Definition Matching – (8 Points)

1. (8 pts) Match the words with their definitions. Choose the best definition for each word.

Semantics _____  Function Call _____
Syntax _____  Data Type _____
Literal Value _____  Algorithm _____
Assignment Statement _____  Named Constant _____

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) The set of rules that determines the meaning of instructions written in a programming language.
D) The explicit conversion of a value from one data type to another.
E) The mechanism that transfers control to a function

F) A specific set of values along with a set of operations on those values
G) A statement that associates an identifier with a data object, a function or a data type
H) Any constant value written in a program.

J) A statement that stores the value of an expression into a variable
K) A Name associated with a function or data object and used to refer to that function or data object.
L) A location in memory, referenced by an identifier, that contains a data value that can be changed
M) A location in memory, referenced by an identifier, that contains a data value that cannot be changed.
True or False – (8 Points)

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

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

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

   T F  d) **Type casting** is the explicit 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.

   T F  f) The statement `cin.ignore(’\n’, 100);` is syntactically correct and will compile.

   T F  g) Algorithms are a step-by-step procedure for solving a problem in a finite amount of time.

   T F  h) Documentation is not a very important part of programming.

   T F  i) A **void function** can be invoked (called) within an expression.

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 **are valid** identifiers in C++?

   A) Truck  B) `car`  C) `two%`  D) `123_456`  E) All are invalid

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

   A) `4by4`  B) `MyMoney$`  C) `Two:Bit`  D) `_PI`  E) All are valid

5. Converting algorithms into C++ code 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. 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

8. Which output manipulator is used to terminate an output line?
   A) `setw`  B) `setprecision`  C) `showpoint`  D) `endl`
   E) None of the above

For questions 9-11, consider the following C++ declarations. In the code, a □ indicates a space

```cpp
string str1 = "This□Class□is□CPE112";
string str2 = "Line□two";
string str3;
string::size_type num, Position;
```

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

9. What is the output of the following program fragment listed below? (a □ indicates a space)
   ```cpp
   num = str2.length();  cout << num;
   ```
   A) 9    B) 8    C) 7    D) 6    E) string::npos

10. What is the output of the following program fragment listed below? (a □ indicates a space)
    ```cpp
    Position = str1.find("cpe"); cout << Position;
    ```
    A) 14    B) 13    C) 15    D) 12    E) string::npos

11. What is the output of the following program fragment listed below? (a □ indicates a space)
    ```cpp
    str3 = str1.substr(10,4);  cout << str3;
    ```
    A) s□Class□is    B) □is□    C) □Class□is□    D) s□is
    E) None of the above

12. After the following code segment executes, what value is stored in the variable `result`?
    ```cpp
    int result;
    float num = 3.0;
    result = num/4 + 1.5;
    ```
    A) 2    B) 1    C) 2.25    D) 1.5    E) a runtime error    F) None of These
13. The following C++ statements are to be included in a program. What is the best correct data type needed for the variable `mystery`? (only one possible answer for this question)

```cpp
float radius = 5.0;
????? mystery;
mystery = int(2*3.14159*radius);
```

A) float  B) string  C) int  D) char  
E) None of these

14. A declaration associates an identifier with which of the following:

A) Data Type  B) Program  C) Name  
D) Independence  E) All of these  F) None of these

15. Which of the following are control structures that can be used to structure statements in a program?

A) Execution  B) Indexing  C) Looping  D) Selection  
E) Subprograms  F) Sequential  G) Coupling  H) Compiling

16. C++ is an example of

A) High Level Language  B) Machine language  C) Assembly Language  
D) Low Level Language  E) Compiler  F) None of the above

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**Unix Commands (8 points) – Questions 17 – 24**

17. What Unix command is used to obtain the current working directory path (shows you which directory you are in)?

18. Give the Unix command to delete the empty directory Programs

19. What command is typed at a terminal prompt to edit the file `prog.cpp` with the editor `nedit`?

20. Give the Unix command that is used to rename the file `in.txt` to `in.txt.bk`
21. Give the Unix command to create the directory Programs.

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

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

24. Give the Unix command to delete the file deleteMe.txt

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**Short Answer (48 points) – Questions 25 – 35**

25. (3pts) Identifiers can consist of what types of characters (three distinct answers)?

