

# CS 150 Lab 13

## Two Dimensional Arrays

The objective of today's lab is to use two dimensional arrays.

- Be sure your output looks exactly like the specified output.
- Be sure to submit the completed project to CS150-02 Lab by Friday at 5pm.
- Be sure to follow the coding standards and add comments to your code!

### Lab 12.1

Write a complete C++ program in a project **13\_1\_MagicSquares** that will read data from a file called **squares.txt**. The program will then determine if each square is a magic square or not.

A magic square is an array of numbers from 1 to  $N^2$ , such that the sum of the numbers in each row, each column, and each diagonal is the same. Here is an example of a 3x3 magic square:

2	7	6	→15
9	5	1	→15
4	3	8	→15

15 ↙   ↓   ↓   ↓   ↘ 15

You will find the solution to this program partly completed in the CS150-02 Public folder in a file called **13lab.cpp**. You are to copy this code into your project and complete the program by writing all of the function definitions as described in the function header comments.

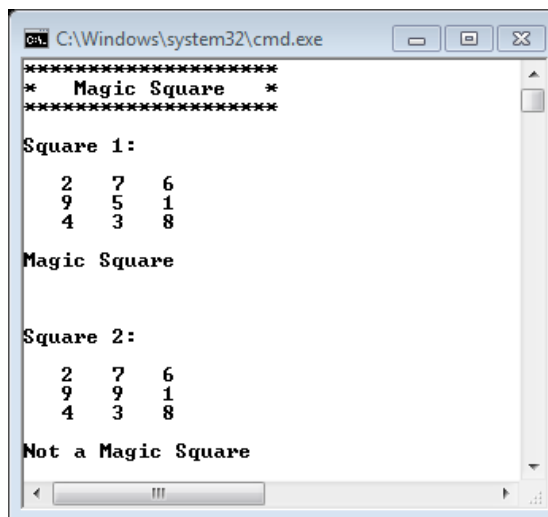
You will also find an input file to test with your program. The input file is called **13input.txt**. Copy the contents of this file into the input file for your project called **squares.txt**. The first number in the file is the number of magic squares. The number above each magic square is the number of rows and columns in that square.

The input file below

```
2
3
2 7 6
9 5 1
4 3 8

3
2 7 6
9 9 1
4 3 8
```

will produce this output to the screen



```
C:\Windows\system32\cmd.exe
*****
*   Magic Square   *
*****
Square 1:
  2  7  6
  9  5  1
  4  3  8
Magic Square
Square 2:
  2  7  6
  9  9  1
  4  3  8
Not a Magic Square
```

Once your project is complete, place your solution PUNetIDLabs into the CS150-02 Drop folder on Turing. Your solution is to have ALL previous projects completely working and correct.