Definition Matching – (10 Points)

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

- Function Prototype ______
- Scope ______
- Lifetime ______
- Local Variable ______
- Argument ______
- Name Precedence ______
- Switch Expression ______
- Reference Parameter ______
- Function Call ______
- Static Variable ______

A) Definition is not listed below (may be used more than once)

B) A statement that transfers control to a function.
C) A function declaration without the body of the function
D) A variable declared within a block and not accessible outside of that block
E) The region of program code where it is legal to reference (use) an identifier.

F) The expression whose value determines which switch label is selected.
G) A variable or expression listed in a call to a function
H) A parameter that receives a copy of the value of the corresponding argument
I) The period of time during program execution when an identifier has memory allocated to it.

J) The data type of the result value returned by a value returning function
K) A parameter that receives the location (memory address) of the corresponding argument
L) A variable for which memory remains allocated throughout the execution of the entire program
M) The precedence that a local identifier has over a global identifier with the same name

True or False – (10 Points)

2. (10 pts) Circle T for true and F for false:

T F a) A do-while loop is executed zero or more times.
T F b) Static variables retain their value from function call to function call.
T F c) When a continue statement is executed, the innermost loop in which it appears is exited.
T F d) Arguments corresponding to value parameters can be literal values.
T F e) All possible values for the switch expression must be included among the case labels for a given switch statement.
T F f) A switch statement MUST have a default switch label
T F  g) **Reference parameters** receive a copy of an arguments value

T F  h) Global identifiers have name precedence over local identifiers.

T F  i) A **function call** cannot contain more arguments than the number of parameters in the corresponding function heading.

T F  j) **value returning functions** must use **return expression**;

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**Multiple choice (18 points) – Questions 3 – 11**

*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. How many function values does a value returning function have?

   A) 4  B) 2  C) **As many as necessary**
   D) 1  E) 3  F) **None of these**

4. A function that does not return a function value is known as what kind of function?

   A) **Value returning**  B) **Reference Parameter**  C) **Empty**
   D) **Void**  E) **Expression less**  F) **None of these**

5. Value parameters (passing by value) are used if a parameters data flow is

   A) **One-way, into the function**
   B) **One-way, out of the function**
   C) **Two-way, into and out of the function**
   D) **B and C**
   E) **None of these**

6. Reference parameters (passing by reference) are used if a parameters data flow is

   A) **One-way, into the function**
   B) **One-way, out of the function**
   C) **Two-way, into and out of the function**
   D) **B and C**
   E) **None of these**

7. Which of the following can be used as a **switch expression**? (Select all correct answers):

   A) **bool variable**  B) **string constant**  C) **char variable**
   D) **integer variable**  E) **floating point variable**  F) **None of Them**
8. Which parameters in the following function heading are value parameters?

```c
void DoSomething(string date, int& num, float average, float sum, string& name)
```

A) date  B) num  C) average  D) sum  E) name  F) None of them

9. Which parameters in the following function heading are reference parameters?

```c
void DoSomething(string date, int& num, float average, float sum, string& name)
```

A) date  B) num  C) average  D) sum  E) name  F) None of them

10. The void function named GetNums has two parameters

A pass-by-reference parameter named x of type float
A pass-by-value parameter named num of type int.

Which of the following choices is a valid function heading for the function GetNums?

A) ```void GetNums( float& , int )```  
B) ```void GetNums( float x , int num )```  
C) ```void GetNums( float x , int num )```  
D) both A and C  
E) none of the above

11. The void function named GetNums has two parameters

A pass-by-reference parameter named x of type float
A pass-by-value parameter named num of type int.

Which of the following choices is a valid function prototype for the function GetNums?

A) ```void GetNums( float , int );```  
B) ```void GetNums( float x , int num );```  
C) ```void GetNums( float& x , int num );```  
D) both A and C  
E) none of the above
Short Answer (87 points) – Questions 12 – 22

12. (8 pts) Given the following constant and variable definitions/declarations.

```c
const int MAX = 100;
int sum;
float average;
string name;
int square(int); // function prototype
```

and the following list of expressions to be used as arguments in a function call:

- a) average
- b) ‘A’
- c) sum
- d) square(sum)
- e) MAX
- f) name
- g) “name”
- h) sum - average

A) Which expressions are valid for use as arguments with value parameters?

B) Which expressions are valid for use as arguments with reference parameters?

13. (8 pts) There are three functions shown in the code segment below. Assume all variables and function prototypes have been correctly declared before this segment of code.

```c
Average(Sum(x), avg);
A = Square(w, y);
```

A) Which function(s) is(are) most likely value-returning function(s)?

B) Which function(s) is(are) most likely void function(s)?

