COSC2430 Homework 0: Array and Argument Manager

1. **Introduction**
   You will create a C++ program to calculate the percentage of a subset from the given matrix. The condition of the subset will be given in the input file. The purpose of this homework is to get students familiar with the server and ArgumentManager.h (more info about ArgumentManager.h can be found here)

2. **Input and Output**
   a. Input file
      The input is a single text file and will never be empty. It contains 3 parts:
      i. A number k (k>0, k is an integer) for the size of the matrix (it will be a square matrix).
      ii. A matrix with number aij (aij >=0, aij is an integer, 1<=i<=k, 1<=j<=k), for the numbers of the cells. There will be ONE matrix row per line in the file, and values are separated by spaces.
      iii. The conditions of the subset matrix: even, odd, equal, greater than, less than or equal.
      Format: e, o, =, >, <

   b. Output file
      The output is also a single text file. It contains a real number d (0<= d <=100) rounded up to the nearest hundredth.

   c. Examples
      i. Example 1
      Input01.txt
      3
      1 2 3
      4 5 6
      7 8 9
      >6

      output01.txt
      0.33

ii. Example 2

input02.txt

```
4
2 2 2 2
3 3 3 3
4 4 4 4
5 5 5 5
e
```

output02.txt

```
0.50
```

iii. Example 3

input03.txt

```
6
1 1 1 1 1 1
1 1 1 1 1 1
1 1 1 1 1 1
1 1 1 1 1 1
1 1 1 1 1 1
1 1 1 1 1 1
=2
```

output03.txt

```
0.00
```

3. The Rules and Operations

By reading the input file, you should be able to create a grid with the read numbers. Each number corresponds to one cell. After reading the example file from below input11.txt, you should be able to create a grid as follow:

1	2	3
4	5	6
7	8	9

Depending on the condition, you will need to perform the appropriate operation to count the number of cells that meet the condition. Then the percentage will be calculated by:

$$\frac{Number\ of\ correct\ cells}{Total\ cells}$$

For example: Using the matrix above and the condition is odd numbers

The subset will be [1,3,5,7,9]

=> 5 cells.

The percentage of the subset:

(5/9) ≈ 0.56

Finally, write the percentage to the output file: 0.56

4. **Requirements**

   Homework is individual. Your homework will be automatically screened for code plagiarism against code from the other students and code from external sources. Code that is copied from another student (for instance, renaming variables, changing for and while loops, changing indentation, etc, will be treated as copy) will be detected and result in ”0” in this homework. The limit is 50% similarity. Here are some previous homework which have been found to copy each other (the main function has been deleted).

5. **Turn in your homework**

   Homework 0 needs to be turned in to our Linux server, follow the link here https://rizk.netlify.app/courses/cosc2430/2_resources/

   Make sure to create a folder under your root directory, name it hw0 (name need to be lower case), only copy your code to this folder, no testcase or other files needed.

   PS: This document may have typos, if you think something illogical, please email TAs for confirmation.