Chapter 1

1. Match the following people with their contribution to the field of Computer Science, where a
   name can be used more than once.
   A. John Atanasoff and Clifford Berry
   B. Augusta Ada Byron
   C. Charles Babbage
   D. Luigi F. Menabrea
   E. John Mauchly and J. Presper Eckert.
   F. John von Neumann
   ____ C ___ Inventor of the Analytical Engine
   ____ D ___ Published a paper describing the Analytical Engine in French
   ____ A ___ Inventor of the ABC
   ____ B ___ Wrote detailed instructions for numerical computations, thought to be the first
           computer program.
   ____ F ___ proposed a computing model used in most digital computers
   ____ E ___ Inventor of the ENIAC

2. Place the following computers in order from oldest to most recent.
   _middle___ ABC
   _oldest___ Analytical Engine
   _newest___ ENIAC

3. List the five steps of the problem solving methodology given in this chapter.
   (1) Problem Statement
   (2) Input/Output Description
   (3) Hand Calculations
   (4) Algorithm Development
   (5) Testing

4. Which of the following is not computer hardware?
   A. a printer
   B. the hard disk
   C. the operating system
   D. the mouse

5. Which of the following is not computer software?
   A. a USB memory stick
   B. the operating system
   C. a C++ compiler
   D. a spreadsheet

6. Which of the following is responsible for interpreting the instructions stored in memory?
   A. the ALU (arithmetic logic unit)
   B. the control unit
   C. the software
   D. the accumulator
7. Which of the following language is unique to a computer design where the instructions are binary strings?
   A. assembly language
   B. Basic
   C. C++
   D. machine language

8. Real-time programs are usually written in what language?
   A. assembly language
   B. Basic
   C. Fortran
   D. machine language

   A. true
   B. false

10. A compiler is hardware used to translate a C++ program into machine language.
    A. true
    B. false

11. The source file is the machine language version of a C++ program.
    A. true
    B. false

12. Linking is the process of combining the object file with other machine language statements and loading the executable program into memory.
    A. true
    B. false

Chapter 2

1. Match each of the following data types with literal constants of that data type. A data type can be used more than once.
   A. integer
   B. double
   C. character
   D. string
   E. boolean
   F. none of the above.
   __B__ 1.427E3
   __D__ "Oct"
   __B__ -63.29
   __F__ Zipcode
   __C__ '+'
   __A__ -85
   __E__ true
   __C__ \"
2. What is the output of the following program.
```
#include <iostream.h>
#include <iomanip.h>
int main ()
{
    int hr, min;
    hr = 1;
    min = 50;
    cout << "The exam is over at " << hr << ":" << min << endl;
    cout << "One down\n  " << "two to go!";
    return 0;
}
```

The exam is over at 1:50
One down
two to go!

3. For each of the following determine if it is a valid identifier, and if it is not state why.
   A. House# not valid, # is not allowed in identifier
   B. 2nd not valid, identifiers must start with letter or underscore not a number
   C. WHILE valid
   D. num4 valid
   E. double not valid, double is a reserved keyword
   F. last_name valid

4. Evaluate the following functions
   A. (4 - 7) * 3
   B. 14 % 4
   C. 24 / 9
   D. 6.72 / 4.2
   E. 2 + 8 * 3 + 7

<table>
<thead>
<tr>
<th>Function</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. (4 - 7) * 3</td>
<td>-9</td>
</tr>
<tr>
<td>B. 14 % 4</td>
<td>2</td>
</tr>
<tr>
<td>C. 24 / 9</td>
<td>2</td>
</tr>
<tr>
<td>D. 6.72 / 4.2</td>
<td>1.6</td>
</tr>
<tr>
<td>E. 2 + 8 * 3 + 7</td>
<td>33</td>
</tr>
</tbody>
</table>

5. Which of the following is valid on the left side of an assignment operator?
   A. A numeric constant
   B. An expression such as 8*6
   C. A declared constant
   D. A variable
   E. All of the above are valid on the left side of an assignment operator.

6. The operator >> is used to
   A. Take a value from the input stream and store it into a variable
   B. Take a value from a variable and place it into the output stream
   C. Perform integer division and produce the remainder of the division
   D. Specify that the left hand operand is much larger than the right hand operand.
7. Which of the following operators is the increment operator
   A. +=
   B. +
   C. %
   D. ++

8. Which output flag is set to guarantee that a decimal point will be printed when printing a floating point value?
   A. fixed
   B. showpoint
   C. precision
   D. setw

9. Line comments begin with // and run for the rest of the line
   A. true
   B. false

Chapter 3

1. Evaluate the following expressions.
   A. 13 < 6          false
   B. (7 > 9) && (6 != 5)    false
   C. (4 < 3) || (4 >= 0)   true
   D. !(‘F’ < ‘M’)        false

