

# CSci 1113

## Midterm 2

Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

*Instructions:* Please pick and answer any 6 of the 7 problems for a total of 90 points. If you answer more than 6 problems, only the first 6 will be graded. The time limit is 50 minutes. Please write your answers in the space provided. The exam is open book and notes. You may use electronic devices to ONLY look at either an e-book version or electronic notes. You may not use the internet, compiler or any other outside resources. (If you are typing on your keyboard/input device for anything other than ctrl-F to find words in the e-book or notes, this is probably not acceptable.)

**Problem (1)** [15 points] Write a function (in C++) that takes a string as an input. Assume this string contains all digits (0 to 9) and return the sum of all the digits.

Example input: "0415" as string

Example output: 10

**Problem (2)** [15 points] Assume there exists an array of doubles called “`nums`” (and a variable “`size`” for the array size) and two other doubles: “`dmax`” and “`dmin`”. Write code (in C++) that will put all elements of the array between “`dmax`” and “`dmin`” into the file called “`innerCircle.txt`” (the bounds of “`dmax`” and “`dmin`” should be exclusive). Separate each entry in the file by a space (you can have a trailing space at the end). You may assume: `dmin < dmax`.

Example: `nums = {4.5, 4.2, 9.8, 5.4, 3.2}`, `size = 5`, `dmin = 4.0`, `dmax = 7.0`

File (order doesn't matter): `4.5 4.2 5.4`

**Problem (3)** [15 points] Assume there exists a 2D array of ints called “`data`” with dimensions 100 by 100. Write code to display the maximum of each column in this array (100 outputs).

**Problem (4)** [15 points] Write C++ code that reads a single word from the user. Then output all sentences in "lines.txt" that contains this sequence of letters. (Only output matched lines once and ignore any upper/lower case issues.)

Example: input = "ate", line.txt below:

```
fate hates plates  
not this line  
i ate a cookie
```

Output:

```
fate hates plates  
i ate a cookie
```

**Problem (5)** [15 points] Write a function (in C++) that takes an array of integers as input along with the size of the array. Assume each element in the array is a single digit. Return which digit is most common.

Example input: `array = {3, 5, 6, 5, 6, 7, 3, 5, 2, 9, 5}, size = 11`

Example output: 5 (as it happens 4 times)

**Problem (6)** [15 points] What is the output of this code? You **must** show work to get full credit.

```
int foo(int a, int b)
{
    if(a == 0)
    {
        return b;
    }
    return foo( (3*a)%b, b+1) + foo( a/b, b);
}

int main()
{
    cout << foo(1,2);
    return 0;
}
```

**Problem (7)** [15 points] Find 3 possible places for errors in the following code fragment. Explain specifically what causes the error and whether it is a syntax, runtime or logic error. You may assume all includes are done properly, it is using namespace std and there are no manually declared global variables.

```
string repeat(string word)
{
    for(int i=times; i >= 1; --i)
    {
        word += word;
    }
}

int main()
{
    int times = 5;
    string phrase = "All work and no play makes Jack a dull boy\n";
    repeat(phrase);
    cout << phrase;
}
```

Desired output for this main():

```
All work and no play makes Jack a dull boy
All work and no play makes Jack a dull boy
All work and no play makes Jack a dull boy
All work and no play makes Jack a dull boy
All work and no play makes Jack a dull boy
```