Exam I Instructions – Time Limit 65 Minutes

General Instructions:

- Neatness counts!! If the machine cannot read your answer, you will receive no credit.
- This is a closed book/closed notes exam.
- No reference materials of any kind will be permitted.
- No calculators or other portable computing/data storage devices are permitted.
- Any C++ code segments that you write must be syntactically correct or you will lose points.

There is one part to this exam:

Part I  Bubble Sheet – True/False, Multiple Choice, Vocabulary, fill in the blank

Bubble Sheet Instructions:  (Part I)

1) Use a #2 pencil to complete the bubble sheet!

2) Print your name in the Name box as follows:
   LASTNAME  FIRSTNAME  MIDDLEINITIAL

   Example:  Simpson  Homer  J

3) Use your #2 pencil to fill in the corresponding bubbles under each character of your name.
   (Bubble marking instructions are included on Side 2 of the bubble sheet.)

4) Record your answers to the questions in Part I on Side 1 of the bubble sheet. Neatness Counts!!

Warnings:

- For Part I, answers not recorded on the bubble sheet will receive no credit!!
- Be wary of skipping problems!!
- I recommend that you answer each question in this section in the order presented.
- Read all possible answers. Some questions have answers like “a and b” or “all of the above”

   ➢  Make sure that the answer you record on the bubble sheet for question X corresponds to your selection for question X.
   ➢  You may lose a large number of points if you do not follow this advice!!

I will let you know when there are 15, 10 and 5 minutes left to take the exam. It may be best to mark your answers on the test sheet first and then at the 15 minute mark go back and fill in the bubble sheet.

Put your name on page 2 of the exam only. Turn in the exam and the bubble sheet.
Part I  [150 points] – For each problem, select the best answer and record it on the bubble sheet!!

1. Coding of an algorithm takes place during the ____________________ phase of a computer program's life cycle.
   A) Implementation    B) Problem-Solving    C) Maintenance    D) Full Moon

2. True or False? There is only one unique general solution (algorithm) for a given problem.
   A) True    B) False

3. Which of the following terms describes the execution of a series of statements (instructions) one after another?
   A) Sequence    B) Selection    C) Looping    D) Sub-program    E) None of These

4. Which of the following terms describes the execution of different statements (instructions) depending on certain conditions?
   A) Sequence    B) Selection    C) Looping    D) Sub-program    E) None of These

5. Which of the following terms describes the repetition of statements (instructions) while certain conditions are met?
   A) Sequence    B) Selection    C) Looping    D) Sub-program    E) None of These

6. _________________ is the formal rules governing how valid instructions are written in a programming language.
   A) Semantics    B) Metalanguage    C) Preprocessing    D) Syntax    E) C++

7. _________________ is the set of rules that determines the meaning of instructions written in a programming language.
   A) Semantics    B) Metalanguage    C) Preprocessing    D) Syntax    E) C++

8. A(n) _________________ is a specific set of data values, along with a set of operations on those values.
   A) Reserved word    B) Variable    C) Data Type    D) Expression    E) Identifier

9. A(n) _________________ is a word that has special meaning in C++; it cannot be used as a programmer defined identifier.
   A) Reserved word    B) Variable    C) Data Type    D) Expression    E) Identifier
The University of Alabama in Huntsville
Exam I, CPE 112, Spring 2005, page 3 of 16

10. A(n) ____________________ is a statement that stores the value of an expression into a variable.
   A) Literal Value       B) Assignment Statement       C) Evaluate
   D) Expression         E) Function

11. A(n) ____________________ is any constant value written in a program.
   A) Literal Value       B) Assignment Statement       C) Evaluate
   D) Expression         E) Function

12. A(n) ____________________ is an arrangement of identifiers, literals, and operators that can be evaluated to compute a value of a given type.
   A) Literal Value       B) Assignment Statement       C) Evaluate
   D) Expression         E) Function

13. ____________________ is the implicit (automatic) conversion of a value from one data type to another.
   A) Type Conversion       B) Type Casting       C) Type Coercion
   D) A and B                   E) A and C

14. ____________________ is the explicit conversion of a value from one data type to another.
   A) Type Conversion       B) Type Casting       C) Type Coercion
   D) A and B                   E) A and C

15. A(n) ____________________ is a function that does not return a function value to its caller and is invoked as a complete, stand-alone statement.
   A) Value-returning function       B) Main Function       C) Subprogram
   D) Void Function                   E) None of these

