answer:

Students' answers will vary. But a simple solution could be:

```
start
   input word1
   input word2
   input word3
   input word4
   input word5
   output "Jack and Jill went up the ", word1,
          " to fetch a pail of ", word2,
          ". "Jack ", word3, " down and broke his ", word4,
          " and Jill came ", word5, " after."
stop
```