CSC250 Practice Exam Name (Printed):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **I** | /20 | **II** | /10 | **III** | /30 | **IV** | /40 | /100 |

**All answers must be on this test. Scratch paper will not be graded.**

1. **True/False answer the following question. You must spell the word True or False out. ( 20 points )**

\_\_\_\_\_\_\_\_\_\_ 1. You must always have a base case to stop recursion.

\_\_\_\_\_\_\_\_\_\_ 2. A typedef statement creates another name for an existing data type.

\_\_\_\_\_\_\_\_\_\_ 3. Using the Standard Template Library string class, you can compare strings using the operators <, >, <=, >=, !=, and ==.

\_\_\_\_\_\_\_\_\_\_ 4. The following statement outputs a T if the variables are equal and an F if the variables are different.

cout << ( ( x == y) ? "T" : "F" );

\_\_\_\_\_\_\_\_\_\_ 5. When writing an integer to a binary file, 8 bytes would be written to the file regardless of the integer value stored in memory?

1. **Bitwise Operators – Two numbers are stored in integers a and b (both have values less than 65535). Write the code necessary to store integer a in the upper 16 bits and integer b in the lower 16 bits of integer C. You must use bitwise operators, other solutions will receive no credit. (10 points)**

int a = 460, b= 1045, c;

**Short Answer (30 points)**

* 1. What does dereferencing a pointer mean? Give an example of this.
  2. You have a vector and an array of integers, both have 10 elements. Write the 2 function calls to stl sort function to sort the elements in ascending order.
  3. Write a function to allocate a 2d array of doubles with dimensions’ row and column. Your function should return the address of the dynamically allocated memory. If an error occurs, output an error message and exit the program.
  4. What is the difference between a text file and a binary file?
  5. a. Write the code necessary to find the number of bytes in a file and store this in a variable, then output this value to the screen. You may assume that the file has been opened already.

b. If this file contained only floats, write the code to compute the number of floating point values in the file using the value computed above and display it to the screen.

* 1. Briefly describe the vector class, the push\_back member function and the at member function of the vector class?

1. **Recursion (40 points)**
   1. Write a recursive function that will compare the contents of char str1[] to char str2[] (both are null terminated strings). It should return the same values as the strcmp function. (15 points)
   2. Write a **program** to recursively compute M to the Nth power based on the following conditions. M ^ 0 = 1, if N is even compute M ^ (N/2) \* M ^ (N/2), otherwise if N is odd compute M \* M^(N/2) \* M^(N/2). A sample run of your program should look like. ( 25 Points)

Enter the mantissa: **5**

Enter the exponent: **3**

5 raised to the 3 power is: 125