Homework 1
Advanced Python Programming
Due Date: 10/3

1. (*Largest rows and columns*) Write a program that randomly fills **0**s and **1**s into a 4 × 4 matrix, prints the matrix, and finds the rows and columns with the most **1**s. Here is a sample run of the program:

```
0011
0011
1101
1010
The largest row index: 2
The largest column index: 2, 3
```

2. (*Markov Matrix*) An *n* × *n* is called a *positive Markov matrix* id each element is positive and the sum of the elements in each column is **1**. Write the following function to check whether a matrix is a Markov matrix:

```
def isMarkovMatrix(m):
```

Write a test program that prompts the user to enter a 3 × 3 matrix of numbers and tests whether it is a Markov matrix. Here are sample runs:

```
Enter a 3-by-3 matrix row by row:
0.15 0.875 0.375
0.55 0.005 0.225
0.30 0.12 0.4
It is a Markov matrix

Enter a 3-by-3 matrix row by row:
0.95 -0.875 0.375
0.65 0.005 0.225
0.30 0.22 -0.4
It is not a Markov matrix
```

3. (*Game: Connect Four*) Connect Four is a two-player board game in which the players alternately drop colored disks into a seven-column, six-row vertically suspended grid, as shown at cs.armstrong.edu/liang/ConnectFour/ConnectFour.html. The objective of the game is to connect four same-colored disks in a row, column, or diagonal before your opponent does. The program prompts two players to drop a red or yellow disk alternately. Whenever a disk is dropped, the program redisplays the board on the console and determines the status of the game (win, draw, or continue) Here is a sample run:

```
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| | | | | | | |
- - - - - - - - -
```

```
Drop a red disk at column (0-6): 0



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 | | | | | | | |
 | | | | | | | |
 |R| | | | | | |
- - - - - - - - - -
Drop a red disk at column (0-6): 0

 | | | | | | | |
 | | | | | | | |
 | | | | | | | |
 | | | | | | | |
 |R| | |Y| | | |
- - - - - - - - - -

…
…
…

Drop a red disk at column (0-6): 0

 | | | | | | | |
 | | | |R| | | |
 | | | |Y|R|Y| |
 | | |R|Y|Y|Y|Y|
 |R|Y|R|Y|R|R|R|
- - - - - - - - - -
The yellow player won
```