Definition Matching – (10 Points)

1. (10 pts) Match the words with their definitions. Choose the best definition for each word.

Semantics ______ Syntax ______
Algorithm ______ Data Type ______
Named Constant ______ Identifier ______
Literal Value ______ Variable ______
Declaration ______ Assignment Statement____

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

B) The formal rules governing how valid instructions are written in a programming language.
C) A location in memory, referenced by an identifier, that contains a data value that can be changed
D) A location in memory, referenced by an identifier, that contains a data value that cannot be changed.
E) A Name associated with a function or data object and used to refer to that function or data object.

G) The mechanism that transfers control to a function
H) A statement that associates an identifier with a data object, a function or a data type.
I) A specific set of values along with a set of operations on those values

J) A statement that stores the value of an expression into a variable
K) Any constant value written in a program
L) To compute a new value by performing a specified set of operations on given values
M) The set of rules that determines the meaning of instructions written in a programming language.
True or False – (8 Points)

2. (8 pts) **Circle T for true and F for false:**

T   F  a) The C++ compiler finds *syntax* errors in a program?

T   F  b) The function `main()` is required for every C++ program.

T   F  c) A `char` variable can hold a string value.

T   F  d) **Type coercion** is the implicit conversion of one data type to another.

T   F  e) The statement `cin.get(charVar);` reads the first *non-white space* character from the input stream `cin` (charVar has been declared as a char).

T   F  f) The statement `cin.ignore(10, ':');` skips characters on the input stream until the : character is encountered.

T   F  g) The extraction operator skips all whitespace characters when reading from the input stream?

T   F  h) Value returning functions return exactly one function value.

Multiple choice (12 points) – Questions 3 – 14

⇒ *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 are valid identifiers in C++?

A) _Name  B) 1AB  C) Aa*3  D) two2  E) One

4. Which of the following are not valid identifiers in C++?

A) 6Oclock  B) six_Oclock  C) _clock  D) t5t  E) 2x2

5. Translating algorithms into a programming language 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

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

A) iostream  B)iomanip  C) manip  D) string  E) cmath
7. What is the name of the header file required for use with **strings**?

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

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

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

9. Which output manipulator is used to set justification in a field specified by setw?

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

For questions 10-12, consider the following C++ declarations. In the code, a □ indicates a space

```
string str1 = "This□class□is□CPE112";
string str2 = "two□step";
string str3;
string::size_type num, Position;
```

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

10. What is the **output** of the following program fragment listed below?

```
num = str2.length(); cout << num;
```

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

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

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

A) 9  B) 10  C) 4  D) 5  E) string::npos

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

```
str3 = str1.substr(5,10); cout << str3;
```

A) s□is□  B) □is□C  C) class□is□C  D) □class□is□  
E) None of the above
13. After the following code segment executes, what value is stored in the variable `result`?

```c
float result;
int num = 12;
result = num/5 + 3.2;
```

A) 5.2  B) 5  C) 6  D) 5.6  E) a runtime error  F) None of These

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

```c
string firstName="Reginald";
?????? mystery;
getline(cin,mystery,'
');
```

A) char  B) string::size_type  C) string  D) int  

E) None of these

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**Unix Commands (6 points) – Questions 15 – 20**

15. What is the Unix command that is used to **view the contents of a directory**?

16. Give the Unix command to **delete** the file `myfile.txt`

17. Give the Unix command to **create the directory** `Dir`.

18. Give the Unix command to **compile** the C++ program `MyProgram.cpp` and **create an executable** named `MyProgram`?

19. Give the Unix command that is used to **copy** the file `in.txt` to `out.txt`

20. What Unix command is used to obtain the **current working directory path** (shows you which directory the terminal window is in)?
Short Answer (64 points) – Questions 21 – 33

21. (3pts) Identifiers can consist of what types of characters (three distinct answers)?

22. (3pts) An expression is an arrangement of __________________, __________________
and __________________ that can be evaluated to compute a value of a given type.

23. (2 pts) What are two methods used to indicate comments in a C++ program?

