Definition Matching – (12 Points)

1. (12 pts) Match the words with their definitions. Choose the best definition for each word.

Algorithm _____ Software Piracy _____ Function Call _____
Syntax _____ Identifier _____ Declaration _____
named constant _____ Binary Operator _____ Precondition _____
Flow of Control _____ Data Type _____ If Statement _____

A) Definition is not listed below (This answer can be used more than once if necessary)

B) The set of rules that determines the meaning of instructions written in a programming language.
C) Computes a new value by performing a specified set of operations on given values.
D) The formal rules governing how valid instructions are written in a programming language.
E) A Name associated with a function or data object and used to refer to that function or data object.

F) A function that returns a single function value to its caller
G) The fundamental control structure that allows for branches in the flow of control.
H) The implicit conversion of a value from one data type to another.
I) A statement that associates an identifier with a data object, a function or a data type.

J) The unauthorized copying of software for either personal use or use by others
L) A function that does not return a function value to its caller
M) A location in memory, referenced by an identifier, that contains a data value that cannot be changed.

N) A specific set of values along with a set of operations on those values.
O) The mechanism that transfers control to a function.
P) An operator that has two operands
Q) A location in memory, referenced by an identifier, that contains a data value that can be changed.
True or False – (13 Points)

2. (13 pts) Circle T for true and F for false:

T  F  a) The C++ compiler finds all semantic errors?
T  F  b) The function main() is required for every C++ program.
T  F  c) The logical operator && (And) requires both operands to be false for the result to be false
T  F  d) The getline function reads a single character without skipping any leading white spaces.
T  F  e) char variables can hold more than one character.
T  F  f) Type coercion is the implicit conversion of one data type to another.
T  F  g) The logical operator || (Or) requires both operands to be true for the result to be true.
T  F  h) Relational expressions are made up of expressions and relational operators.
T  F  i) The statement cin.ignore(100, ’A’); skips characters until an ‘A’ is encountered.
T  F  j) Conversion of a number from a float to an int usually results in a loss of information.
T  F  k) Algorithms are a step-by-step procedure for solving a problem in a finite amount of time.
T  F  l) sum = (float)(average + 25.0); is a valid assignment statement.
T  F  m) An if statement must have an else paired with it.

Multiple choice (28 points) – Questions 3 – 16

For these problems circle all correct answers.
For example if answers A, C and E are all valid then circle A, C and E.

3. Which of the following statements about the C++ main() function are false?

A) main() is an optional function for all programs
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 has one integer argument.
E) All of the above are true statements

4. Which of the following are valid identifiers in C++?

A) one_by  B) _by2  C) _2by4  D) 4by4  E) All are invalid
5. Which of the following are not valid identifiers in C++?

A) 2bits  B) fourBits  C) _6bits  D) -aByte  E) All are valid

6. Determining and writing algorithms takes place during the ______________ phase of a computer program's life cycle.

A) Implementation  B) Problem-Solving  C) Maintenance  D) Full Moon  E) None of the above

7. After the following code segment executes, what value is stored in the variable result?:

```
float result;
int num = 7;
result = float(num / 4 + 2.25);
```

A) Nothing; a compile-time error occurs  B) 4.25  C) 4.0  D) 4.75  E) 3.25

8. What is the name of the header file required for using setw and setprecision?

A) iostream  B) string  C) cmath  D) iomanip  E) fstream

9. 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

10. Which output manipulator is used to control the number of digits printed?

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

11. 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
12. The following C++ statements are to be included in a program. What is the correct data type needed for the variable len? (only one possible answer for this question)

```cpp
string firstName = "Reginald";
????? len;
len = firstName.substr(5,5);
```

A) float  B) string::size_type  C) string  D) bool

E) None of these

For questions 13-16, consider the following C++ declarations. In the code, a indicates a space.

```cpp
string str1 = "This is the First Test";
string str2 = "Second Line?";
string str3;
string::size_type Length, Position;
```

For the above declarations, answer the questions based on the program fragment shown.

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

```cpp
Length = str2.length();  cout << Length;
```

A) 12  B) 11  C) 13  D) 0  E) string::npos

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

```cpp
Position = str1.find("first"); cout << Position;
```

A) 10  B) 11  C) 12  D) 13  E) string::npos

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

```cpp
Position = str2.find("L"); cout << Position;
```

A) 8  B) 7  C) 6  D) 5  E) string::npos

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

```cpp
str3 = str1.substr(str1.find("The"),4);  cout << str3;
```

A) the  B) fir  C) The  D) e fir

E) None of the above
17. (3pts) Identifiers can consist of what types of characters (three distinct answers)?

18. (3pts) An expression is an arrangement of ________________, ________________ and ________________ that can be evaluated to compute a value of a given type.