2. Show the output for the following program:
   #include<iostream>
   using namespace std;
   int main()
   {   int I, J;
       for (I=1; I<4; I++)
       { for (J=4; J>1; J--)
           { cout << J << " , " << I;
               cout << endl;
           }
       }
       return 0;
   }
   4, 1
   3, 1
   2, 1
   4, 2
   3, 2
   2, 2
   4, 3
   3, 3
   2, 3
3. Which control statement which is best used when you know how many times to repeat the execution of a group of statements?
   A. the **do-while** statement
   B. the **for** statement
   C. the **switch** statement
   D. the **while** statement

4. The control statement which is best used when you need to choose which statements to execute from among many choices, and the condition for selection can be expressed as some expression is equivalent to an integer value is the . . .
   A. the **for** statement
   B. the **while** statement
   C. the **do/while** statement
   D. the **switch** statement

5. The control statement which is best used when you want to repeat a group of statements over and over based on a condition and the statements in the loop body must be executed at least once is the . . .
   A. the **for** statement
   B. the **while** statement
   C. the **do/while** statement
   D. the **switch** statement

6. What is the correct output from the following program?
   ```
   #include <iostream>
   using namespace std;
   int main()
   {
       int A, B;
       A = 6;
       B = 1;
       if (A > B)
       {
           A = A * B + 2;
           B ++;
       }
       else
       {
           A = A / 2;
           B = B + 4;
       }
       cout << “A = “ << A << “ B = “ << B;
       return 0;
   }
   ```
   A. **A = 8 B = 2**
   B. **A = 3 B = 5**
   C. **A = 4 B = 6**
   D. None of the above is correct
7. A blank space can be placed between the ampersands in the logical operator && to make it more readable.
   A. True
   B. False

8. The while statement will execute the loop body if the condition evaluates to false or zero.
   A. True
   B. False

10. The math function sin will compute sine when given the angle in degrees
    A. true
    B. false

11. In a case sensitive language, such as C++, the variables apples and APPLES refer to different storage locations.
    A. true
    B. false

Chapter 4

1. The class name used to declare a user defined input file is …
   A. inFile
   B. ifstream
   C. iostream
   D. istream

2. Which include statement must you use to define and use files
   A. #include <ifstream>
   B. #include <filestream>
   C. #include <cstream>
   D. #include <fstream>

3. Which of the following statements correctly declares the input file object MyInput and initializes the file object to read the file exam.txt?
   A. ifstream MyInput("exam.txt");
   B. MyInput ifstream("exam.txt");
   C. ifstream MyInput(exam.txt);
   D. MyInput ifstream(exam.txt);

4. What is the next step in using a file, after the file has been declared with the following statement?
   ofstream AnsFile;
   A. You use the file to input a variable.
   B. You use the file by outputting a value to it.
   C. You search for a file named AnsFile.
   D. You open the file, and associate it with a specific file name.
5. Which of the following statements correctly opens the output file object AnsFile to store answers into file *myanswers.txt*?

A. AnsFile.open("myanswers.txt");
B. open.AnsFile("myanswers.txt");
C. open.AnsFile(myanswers.txt);
D. AnsFile.open(myanswers.txt);

6. Which of the following statements will properly store the number from variable *value* into the output file object AnsFile?

A. AnsFile << value;
B. AnsFile << cout << value;
C. cout << AnsFile << value;
D. store.AnsFile(value);

7. Read a number from the input file object MyInput into variable *value*

A. MyInput >> value;
B. MyInput >> cin >> value;
C. cin >> MyInput >> value;
D. value = read.MyInput();

8. Which of the following statements will close the output file object AnsFile from the previous question?

A. close.AnsFile;
B. "myanswers.txt".close;
C. AnsFile.close();
D. AnsFile.close("myanswers.txt ");

9. Which of the following repetition constructs will properly repeat the loop body while not at the end-of-file for input file object DataFile

A. while( ! DataFile)
B. while ( ! eof())
C. while ( ! DataFile.eof())
D. while ( ! eof.DataFile())

10. Which of the following conditions will put the input file object into the fail state?

A. Opening a file which already exists and is in the same directory as the program.
B. Opening a file which does not already exist, or is not in the same directory as the program.
C. Trying to read an integer when the next character in the file is the /n.
D. All of the above will put the file object into the fail state.
Chapter 5

1. What is the output from the following program

```cpp
#include <iostream>
using namespace std;
int X(6), C(3);
int TestMe(int &Y, int Z);
int main (void)
{
    int A, B, W;
    A = 5;
    B = 2;
    X = 1;
    W = TestMe(A, B);
    // Last two output lines
    cout << "A = " << A << " B = " << B << endl;
    cout << "X= " << X << " C = " << C << endl;
    return 0;
}
int TestMe (int &Y, int Z)
{
    int C;
    C = 4;
    cout << " Y = " << Y << " Z = " << Z << endl;
    cout << "C = " << C << endl;
    cout << " X = " << X << endl;
    Z = 7;
    X = C + Z;
    Y = X + Z;
    cout << " X = " << X << " Z = " << Z << endl;
    cout << " Y = " << Y << endl;
    return Z;
}

Y = 5 Z = 2
C = 4
X = 1
X = 11 Z = 7
Y = 18
A = 18 B = 2
X = 11 C = 3
```
2. Write a function that will calculate the length of the hypotenuse of a right triangle. The function will take two real number parameters for the other two sides of the right triangle. The function will return the result it computes.

```c
double hypotenuse(double side1, double side2)
{
    return sqrt(side1*side1 + side2*side2);
}
```