C) What are the five different arguments that are used in the function calls?
14. (6 pts) If the numbers entered are 1 3 5 7 9 11, what is the output for the following segment of code? Assume all variables are declared as integers.

   sum = 0;
   do
   {
       cin >> number;
       sum = sum + number;
       cout << sum << "-";
   } while (number < 9);

15. (9 pts) Consider the following segment of code

   int value;
   cin >> value;
   switch (value)
   {
       case 7:  cout << "7";
       case 8:  cout << "8";
                   break;
       case 9:  cout << "9";
       case 10: cout << "10";
       default: cout << "No Match";
   }

a) What is the output if the value entered is 7?

b) What is the output if the value entered is 9?

c) What is the output if the value entered is 12?
For Problem 16 show precisely the displayed output
  o Write one character per box.
  o Skip a box to indicate the presence of a blank space in the output.
  o Skip a row to indicate the presence of a blank line in the output.

16. (8 pts) What is the output for the following segment of code? All variables are integers
   
   ```
   for (i = 0 ; i < 10; i++)
   {
       for (j = 0; j < 10; j++)
       {
           cout << i << j;
           if ( j >= 2)
               break;
       }
       cout << endl;
       if ( i >= 3)
           break;
   }
   ```

17. (8 pts) Write a do-while loop segment of code that continues to prompt for and read an integer value entered by the user until the user enters in a positive integer. In other words the do-while loop continues to execute until the user enters in a positive integer (number greater than 0). Assume the user enters in integers only. Declare any variables required.
18. (6 pts) Rewrite the value returning function definition below as a void function definition such that the caller of the function still has access to the result (contained in the function variable sum) that is being returned by the value returning function.

- Use three parameters (one reference and two value) with the void function.

```c
float FindSum(float average, int number)
{
    float sum;
    sum = average*number;
    return sum;
}
```

19. (8 pts) Write a segment of code using a switch statement to solve the following problem. The char variable letter is used as the switch expression, and it can contain ‘A’, ‘B’, ‘C’ or some other character. Only ‘A’, ‘B’ and ‘C’ are expected. If letter contains ‘A’, print out the word “Apple”. If letter contains ‘B’ print out the word “Bubble”. If letter contains ‘C’, print out the word “Color”. For any other value of letter, print out the word “Wrong”.

```c
```
20. (8 pts) When the program shown below is executed, what is the output to the screen? This problem deals with the scope of a variable in a program, and the order of execution of statements.

```
#include <iostream>
using namespace std;

void function_A(int&);
void function_B(int&);
int number = 1; // global variable declaration of number
int main()
{
    int number = 2;
    cout << "number in main is: " << number << endl;
    function_A(number);
    return 0;
}
void function_A(int& num)
{
    int number = 3;
    num = num + 2;
    function_B(num);
    cout << "number in function A is: " << number << endl;
}
void function_B(int& sum)
{
    sum = sum - 1;
    cout << "number in function B is: " << number << endl;
    cout << "sum in function B is: " << sum << endl;
}
```

The identifying phrases written by the cout statements in this program are shown below. In the blank to the left of the lines, place 1, 2, 3 or 4 to indicate the order the statements are printed (1 for first, 4 for last). In the blank at the end of the line, put in the output value.

_____ number in main is: ___
_____ number in function A is: ___
_____ number in function B is: ___
_____ sum in function B is: ___
21. (12 pts) Add a function prototype, function call statement and function definition only to the following program. The function to add is described below:

- The name of the Boolean value-returning function is OpenInput.
- The function has one parameter – an input file stream.
- The function is to prompt the user for the name of the input file, open that input file and return the status of the input file stream via the functions return value.

```c++
#include <iostream>
#include <fstream>
#include <string>
using namespace std;

// Place the function prototype for OpenInput below this line

int main()
{
    ifstream inputFile;
    bool status;

    // Place the function call statement for OpenInput below this line
    // store the return value in the variable status

    cout << "Status: " << status << endl;
    return 0;
}
// Place the function definition for OpenInput below this line
```
22. (6 pts) For the following code segment, write out what is printed to the screen. Show the displayed output precisely by using the following rules:

- Write one character per box.
- 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.

```cpp
#include <iostream>
using namespace std;
void Test();
int main()
{
    Test();
    Test();
    Test();
    Test();
    Test();
    Test();
    return 0;
}
void Test()
{
    static int i = 5;
    static int j = 0;
    cout << i << "—" << j << endl;
    i--;
    j++;
}
```
Extra Credit (5 pts)  
What is the output of the following program?

```cpp
#include <iostream>
using namespace std;
void Sum(int , int& );
int main()
{
    int sum=-1,num=5;
    Sum(num,sum);
    cout<<"Sum of integers from 1 to "<<num<<" is: "<<sum<<endl;
    return 0;
}
void Sum(int n, int& sum)
{
    do
    {
        sum=sum+n;
        n=n-1;
    } while(n>=1);
}

Sum of integers from 1 to ____________ is: ______________
```