Question 1:

Write a program to, given a square matrix with elements of 0 or 1, find the first square submatrix with all 1 elements. This square submatrix should be as big as it can be, but it must include only ones and be at least 3 in size. Your program should prompt the user to enter the number of rows in the matrix. The number of rows should be at least 5. The program then displays the location of the first element in the square submatrix and the number of the rows in the submatrix. Here is a sample run:

Example 1:

```
Enter the number of rows in the matrix: 6
Enter the matrix row by row:
101011
111011
101111
101111
101111
111111
The first square submatrix is at (2, 2) with size 4
```

Example 2:

```
Enter the number of rows in the matrix: 6
Enter the matrix row by row:
101011
111011
101111
101111
101111
111101
The first square submatrix is at (2, 2) with size 3
```

Example 3:

```
Enter the number of rows in the matrix: 7
Enter the matrix row by row:
1111111
1111111
1111111
1011111
1011111
1111111
1111111
The first square submatrix is at (0, 0) with size 3
```

Your program should implement and use the following method to find the first square submatrix with the minimum size 3.

def find_first_squareblock(matrix : list[int]) -> list[int]

The return value is a list that consists of three values. The first two values are the row and column indices for the first element in the submatrix, and the third value is the number of the rows in the submatrix.

CS500 HW - Simple Class and Lists

Question 2:

Design a class named MyInteger. The class contains:

- An int data attribute named value that stores the int value represented by this object.
- A constructor that creates a MyInteger object for the specified int value.
- A getter method that returns the int value.
- A setter method that sets the int value.
- The methods iseven(self), isodd(self), and isprime(self) that return true if the value in self object is even, odd, or prime, respectively.
- The __eq__(self, other : MyInteger) that returns true if the value in the self object is equal to the value of the other object.
- The __str__(self) that returns the string representation of the object.
- The add(self, other : MyInteger) that adds the value of the other object to the value of the self object.
- The sub(self, other : MyInteger) that subtracts the value of the other object from the value of the self object
- The __gt__(self, other: MyInteger) that is the implementation of > operator. If the value of the self object is greater than thevalue of the other object, it returns true otherwise false.
- Draw the UML diagram for the class and then implement the class. Write a client program that tests all methods in the class.