16. Given that \( x \) is a float variable and \( num \) is an int variable containing the value 33, what will \( x \) contain after execution of the following statement:

   \[
x = num / 4 + 3.0;
   \]

   A) Nothing; a compile-time error occurs       B) 3.0       C) 8.0       D) 11.0       E) 4.0

17. If the int variables \( \text{int1} \) and \( \text{int2} \) contain the values 9 and 10, respectively, then the value of the expression \( \text{float}(\text{int1} / \text{int2}) \) is:

   A) 1.0       B) 0.9       C) 0.0       D) 9.0       E) 10.0
18. The value of the C++ expression $9 + 22 \% 5$ is:

A) 9  B) 11  C) 3  D) 5  E) 13

19. The value of the C++ expression $5/4 * 4$ is:

A) 4.8  B) 0  C) 1  D) 5  E) 4

20. Which expression does not correctly compute the mathematical average of the int variables int1, int2, and int3?

A) float(int1 + int2 + int3) / 3
B) (int1 + int2 + int3) / 3.0
C) float(int1 + int2 + int3) / 3.0
D) float((int1 + int2 + int3) / 3)
E) b and d above

21. Given a variable n of type int with an initial value of 4, which of the following statements will result in the value 5 being stored into n?

A) n = n + 1;
B) ++n;
C) n++;  
D) n = 5;
E) All of the above

22. Which output manipulator is used to force numeric output in decimal format?

A) endl
B) showpoint
C) setprecision
D) fixed
E) None of the above

23. Which output manipulator is used to terminate output on the current line?

A) endl
B) showpoint
C) setprecision
D) fixed
E) None of the above

24. Which output manipulator is used to control the number of digits printed to the right of the decimal point?

A) endl
B) showpoint
C) setprecision
D) fixed
E) None of the above
25. Which output manipulator is used to control the number of positions the next data item should occupy when printed?
   
   A) endl  
   B) showpoint  
   C) setprecision  
   D) fixed  
   E) None of the above

26. What is the value of str3 following execution of all statements listed below? (a indicates a space)
   
   string str1;
   string str2;
   string str3;
   str1 = “This a sample ”;
   str2 = “string”;
   str3 = str2 + str2;

   A) “This is a sample string”  
   B) “sample”  
   C) “string string”  
   D) “string string”  
   E) None of the above

27. What is the output of the following program fragment listed below? (a indicates a space)
   
   string str1;
   string str2;
   str1 = “This a sample string”;
   str2 = “sample”;
   cout << str1.find(“s”);

   A) 5  
   B) 6  
   C) 7  
   D) 0  
   E) string::npos

28. What is the output of the following program fragment listed below? (a indicates a space)
   
   string str1;
   string str2;
   str1 = “This a sample string”;
   str2 = “sample”;
   cout << str1.find(“this”);

   A) 5  
   B) 6  
   C) 7  
   D) 0  
   E) string::npos
29. What is the output of the following program fragment listed below? (a indicates a space)

```cpp
string str1;
string str2;
str1 = "This a sample string";
str2 = "sample";
cout << str2.size();
```

A) 5  B) 6  C) 7  D) 0  E) string::npos

30. What is the output of the following program fragment listed below? (a indicates a space)

```cpp
string str1;
string str2;
str1 = "This a sample string";
str2 = "sample";
str2 = str1 + str2;
cout << str2.find("ample");
```

A) 9  B) 10  C) 11  D) 8  E) string::npos

31. What is the output of the following program fragment listed below? (a indicates a space)

```cpp
string str1;
string str2;
string str3;
str1 = "This a sample string";
str2 = "sample";
str3 = str2.substr(1,3);
cout << str3;
```

A) Thi  B) his  C) his  D) sam  E) amp

32. What is the output of the following program fragment listed below? (a indicates a space)

```cpp
string str1;
string str2;
string str3;
str1 = "This a sample string";
str2 = "sample";
str3 = str1.substr(str1.find("Sample"),12);
cout << str3;
```

A) Thi  B) sample strin  C) Sample strin  D) B or C  E) None of the above
33. If we wish to include the following statements in a program, what is the correct data type for the variable `len`?

```cpp
string firstName;
len = firstName.size();
```

A) `int`  
B) `float`  
C) `string::size_type`  
D) `string`  
E) `char`

34. Given the constant declaration

```cpp
const int FACTOR = 95;
```

which of the following is not a valid use of `FACTOR`?

