4MM013 Workshop

Week 5 ‘Matrix Tasks’

Task 1

Create a program that reads in two 5x6 numpy.arrays, adds them together, and then stores the result in a third 5x6 matrix. The program should then print out the first two matrices and the result matrix.

Task 2

Create a program that reads in three 2x3 numpy.arrays, subtracts the second from the first, and adds the third to the result. The program should then print out all three matrices and the result matrix.

Task 3

Create a 4x4 matrix containing random numbers in the range of 1 to 20. Have the user prompted for a number, check that the imputed value is a number and then check if the number is in the matrix. If the number is in the matrix, return the number of times that number is in the matrix.

Task 4

Create a text based game that allows a player to play a simple one person game of battleships. With a 6x6 matrix of all 0’s add 4 random x,y locations with the values 1, 2, 3 and 4.

1 = ‘Battleship'
2 = ‘Aircraft Carrier'
3 = ‘Submarine'
4 = ‘Destroyer’

The player then is asked to ‘shoot’ at 8 matrix locations from the 6x6 matrix. Use a function to assess iIf the location has a value in it over 0, and if so feedback to the

player that they have ‘Hit!’ and tell them which ship they have sunk. If the location has only a 0 in it, let the player know that their shot was a ‘Miss!’.

Once all the shots have been taken, show the matrix to the player, with a -1 in the locations they shot at. If any of the ships remain in the matrix, tell the player that they have lost, otherwise, they have won.

Consider

How would you create a 6x6 grid using numpy?
How would you assign values to the grid?
How would you print the grid?
How would you create a function that checks if a certain position has been hit?
How will you keep track of the number of shots a player has taken or has left?
How will you assess if the player has won or lost?

Point out your solutions to these questions in your program with comments.