19. (2 pts) What are two methods used to indicate comments in a C++ program?

20. (6 pts) Assignment and declaration statements
   
a) Provide a constant declaration for a string identifier of DAY.

b) Provide a constant declaration for a float identifier of PI.

c) Provide a bool variable declaration for the identifier finished.

d) Provide a double variable declaration for the identifier cost.

e) Write a statement that assigns a null string to the string variable str1.

f) Write a statement that assigns the value 32.5 to the float variable avg.
21. (4 pts) Show the output of each statement below. Place a single character in each box. Skip a box to indicate a space.

a) `cout << setw(7) << right << “Hello” << setw(7) << left << “World”;`

   |   |   |   |   |   |   |   |

b) `cout << left << setw(3) <<”Number“ << right << setw(8) << “please”;`

   |   |   |   |   |   |   |   |   |   |   |

22. (4 pts) For the code segments shown, add ONE LINE OF code to open an output file, named output.txt, in the manner specified.

a) For this code segment use the literal value, output.txt, for opening the file

   ofstream outFile;
   // place open statement using a literal value below this line

b) For this code segment the file name is stored in a string variable, and the string variable is used for opening the output file.

   ofstream outFile;
   string filename = “output.txt”;
   // place open statement using a string variable below this line

23. (4 pts) What is the output of the following code segment if `a` has a value of 10?

```cpp
if (a > 20)
    if (a > 40)
        cout << “a is greater than 40-“;
    else
        cout << “a is less than 20-“;
cout << “end\n”;
```
24. (6 pts) What is the Boolean result for the following if \( W = false, X = false, Y = true \) and \( Z = true \)

a) \( X \lor Y \land W \lor Z \) ______________ b) \( !X \land (!W \lor W) \land Y \) ______________

c) \( !X \lor W \land !Z \land Y \land !W \) ____________

25. (4 pts) Show precisely the displayed output of the following cout statement.

- Write one character per box. A \( \_ \) indicates a space.
- Skip a box to indicate the presence of a blank space in the output.
- Skip a row to indicate the presence of a blank line in the output.

Example: See Spot run.

\[
\text{cout} \ll \text{“Al “} \ll \text{endl} \ll \text{“ Gore “} \\
\ll \text{“invented “} \ll \text{endl} \ll \text{“the
“} \ll \text{endl} \\
\ll \text{“ internet in “} \ll \text{setw(6)} \ll \text{“1985 “} \ll \text{endl};
\]

26. (4 pts) Write a segment of code that prints out “\( a \) is greater than \( b \)” if the integer variable \( a \) is greater than the integer variable \( b \). Assume that all variables have been declared previously.
27. (4 pts) Write a segment of code that prints out “a equals b” if the integer variable `a` is equal to the integer variable `b`. Otherwise, print out “a does not equal b”. Assume that all variables have been declared previously.

28. (6 pts) If the standard input stream contains the characters indicated, what is the output for the following segment of code? Remember \n indicates the new line character, and the character indicates a space.

Input stream cin contains characters: Line1\nLine 2\nLine 3\nLine4

```cpp
int num1;
string L1="L1", L2="L2", L3="L3", L4="L4"; // initial values
cin >> L1 >> L2;
cin.ignore(6,\n');
cin >> L3 >> L4;
cout << L1 << endl << L2 << endl << L3 << endl << L4;
```

Place a single character in each box, skip a box to indicate a space, skip a row to indicate a blank line.
29. (6 pts) What is the output for the following segment of code? Remember \n indicates the new line character, and the   character indicates a space

Input file (Input.txt) for the code below is shown on the right:

```cpp
string phrase;
int num1;
char ch;
ifstream InFile;

InFile.open(“Input.txt”);
InFile >> num1;  // read in an integer
InFile.ignore(6,’\n’);
InFile >> num1;  // read in another integer
InFile.ignore(8,’\n’);

InFile.get(ch);
InFile.ignore(4,’\n’);
InFile >> phrase;

cout << num1 << endl;
cout << ch << endl << setw(8) << right << phrase << endl;
```

Place a single character in each box, skip a box to indicate a space, skip a row to indicate a blank line.

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30. (4 pts) Write a segment of code that tests the current state of the input file stream variable inFile. If the input stream is in the fail state mode, the segment should print out the message “Fail state mode”. Otherwise, print out “Valid”. Assume that all variables have been declared previously.
31. (12 pts) Write a **complete program** that performs the following:

- Prompts the user for two integer numbers
- Reads the two integers entered
- Averages the numbers
- Outputs the average with two decimal places of precision (requires the fixed manipulator and one other manipulator)

*Assume* that all values entered are valid integers – no testing required.