A) `cin >> FACTOR;`  
B) `cout << FACTOR * 3;`  
C) `FACTOR = 24;`  
D) a and c  
E) b and c

35. True or False? A hierarchical implementation of a functional decomposition is one in which some or all of the modules are implemented as separate C++ functions.

A) True  
B) False

36. Which of the following statements about the C++ `main` function is false?

A) Every program must have a function called `main`  
B) Program execution begins with the first executable statement in the `main` function.  
C) The `main` function must call (invoke) at least one other function.  
D) The word `int` in the function heading means that the `main` function returns an integer value (to the operating system).

37. Which one of the following is not a valid identifier in C++?

A) `My_Name`  
B) `MyName`  
C) `My-Name`  
D) `My2Name`  
E) All are valid
38. Given the following series of C++ statements, what value is stored in the variable \texttt{ch3} assuming that the user inputs the text highlighted in gray? (\[
\begin{array}{ll}
\text{AB} & \text{A)} \quad \text{‘A’} \\
\text{CD} & \text{B)} \quad \text{‘□’} \\
\text{char ch1;} & \text{C)} \quad \text{‘B’} \\
\text{char ch2;} & \text{D)} \quad \text{‘C’} \\
\text{char ch3;} & \text{E)} \quad \text{None of the above} \\
\text{cin >> ch1;} & \\
\text{cin >> ch2;} & \\
\text{cin >> ch3;} & \\
\end{array}
\]
)

39. Given the following series of C++ statements, what value is stored in the variable \texttt{ch3} assuming that the user inputs the text highlighted in gray? (\[
\begin{array}{ll}
\text{AB} & \text{A)} \quad \text{‘A’} \\
\text{CD} & \text{B)} \quad \text{‘□’} \\
\text{char ch1;} & \text{C)} \quad \text{‘B’} \\
\text{char ch2;} & \text{D)} \quad \text{‘C’} \\
\text{char ch3;} & \text{E)} \quad \text{None of the above} \\
\text{cin.get(ch1);} & \\
\text{cin.get(ch2);} & \\
\text{cin.get(ch3);} & \\
\end{array}
\]
)

40. Given the following series of C++ statements, what value is stored in the variable \texttt{ch3} assuming that the user inputs the text highlighted in gray? (\[
\begin{array}{ll}
\text{AB} & \text{A)} \quad \text{‘A’} \\
\text{CD} & \text{B)} \quad \text{‘□’} \\
\text{char ch1;} & \text{C)} \quad \text{‘B’} \\
\text{char ch2;} & \text{D)} \quad \text{‘C’} \\
\text{char ch3;} & \text{E)} \quad \text{None of the above} \\
\text{cin.get(ch1);} & \\
\text{cin.get(ch2);} & \\
\text{cin.get(ch3);} & \\
\end{array}
\]
)

41. Given the following series of C++ statements, what value is stored in the variable \texttt{ch} assuming that the user inputs the text highlighted in gray? (\[
\begin{array}{ll}
\text{ABCDEF} & \text{A)} \quad \text{‘A’} \\
\text{\ln} & \text{B)} \quad \text{‘B’} \\
\text{char ch;} & \text{C)} \quad \text{‘C’} \\
\text{cin.ignore(2,‘\ln’);} & \text{D)} \quad \text{‘D’} \\
\text{cin.get(ch);} & \text{E)} \quad \text{None of the above} \\
\end{array}
\]
)
42. Given the following series of C++ statements, what value is stored in the variable `string1` assuming that the user inputs the text highlighted in gray? ( □ indicates a space)

```
February 15, 2005
```

A) “February 15, 2005”
B) “February 15, 2005”
C) “February”
D) “15, 2005”
E) None of the above

43. Given the following series of C++ statements, what value is stored in the variable `string2` assuming that the user inputs the text highlighted in gray? ( □ indicates a space)

```
February 15, 2005
```

A) “February 15, 2005”
B) “February 15, 2005”
C) “February”
D) “15, 2005”
E) None of the above

44. Given the following series of C++ statements, what value is stored in the variable `string1` assuming that the user inputs the text highlighted in gray? ( □ indicates a space)

```
February 15, 2005
```

A) “ruary 15, 2005”
B) “ruary 15, 2005”
C) “February”
D) “15, 2005”
E) None of the above

45. Which of the following is not a step a programmer must do in order to use files in a C++ program?

A) Use a preprocessor directive to include the header file `fstream`.
B) Declare each file stream in a variable declaration.
C) Specify the name of the file stream in each input or output statement that uses it.
D) Erase the contents of each output file before running the program.
E) Prepare each file for reading or writing by calling the open function.
46. When used with an input file stream, which of the following statements about the open function is false?

