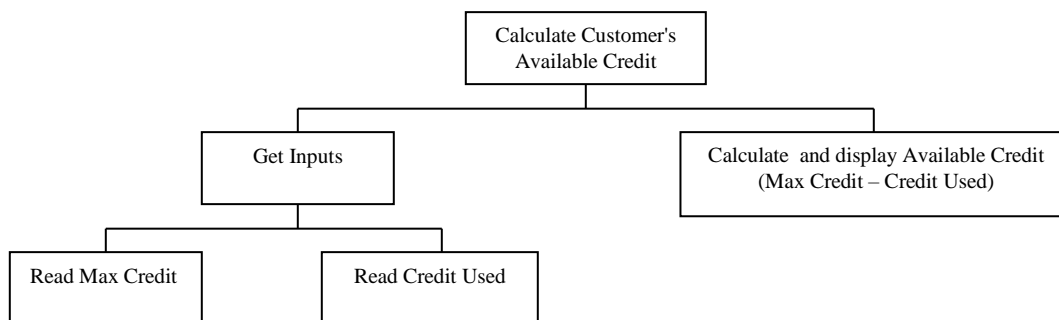


Starting Out With C++: Early Objects, Seventh Edition

Solutions to End-of-Chapter Review Questions

Chapter 1

1. programmed
 2. CPU
 3. arithmetic logic unit (ALU) and control unit
 4. disk drive
 5. operating systems and application software
 6. instructions
 7. programming language
 8. Machine language
 9. High-level
 10. Low-level
 11. portability
 12. key
 13. programmer-defined symbols
 14. Operators
 15. Punctuation
 16. syntax
 17. variable
 18. defined (or declared)
 19. input, processing, output
 20. Input
 21. Output
 22. hierarchy chart
23. Main memory, or RAM, is volatile, which means its contents are erased when power is removed from the computer. Secondary memory, such as a disk or CD, does not lose its contents when power is removed from the computer.
24. An operating system is a set of programs that manages the computer's hardware devices and controls their processes. Application software are programs that users use to solve specific problems or perform general operations.
25. A syntax error is the misuse of a key word, operator, punctuation, or other part of the programming language. A logical error is a mistake that tells the computer to carry out a task incorrectly or to carry out tasks in the wrong order. It causes the program to produce the wrong results.
26. Hierarchy Chart:



27. Account Balance High Level Pseudocode

Have user input starting balance
Have user input total deposits
Have user input total withdrawals
Calculate current balance
Display current balance

Account Balance Detailed Pseudocode

Input startBalance // with prompt
Input totalDeposits // with prompt
Input totalWithdrawals // with prompt
currentBalance = startBalance + totalDeposits - totalWithdrawals
Display currentBalance

28. Sales Tax High Level Pseudocode

Have user input retail price
Have user input sales tax rate
Calculate tax amount
Calculate sales total
Display tax amount and sales total

Sales Tax Detailed Pseudocode

Input retailPrice // with prompt
Input salesTaxRate // with prompt
taxAmount = retailPrice * salesTaxRate
salesTotal = retailPrice + taxAmount
Display taxAmount, salesTotal

29. 45

30. 7

31. 28

32. 365

33. The error is that the program performs its math operation before the user has entered values for the variables width and length.

34. Some of the questions that should be asked are:

What standard ceiling height should be used, or is this figure to be input?

How many square feet should be subtracted out for windows and doors, or do you also want this information input since it could vary by room?

Are the ceilings also to be painted, or just the walls?

How many square feet will 1 gallon of paint cover?

How many coats of paint will you use, or should this information be input?

Chapter 2

- | | |
|--------------------------|---------------------------|
| 1. semicolon | 5. braces { } |
| 2. <code>iostream</code> | 6. constants, or literals |
| 3. <code>main</code> | 7. <code>9.7865E14</code> |
| 4. <code>#</code> | 8. 1, 2 |

9. B

10. A, C

11. B (C is valid, but prints the contents of variable `Hello`, rather than the string `"Hello"`.)

12. B

13. A) 11 B) 14 C) 3 (An integer divide takes place.)

14. A) 9 B) 14 C) 2

15. `double temp,`
 `weight,`
 `height;`

16. `int months = 2,`
 `days,`
 `years = 3;`

17. A) `d2 = d1 + 2;`
 B) `d1 = d2 * 4;`
 C) `c = 'K';`
 D) `i = 'K';`
 E) `i = i - 1;`

18. A) `d1 = d2 - 8.5;`
 B) `d2 = d1 / 3.14;`
 C) `c = 'F';`
 D) `i = i + 1;`
 E) `d2 = d2 + d1;`

19. `cout << "Two mandolins like creatures in the\n\n\n";`
 `cout << "dark\n\n\n";`
 `cout << "Creating the agony of ecstasy.\n\n\n";`
 `cout << " - George Barker\n\n\n\n";`

