Computing Machinery I
Assignment 1
10% of your final score
Due May 13th @ 11:59PM MST

Objective

The objective of this assignment is to practice basic C concepts, including 2D arrays, random numbers, and searching.

Skills needed for this assignment

- Ability to work with 2D arrays in C
- Ability to use a random number generator
- Ability to employ a simple search algorithm
- Ability to use command-line arguments
- Ability to write and read text files in C
- Ability to define functions in C
- Ability to pass parameters by value and by reference

Overview

Your program will simply display a table of random digits. The user requests to search the table for a specific digit. The program reports the number of occurrences of that digit in the table in addition to the row and column number for each occurrence.

Details

Display to the user an N×N table of random digits (positive integer between 0 and 9). N is chosen by the user using a command-line argument, such as:

```
./tableSearch.o 5
```

The displayed table may look like:

```
0 5 7 8 3
9 3 5 7 2
3 5 3 7 8
2 2 5 7 9
0 9 0 3 4
```

The user then chooses a digit:

```
Enter a digit to search for: 0
```

The program responds with the following statistics:

```
Digit 0 occurs 3 times
1. In (0,0)
2. In (4,0)
3. In (4,2)
The digit 0 is 12% of the matrix
```

The user can quit the program or choose another digit. A log file must be created showing: the initial table, which digits the user chose, and the statistics before exiting the program.

Modularity

Your code must divided into functions as appropriate. At a minimum, you must define the following

functions (we are not showing all necessary arguments):

- `initialize(*table)`
- `randomNum(n,m);` n and m are the lower and upper bounds for the random number. You can use the C library function `rand()`.
- `displayStats(*table)`
- `search(*table, digit)`
- `logFile(*table)`

Submission
- **Note:** The TA may provide further submission instructions
- Name your program *assign1.c*
- Create a script file and call it *assign1.script*
- Name your log file *assign1.log*
- Submit a *README* file providing extra instructions or information for your TA, such as the search algorithm you are using
- Submit your work to the appropriate dropbox on D2L.

Late Submission Policy
This is a very short semester, and **we will not be granting extensions**. I suggest that you submit by the deadline. There is a grace period of 48 hours: if you submit your assignment within 48 hours of the deadline, no penalty will be levied. After the grace period, late submissions will be penalized as follows:
-12.5% for each late day or portion of a day for the first two days
-25% for each additional day or portion of a day after the first two days
Hence, no submissions will be accepted after 7 days (including weekend days) of the announced deadline.

Academic Misconduct
This assignment is to be done by individual students: your final submission must be your own original work. Teamwork is not allowed. Any similarities between submissions will be further investigated for academic misconduct. While you are encouraged to discuss the assignment with your colleagues, this must be limited to conceptual and design decisions. Code sharing by any means is prohibited, including *looking* at someone else's paper or screen. The submission of compiler generated assembly code is absolutely prohibited. Any re-used code of excess of 5 lines in C and 10 lines in assembly (10 assembly language instructions) must be cited and have its source acknowledged. Failure to credit the source will also result in a misconduct investigation.

D2L Marks
Marks posted on D2L are subject to change (up or down).

Computing Machinery I
Assignment 1 Rubric

Student:_____

Item	Max Points	Points
Code compiles	5	
Code runs	5	
Searching & stats	20	
Log file functionality	10	
User interface (input validation, implementing all features)	15	
Random numbers	10	
Modularity	15	
Command-line arguments	5	
Passing array parameters by reference	5	
Code readability (formatting documentation)	10	
Total Points	**100**	