A) It creates a new, empty file if the file does not already exist.
B) It sets the reading marker at the first character in the file.
C) It puts the stream into the fail state if the file does not already exist.
D) It associates the name of a stream variable with the name of a physical disk file.
E) None of the above

47. What happens when a C++ input stream enters the fail state?

A) The system does not display an error message, the program continues running, and further input operations with that stream are ignored.
B) The system does not display an error message, and program execution is terminated.
C) The system displays an error message, the program continues running, and further input operations with that stream are ignored.
D) The system displays an error message, and program execution is terminated.
E) None of the above

48. An input stream may enter the fail state for which of the following reasons?

A) An attempt to open a nonexistent file for input
B) Invalid input data (Data Type mismatch)
C) An attempt to read beyond the end of an input file
D) All of the above
E) None of the above

49. What is the data type of the value returned by the .c_str() function in C++?

A) string  B) char  C) ifstream  D) ofstream  E) None of the above

50. In the following code segment, what is the data type of the variable named mystery?

```cpp
????? mystery;
int x;
mystery.open("somefile");
mystery >> x;
```

A) ofstream  B) string  C) ifstream  D) Boolean  E) Can’t determine from given info
51. Assume that a program has three variables \( i \), \( j \), and \( k \) of type \texttt{int} initialized with values \( 10 \), \( 20 \), and \( 30 \) respectively. The program then executes the following statements:

\[
\begin{align*}
\text{cin} & \gg i \gg j \gg k; \\
\text{cout} & \ll j;
\end{align*}
\]

If the user inputs the following series of characters highlighted in gray \( 1234.56789 \) what is the value for the variable \( j \) that is printed to the screen?

A) 34  B) 56  C) 7  D) 89  E) None of the above

52. The C++ function called \texttt{get} skips preceding white space characters to find the next non-white space character to input.

A) True  B) False

53. In the following C++ statement, what is \texttt{Beta}?

\[
\text{Alpha} = 4 \times \text{Beta}(\text{gamma}, \text{delta}) + 3;
\]

A) \texttt{int variable}  B) \texttt{float variable}  C) \texttt{void function}  D) \texttt{value-returning function}  E) Not enough information provided to know

54. In the following C++ statement, what is \texttt{Display}?

\[
\text{Display}(\text{gamma}, \text{delta});
\]

A) \texttt{int variable}  B) \texttt{float variable}  C) \texttt{void function}  D) \texttt{value-returning function}  E) Not enough information provided to know

55. If \texttt{alpha} and \texttt{beta} are \texttt{int} variables, which of the following is a valid C++ statement?

A) \texttt{alpha + beta = alpha*beta;}  
B) 6 = beta;  
C) \texttt{alpha = alpha + alpha*beta + beta;}  
D) \texttt{alpha*2 = beta*3;}  
E) None of the above
Problems 56-64  Complete the following program using the possible answers listed on the next page. Sample Input and Output for the program is shown on the next page.

// This program prompts the user for a year, reads in the value entered // and prints out if the year entered is a leap year or not. //******************************************************************************

56 <iostream>     // Access output stream
57;              // Global using directive

bool IsLeapYear( int );  // 58 function Prototype for sub-algorithm

59 main()
{
    int year;          // year value input by the user

    // Prompt the user for input
    60 61 "Enter a year AD, for example, 1997:" << endl;
    62 63 year;  // Read year entered by the user

    if (IsLeapYear(year))     // Test for leap year
        cout << year << " is a leap year." << endl;
    else
        cout << year << " is not a leap year." << endl;

    64 // Done!! Exit from the program
}

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

bool IsLeapYear( int year )
// IsLeapYear returns true if year is a leap year and // false otherwise.
{
    if (year % 4 != 0)          // Is year not divisible by 4?
        return false;       // If so, can't be a leap year
    else if (year % 100 != 0)   // Is year not a multiple of 100?
        return true;        // If so, is a leap year
    else if (year % 400 != 0)   // Is year not a multiple of 400?
        return false;       // If so, then is not a leap year
    else
        return true;         // Is a leap year
Sample Input: Enter a year AD, for example, 1997: 1999

Sample Output: 1999 is not a leap year.

