Practice Exercise Questions (Challenge)

See the notes carefully

Notes 1: Consider it as fun part of your learning and don't take it as a burden or assignment with a forced deadline. Do exercise by yourself.

Notes 2: If you attempt it correctly, you will qualify to receive a gift from my side.

Note 3: Do not ask for a solution. Since there is a gift, it may get leaked which I do not want to happen.

Note 4: Attempt it and submit your code to me for a check via inbox and I will return to you as soon as possible. I will check your solution based on some sample test cases. The minimum requirement for your program to be correct is that it should successfully pass those same test cases correctly.

Note 5: **Have Fun**

Q:1. Write a matlab script which will accept a 2D matrix from the user as input which contains only 0 and 1's. The user needs also to specify the size of the matrix. The script should determine the largest square submatrix size that contains all 1's. A square submatrix is one of equal rows and columns, and your program should return the size of the largest submatrix that contains only 1's. For example: if if the user input a matrix [1 0 1 0 0; 1 0 1 1 1; 1 1 1 1 1 ; 1 0 0 1 0] then this looks like the following matrix:

1 0 1 0 0
1 0 1 **1 1**
1 1 1 **1 1**
1 0 0 1 0

For the input above, you can see the bolded 1's create the largest square submatrix of size 2x2, so your program should return the **4**. You can assume the input will not be empty. Further assume that the maximum matrix size that the user can input is 10*10.

Q:2. Consider two positions on the 8x8 chess board with no pieces namely (x,y) and (a,b). The position (x,y) is our current position and the position (a,b) is the position we want to move to (or the next position). The x,y,a,b takes on values between 1 and 8. Moreover, we assume that the position we want to move to (i.e., next position) is somewhere above and to the right of the

current position. This leads to the following two condition, i.e., a > x and b > y. Write a script that should determine how many ways are there of traveling from (x y) on the board to (a,b) moving only up and to the right. For example: if the user enters (1 1) as a current position and (2 2) as the next position then your program should output 2 because there are only two possible ways to travel from space (1 1) on a chessboard to space (2 2).

So in conclusion, you script should ask the user for a current position and next position and then output the possible ways of moving from current position to next position.

Q:3. Consider a 2-D matrix that contains only the integers 1, 0, or 2. From the position in the matrix containing a 1, return the number of spaces either left, right, down, or up you must move to reach an enemy which is represented by a 2. You may wrap around one side of the matrix to the other as well. For instance, if the user input the matrix [0 0 0 0; 1 0 0 0; 0 0 0 2; 0 0 0 2] then this looks like the following:

0 0 0 0
1 0 0 0
0 0 0 2
0 0 0 2

For this input your program should return 2 because the closest enemy is 2 spaces away from the 1 by moving left to wrap to the other side and then moving down once. The array will contain any number of 0's and 2's, but only a single 1. It may not contain any 2's at all as well, where in that case your program should return a 0.

Enjoy MATLAB