3. What is the output of the following program?

```c
#include <iostream>
using namespace std;
void TestIt(int Y);
int main(void)
{
    int A, B;
    A = 5;
    TestIt(A);
    B = 3;
    TestIt(B);
    return 0;
}
void TestIt(int Y)
{
    int Z(7);
    static int X(2);
    Z = Y*3 - Z;
    Y = Y * 2;
    X ++;
    cout << "X = " << X << " Y = " << Y << " Z = " << Z << "\n\n";
    return;
}
```

X = 3 Y = 10 Z = 8
X = 4 Y = 6 Z = 2

4. In C++, pass by reference for an integer parameter can be achieved …
   A. by placing an & in front of the value when invoking the function.
   B. by placing an & following the data type for that parameter in the function prototype and the function header.
   C. by placing an & before the data type for that parameter in the function prototype and the function header.
   D. by doing nothing special, since pass by reference is the default way to pass integers.

5. The argument for a parameter which is pass by …
   A. may be a declared constant of the same data type as the parameter.
   B. must be a variable.
   C. may be a function call that returns a value of the same data type as the parameter.
   D. Both A and C are true since it can be any expression.
6. In the following function prototype:
   `int fun1(double& Num1, double& Num2);`
   A. Function fun1 can modify the arguments passed to both Num1 and Num2
   B. Function fun1 can not modify the arguments passed to Num1 and Num2
   C. Function fun1 can only modify the argument passed to Num1
   D. Function fun1 can only modify the argument passed to Num2

7. Which library contains the function used to seed the random number generator?
   A. cstdlib
   B. ctime
   C. crandom
   D. cmath

8. Which of the following statements properly invokes the random number generator storing
   the resulting random number into myNumber.
   A. `myNumber = srand();`
   B. `myNumber = srand(time(0));`
   C. `myNumber = rand();`
   D. None of the above.

9. A good way to assure that the random number generator will not give the same sequence of
   random numbers each time your program is run is to
   A. only run your program once in your lifetime.
   B. use the random number generator in a for loop.
   C. seed it using 32767 as the seed.
   D. seed it using time() as the seed.

10. The value returned by the pseudo random number generator in the C++ standard libraries is
    A. a real number between 0 and 1
    B. an integer between 1 and RAND_MAX
    C. an integer between two specified integer values.
    D. None of the above answers are correct.

Chapter 6

1. Write a declaration statement that will declare an array of characters named `vowels` and
   initialized to the letters a, e, i, o, u.
   `char vowels[5]={'a', 'e', 'i', 'o', 'u'};`

2. Using the following function prototype which statement about the argument passed to
   parameter A is true.
   `void F(const int A[], int Cnt);`
   A. The argument is modified when changes are made to parameter A in function F.
   B. The argument passed to parameter A must always have the same number of elements,
      every time function F is invoked.
   C. Changes can not be made to parameter A in function F.
   D. Every element of the argument passed to parameter A must be initialized prior to
      invoking function F.
3. A restriction on arrays in C++ is:
   A. The size of the array must be specified when the program is written.
   B. C++ does not do range checking on array subscripts.
   C. The assignment operator may not be used to copy one array to another.
   D. All of the above are restrictions on arrays in C++.

4. Which of the following is true for C-style strings
   A. C-style strings may be input and output as a unit.
   B. The size of the array holding the C-style string is changed based on the value in the string.
   C. C++ performs range checking when subscripts are used to access the individual characters of a C-style string.
   D. None of the above is true about C-style strings.

5. A C-style string is represented as
   A. An array of just the characters in the string.
   B. An array of characters terminated by the \n character.
   C. An array of characters and the number of characters in the string.
   D. An array of characters terminated by the \0 character.

6. When declaring a parameter, pass by value is the default for which of the following data types.
   A. one dimensional arrays
   B. C-style strings
   C. string objects (i.e. identifiers declared to be type string)
   D. None of the above have pass by value as the default.

7. If a subscript in a C++ program is outside of the declared range for that array
   A. the "bad" subscript is used.
   B. an error message specifying that the subscript is out of range is always generated.
   C. A and B are both true.
   D. Neither A nor B is true.

8. The value placed in the [ ] when declaring an array in C++ is the last subscript of the array.
   A. True
   B. False

9. When an array is passed to a function the modifier const is placed before the parameter declaration, if the function should not modify the array.
   A. True
   B. False

10. If a subscript in a C++ program is outside of the declared range for that array an error message specifying that the subscript is out of range will always be generated.
    A. True
    B. False