20. `cout << "L\n"`
 `<< "E\n"`
 `<< "A\n"`
 `<< "F\n";`

This can also be written as a single string literal: `cout << "L\nE\nA\nF\n";`

21. *Input weeks* *// with prompt*
 `days = weeks * 7`
 Display days

22. *Input eggs* // with prompt
 cartons = eggs / 12 // perform integer divide
 Display cartons

23. *Input speed* // with prompt
 Input time // with prompt
 *distance = speed * time*
 Display distance

24. *Input miles* // with prompt
 Input gallons // with prompt
 milesPerGallon = miles / gallons
 Display milesPerGallon

25. A) 0
 100
 B) 8
 2
 C) I am the incredible computing
 machine
 and I will
 amaze
 you.

26. A) Be careful!
 This might/n be a trick question.
 B) 23
 1

27. The C-style comments symbols are backwards.
 iostream should be enclosed in angle brackets.
 There shouldn't be a semicolon after *int main()*.
 The opening and closing braces of function *main* are reversed.
 There should be a semicolon after *int a, b, c*.
 The comment `\\ Three integers` should read `// Three integers`.
 There should be a semicolon at the end of each of the three assignment statements.
 cout begins with a capital letter.
 The stream insertion operator (that appears twice in the *cout* statement)
 should read `<<` instead of `<`.
 The *cout* statement uses the variable *C* instead of *c*.

28. Whatever problem a pair of students decides to work with they must determine such things as which values will be input vs. which will be set internally in the program, how much precision is required on calculations, what output will be produced by the program, and how it should be displayed. Students must also determine how to handle situations that are not clear cut. In the paint problem many of these considerations are listed in the teacher answer key (Chapter 1, Question 34). In the recipe program students must determine such things as how to handle quantities, like one egg, that cannot be halved. In the driving program, knowing distance and speed are not enough. Agreement should be reached on how to handle delays due to traffic lights and traffic congestion. Should this be an input value, computed as a percent of overall driving time, or handled some other way?

Chapter 3

1. A) `cin >> description;`
B) `getline(cin, description);`
2. `char name[35];`
3. A) `cin >> setw(25) >> name;`
B) `cin.getline(name, 25);`
4. `cin >> age >> pay >> section;`
5. `iostream` and `iomanip`
6. `char city[31];`
7. A) `price = 12 * unitCost;`
B) `cout << setw(12) << 98.7;`
C) `cout << 12;`
8. 5, 22, 20, 6, 46, 30, 0, 3, 16
9. A) `a = 12 * x;`
B) `z = 5 * x + 14 * y + 6 * k;`
C) `y = pow(x, 4);`
D) `g = (h + 12) / (4 * k);`
E) `c = pow(a, 3) / (pow(b, 2) * pow(k, 4));`
10. Two implicit data type conversions occur. First, because `mass` is a float, a copy of the `int` value stored in `units` is promoted to a float before the multiplication operation is done. The result of `mass * units` will be a float. The second data type conversion occurs when the float result is promoted to a double in order to be stored in double variable `weight`.
11. 8
12. Either of these will work:
`unitsEach = static_cast<double>(qty) / salesReps;`
`unitsEach = qty / static_cast<double>(salesReps);`
13. `const int RATE = 12;`
14. `x += 5;`
`total += subtotal;`
`dist /= rep;`
`ppl *= period;`
`inv -= shrinkage;`
`num %= 2;`
15. `east = west = north = south = 1;`
16. `int sum = 0;`

17. No, a named constant must be initialized at the time it is defined. It cannot be assigned a value at a later time.
18. `cout << fixed << showpoint << setprecision(2);`
`cout << setw(8) << divSales;`
19. `cout << fixed << showpoint << setprecision(4);`
`cout << setw(12) << profit;`
20. A) `cmath` B) `fstream` C) `iomanip`

Note: Once students understand that inputs from the keyboard should *always* be preceded by prompts, the `//` with prompt comment can be omitted from the pseudocode. Therefore, beginning with Chapter 3, we no longer include it.

21. `Input score1`
`Input score2`
`Input score3`
`average = (score1 + score2 + score3) / 3.0`
`Display average`
22. `discountPct = .15`
`Input salesAmt`
`amtSaved = salesAmt * discountPct`
`amtDue = salesAmt - amtSaved`
`Display amtSaved, amtDue`
23. `Input maxCredit`
`Input creditUsed`
`availableCredit = maxCredit - creditUsed`
`Display availableCredit`
24. `PI = 3.14`
`PRICE_PIZZA12 = 12.00`
`PRICE_PIZZA14 = 14.00`
`areaPizza12 = PI * (12 / 2)2`
`areaPizza14 = PI * (14 / 2)2`
`pricePerSqIn12 = PRICE_PIZZA12 / areaPizza12`
`pricePerSqIn14 = PRICE_PIZZA14 / areaPizza14`
`Display pricePerSqIn12, pricePerSqIn14`
25. A) Your monthly wages are 3225 `// Some compilers display 3225.0000`
 B) 6 3 12
 C) In 1492 Columbus sailed the ocean blue.