26. (3pts) An expression is an arrangement of __________, __________ and __________ that can be evaluated to compute a value of a given type.

27. (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 <<setw(3) <<left << “Hello” <<setw(8) << right << “World” << “A”;

   
   b) cout << right << setw(6) <<“Name“ << setw(8) << left << “please”;

28. (2 pts) What are two methods used to indicate comments in a C++ program?
29. (4 pts) Assignment and declaration statements

   a) Provide a constant declaration for a string identifier of MONTH with a value of “May”.

   b) Provide a int variable declaration for the identifier number.

   c) Write a statement that assigns “Oak” to the string variable road.

   d) Write a statement that assigns the value 4.5 to the float variable radius.

30. (4 pts) Write a valid C++ mathematical expression for the following algebraic expressions.

   a) \[ \frac{a^2 + b^2}{\sqrt{a + b}} \]

   b) \( (a + b)/(c*d) - e \)

31. (4 pts) The input stream buffer contains the following characters (\n represents the new line character): 22 34.5 \n Hello A 4 5. What is the output to the terminal when the code segment below is executed? Place one character in each box. Hint: Some variables have their value changed as the input is read. A □ indicates a space.

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

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32. (6 pts) Write a segment of code that prompts the user to enter in any ten characters (assume that there are no new line characters contained in the ten characters entered). Use the Ignore and get functions to read the 3rd, 5th and 8th characters entered (regardless of what they are) into char variables \texttt{ch1}, \texttt{ch2} and \texttt{ch3}. Use the standard output and input streams (cout, cin) and assume that all variables have been declared previously. A \texttt{□} indicates a space.

Sample input: \texttt{ABCDEFG\□PT}

After reading the above input, \texttt{ch1} contains C, \texttt{ch2} contains E and \texttt{ch3} contains \texttt{□}

33. (4 pts) Show precisely the displayed output of the following \texttt{cout} statement.

- Write one character per box. A \texttt{□} 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:

\begin{verbatim}
    cout << "Hello\n" << "*□*" << "there" << endl;
    cout << setw(8) << right << "What?";  // Example with spaces
    cout << setw(8) << "Goes□here?" << endl;
    cout << "Huh?";
\end{verbatim}
34. (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 a person’s first name, (use cout)
- Input the response to the variable `first`, (use cin)
- Prompt the user for a person’s last name, (use cout)
- Input the response to the variable `last`, (use cin)
- Concatenate variables `first` and `last` and store the result in the variable `fullName`,
- Output the value of `fullName` to the screen and output the number of characters in it.
- **Do not forget the necessary header files. Program is to be written to handle ANY name entered not just the sample one provided.**
- **Comments are not necessary for this program.**

**Sample input:**  Ron  
Bowman  

**Program output for the above inputs:**  RonBowman9
Extra Credit #1) (2 pts) Given the following variable declarations and assignments, evaluate the C++ expressions shown. If the answer is a floating-point value, be sure to indicate as such by using a decimal point in the answer. Remember that evaluation proceeds from left to right following an order of precedence for the operations.

```cpp
int a = 4, b = 2, c = 6, d = 8;
float x = 4.0, z = 26.0;
```

A) \((4*8)\%4 + (d+c)/3\times b\) ______________________________________________

B) \(z/x - (c+1)/a\times b\) ______________________________________________

Extra Credit #2) (3 pts) What is the output for the following segment of code? Fill in the blanks provided with the numeric value output for the statement:

```cpp
int num = 10;
cout << "First Value: " << num << endl;
num--; num--; num--;
cout << "Second Value: " << num/2 << endl;
num++; --num; num--;
cout << "Third Value: " << num + num << endl;
```

First Value: ___________________
Second Value: ________________
Third Value: __________________

Extra Credit #3) (2pts) The following information is available in the standard input stream (cin). The \n in the stream represents the newline character. Write the necessary code to read the information from the input stream into the variables as indicated. A space indicates a space.

Input stream cin contains: 23 34.5
This sentence is put in line

```cpp
int num; // contains 23 after the code segment executes
float avg; // contains 34.5 after the code segment executes
string line; // contains This sentence is put in line
char ch; // contains a space after the code executes
```