True or False – (15 Points)

1. (15 pts) Circle T for true and F for false:

T   F   a) In C++, a function definition should not be nested within another function definition.

T   F   b) Static variables retain their value from function call to function call.

T   F   c) When a break statement is executed, the innermost loop in which it appears is exited.

T   F   d) Arguments corresponding to reference parameters can be literal values.

T   F   e) Function names have global scope in C++.

T   F   f) Value-returning functions must use return expression;

T   F  g) Members of a structure must have unique names

T   F  h) Members of a structure must all be of the same DataTypes.

T   F  i) The expression first.name could be used to access the first member of the structure variable name.

T   F  j) A break statement is required in a switch statement

T   F  k) The lifetime of a local variable is for the duration of the program

T   F  l) All possible values for the switch expression must be included among the case labels for a given switch statement.

T   F  m) The default switch label is optional for a switch statement.

T   F  n) value parameters receive a copy of an arguments value

T   F  o) Local identifiers have name precedence over global identifiers.
Multiple choice (16 points) – Questions 2 – 9
For these problems circle all correct answers.
For example if answers A, C and E are all valid then circle A, C and E.

2. 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

3. Which operations below ARE ALLOWABLE aggregate operations on structures?
   A) Input/Output   B) Assignment   C) Return as a functions return value
   D) Arithmetic   E) Comparison   F) Pass by value in a function call

4. Which of the following can be used as a switch expression? (Select all correct answers):
   A) floating point variable   B) char variable   C) string constant
   D) integer variable   E) bool variable   F) None of Them

5. 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) A and C
   E) B and C
   F) None of these

6. What are the value parameters in the following function heading?
   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

7. What are the reference parameters in the following function heading?
   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
8. The void function named GetNums has two parameters

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

Which of the following choices are correct function prototypes for the description of the parameters for the function GetNums?

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

9. What is the output of the following code segment if num has a value of 3? Assume all variables are integers.

```
switch(num)
{
    case 3: cout << "a";
    case 2: cout << "b";
    case 1: cout << "c";
        break;
    default: cout << "end";
}
```

A) abcend   B) abc   C) ab   D) a
E) b   F) c   G) cend   H) None of these

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Short Answer (69 points) – Questions 10 – 20

10. (5 pts) If the numbers entered are 1 2 4 4 5 6 7 8 9 , what is the output for the following segment of code? Assume all variables are declared as integers.

```cpp
int sum = 0;
int count = 0;
do
{
    cin >> number;
    cout << sum << "-";  // note no line termination
    sum = sum + number;
    count = count + 2;
}while (count < 9);
```
11. (6 pts) Given the following constant and variable definitions/declarations.

```
const int SIZE = 10;
int sum;
float average;
string name;
void square(float); // void function prototype
```

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

a) \(\text{SIZE} \times 10\)  
b) \(\text{average}\)  
c) \(\text{sum}\)  
d) \(\text{name}\)  
e) \(\text{square(average)}\)  
f) \('A'\)  
g) \("name"\)  
h) \(\text{average} \times \text{float(sum)}\)

A) List all expressions above that are valid for use as arguments with reference parameters?

B) List all expressions above that are valid for use as arguments with value parameters?

12. (6 pts) There are two functions shown in the code segment below. Assume all variables and function prototypes have been correctly declared before this segment of code.

```
Average(sum, num, average);
status = WriteInfo(outFile, num);
```

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 four different arguments that are used in the function calls.
13. (6 pts) Consider the following segment of code

```cpp
int number;
cout << "Enter an integer between 0 and 10: ";
cin >> number;
switch(number*3)
{
    case 2:  cout << 'A';
    case 3:  cout << 'B';
    case 5:  cout << 'C';
    case 12: cout << 'X';
    case 13: cout << 'Y';
    case 16: cout << 'Z';
        break;
    default: cout << "default" << endl;
}
```

a) What is the output if 4 is entered?

b) What is the output if 1 is entered?

14. (4 pts) Given the for loop below, write an equivalent do-while loop. Be sure to include all necessary variable declarations

```cpp
for (int value=0; value <= 10; value++)
    cout<< "value is: " << value << endl;
```
15. (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*float(number);
    return sum;
}
```

16. (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
char letter;

switch (letter) {
    case 'A':
        printf("Apple\n");
        break;
    case 'B':
        printf("Bubble\n");
        break;
    case 'C':
        printf("Color\n");
        break;
    default:
        printf("Wrong\n");
        break;
}
```
17. (6 pts) Write an integer value returning function definition that counts the number of empty lines in an input file. The value returned by the function is the number of empty lines contained in the input file. This function requires a single parameter – the input file stream. An empty line is a null string when the line is read with the getline function. Assume that the input file stream is already open and associated with a file on the hard drive.

18. (4 pts) Write a structure declaration for a structure named Car containing the following members:
   - an integer variable representing the year of manufacture
   - a string variable representing the maker of a vehicle
   - a string variable representing the model of the vehicle
19. (10 pts) Finish the program below by adding a void function as specified below. Add only a function prototype, function call statement and function definition to the following program.

The name of the void function is InitStruct. The function has one parameter of the struct DataType Name. The function is to initialize each member of the structure parameter with a value of “NoName”. The information stored in the parameter must be available in main() after the function call.

#include <iostream>
using namespace std;

struct Name
{
    string first;
    string middle;
    string last;
};
// Place the function prototype below this line

int main()
{
    Name person;

    // Place the function call statement below this line

    return 0;
}
// Place the function definition below this line
20. (8 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);

int main()
{
    Test(1);
    Test(2);

    Test(3);
    Test(4);
    return 0;
}

void Test(int value)
{
    static int i = 5;
    static int j = 0;

    cout << i << "-" << j << endl;
    i--;
    j = j + value;
}
```
Extra Credit (5 pts)
For this problem show precisely the displayed output
- 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.

What is the output for the following segment of code? All variables are integers

```cpp
for (i = 0 ; i < 7; i++)
{
    if ( i <= 2)
        continue;
    for (j = 0; j < i; j++)
    {
        cout << j;
    }
    cout << "-" << i << endl;
}
```