24. (4 pts) Assignment and declaration statements

   a) Provide a constant declaration for an integer identifier NUM with a value of 123.

   b) Provide a string variable declaration for the identifier street.

   c) Write a statement that assigns ‘D’ to the char variable initial.

   d) Write a statement that assigns the value 21.5 to the float variable avg.
25. (4 pts) Show the output of each statement below. (output starts at the left side)
Place a single character in each box, Skip a box to indicate a space.

a) `cout << right << setw(8) << "Hello" << setw(8) << "World" << "A";`

```
```

b) `cout << left << setw(6) << "Name" << right << setw(8) << "please" << "B";`

```
```

26. (4 pts) Write a valid C++ mathematical expression to implement the the following algebraic expressions.

a) \[
\left( \frac{B}{C \times A} \right) + D
\]

b) \[
\frac{c \times (x + y)}{b \times c} (a + b)
\]

27. (6 pts) Given the declarations below, determine the value of the following C++ expressions.

```cpp
int x = 10, y = 20, z = 30;
float a = 5, b = 10, c = 15;
```

a) `x/a*2 + 2.5 = ________________`

b) `a/b + c + y = ________________`

c) `(x/4)*4 + a/b = ________________`
28. (8 pts) Write a segment of code that prompts for and reads in an integer value indicating the number of quarters. Take that value and calculate the number of dollars and the number of quarters remaining. Output this information as shown below. Declare all variables needed in your segment.

If 10 is entered, then the output is: **10 quarters is 2 dollars and 2 quarters.**
If 47 is entered, then the output is: **47 quarters is 11 dollars and 3 quarters.**

29. (4 pts) What is the output for the following segment of code?

```
int num = 8;
num += 3;       // increment num by 3
cout << num%6 << endl;  // mod arithmetic
++num;
cout << num << endl;
```

Place a single character in each box, skip a box to indicate a space, skip a row to indicate a blank line.
30. (6 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:

```
S e e  S p o t  r u n .
```

```
cout << "Hello□" << "world" << endl;
cout << setw(6) << right << "What" << "is" << endl;
cout << endl << setw(6) << left << "next" << endl;
cout << setw(3) << "Finished";
```

31. (4 pts) Your program has three char variables `ch1`, `ch2` and `ch3`. Given the characters present in the standard input stream shown below, write the input statement(s) required to store the ‘A’ into `ch1`, the ‘B’ into `ch2` and the ‘C’ into `ch3`.

Note that there are three spaces(indicated by □) between each character in the input stream, and the reading marker is currently on the ‘A’.

```
S e e  S p o t  r u n .
```

Input stream:  A□□B□□C

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32. (6 pts) Write a segment of code that:
- Prompts for and reads two entire lines into two string variables
- The line termination character for each line is a period (.)
- Determines and outputs the number of characters in the first line
- Determines and outputs the starting character position of the word “Stop” in the second line.
- Assume that all header files have been declared, and use the following variable declarations.

```cpp
string line1, line2;  // lines read from input
string::size_type len, pos;  // length of a line, position in a line
```
33. (10 pts) Write a complete program (turn an empty file into a program that compiles, runs and performs the task mentioned.) that performs the following:

- Prompt the user for three floating point numbers,
- Input the values entered (using cin) into the variables num1, num2 and num3
- Find the average of the three numbers entered
- Output the average to three decimal places to the terminal.
- Do not forget the necessary header files.
Extra Credit #1 (2 pts) The input stream buffer for cin contains the following characters (\n represents the new line character): 15Hello\n4World\n50 65 75. What is the output to the terminal when the code segment below is executed? Place one character in each box. 

**Hint:** Text and ch repeatedly have their value changed as the input is read. Reading marker is on the 1 of 15

```cpp
int m; int x; string text; char ch;

cin >> m >> text >> ch;
getline(cin, text, '\n');

cin >> ch;
cin.get(ch);
cin >> m >> x;
cout << m << "-" << x << "-" << text << "-" << ch;
```

Extra Credit #2 (2 pts) Given a variable \( n \) of type int with an initial value of 4, which of the following statements, after being executed, will result in the value 5 being stored into \( n \)?

A) \( n = n + 1; \)  
B) ++n;  
C) n++;  
D) \( n = 5; \)  
E) \( n = ++n + 1; \)  
F) All of These