56. Possible Answers:  
   (A) include  (B) process  (C) #include  (D) #process  (E) None of the above

57. Possible Answers:  
   (A) using  (B) namespace  (C) namespace std  (D) using std namespace  
   (E) None of the above

58. Possible Answers:  
   (A) void  (B) value-returning  (C) empty  (D) string  (E) None of the above

59. Possible Answers:  
   (A) float  (B) string  (C) int  (D) char  (E) None of the above

60. Possible Answers:  
   "Enter a year AD, for example, 1997:" << endl;  
   (A) cout  (B) input  (C) getline  (D) cin  (E) None of the above

61. Possible Answers:  
   "Enter a year AD, for example, 1997:" << endl;  
   (A) >=  (B) >>  (C) ==  (D) <<  (E) None of the above

62. Possible Answers:  
   year; // Read year entered by the user  
   (A) cout  (B) input  (C) getline  (D) cin  (E) None of the above

63. Possible Answers:  
   year; // Read year entered by the user  
   (A) >=  (B) >>  (C) ==  (D) <<  (E) None of the above

64. Possible Answers:  
   return; // Done!! Exit from the program  
   (A) return;  (B) return 0  (C) return 0;  (D) return  (E) None of the above
Problems 65-75  Complete the following program using the possible answers listed on the next page.
Sample Input and Output for the program is shown on the next page.

// Program Description:
// This program reads in a line from a text file and determines
// if a ":" is present in the line. It then prints out the line and
// the position of the ":" in the string. The program then skips the
// next line in the input file, reads the third line and prints the
// third line out to the screen

#include <iostream>   // Header file for cout and endl
#include <____65____>   // string operations
#include <____66____>   // file stream operations

using____67____;    // Global using directive

int main()
{
    InFile;   // input file stream variable
    filename;   // name of the input file
    string line;   // holds the line read in from the file
    string::size_type position; // holds position of the :

    cout << "Name of input file: "; // Prompt for input file name
    cin >> filename;   // Read the input file name

    .open(____71____);  // Open the input file

    // Read in the first line from the file
    position = 73; // find the position of the :

    // output the first line read from the file
    cout << "First line: " << line << " - position: " << position << endl;

    // Skip the next line in the file
    // maximum number of characters on the line is 70
    // skip the second line in the file

    // This 72 and the 72 above are the exact same C++ statement
    // Read in the third line from the file
    cout << "Third line: " << line << endl;

    // Program successful
}

}  // End of main()
Sample Input: Line 1 has a: in it
Line 2 is skipped
Line 3 is read.

Sample Output: Name of input file: Input.txt
First line: Line 1 has a: in it - position: 11
Third line: Line 3 is read.

65. Possible Answers: #include <65> //string operations
   A) fstream   B) string   C) iomanip   D) ifstream   E) None of the above

66. Possible Answers: #include <66> //file stream operations
   A) fstream   B) string   C) iomanip   D) ifstream   E) None of the above

67. Possible Answers: using 67; // Global using directive
   A) std   B) namespace   C) namespace std   D) std namespace   E) None of the above

68. Possible Answers: 68 InFile; // input file stream variable
   A) fstream   B) string   C) iomanip   D) ifstream   E) None of the above

69. Possible Answers: 69 filename; // name of the input file
   A) char   B) int   C) float   D) string   E) None of the above

70. Possible Answers: .open(61); // Open the input file
   A) filename   B) filename.c_str()   C) c_str().filename   D) InFile   E) None of the above
71. Possible Answers: open(71); // Open the input file
A) filename  B) filename.c_str()  C) c_str().filename  D) InFile
E) None of the above

72. Possible Answers: // Read in the first line from the file
A) InFile.getline(line);  B) getline(line,InFile);  C) getline (InFile, line);
D) Infile.get(line);  E) None of the above

73. Possible Answers: position =  // find the position of the :
A) line.find(':');  B) find(line,":’");  C) InFile.find(":");  D) find.line(':');
E) None of the above

74. Possible Answers: // skip the second line in the file
A) InFile.ignore(40,\’\n\’);  B) ignore(75,\"\n\");  C) InFile.ignore(75,\"\n\");
D) Infile.ignore(75,\’\n\’);  E) ignore.InFile(40,\’\n\’);

75. Possible Answers: // Program successful
A) return;  B) return 0  C) return 0;  D) return  E) None of the above