Homework 4

Exercise 1

Write a method

public static boolean isPrime(int nr) which returns true if nr is prime and false otherwise. Test it.

Exercise 2

Write a class `MatrixGenerators` in which you implement the methods:

```
public static int[][] matrix1(int size) {…}
```

that returns a square matrix with the size equal to size and in which the elements increase on the columns.

Eg for size = 4 the result is

1 2 3 4

5 6 7 8

9 10 11 12

13 14 15 16

```
public static int[][] matrix2(int size) {…}
```

that returns a square matrix with the size equal to size and in which the elements increase on the lines.

Eg for size = 4 the result is

1 5 9 13

2 6 10 14

3 7 11 15

4 8 12 16

```
public static int[][] matrix3(int size) {…}
```

that returns a square matrix with the size equal to size and in which the elements increase on the even columns from left to right and on odd columns from right to left

Eg for size = 4 the result is

1 2 3 4

8 7 6 5

9 10 11 12

16 15 14 13

```
public static int[][] matrix4(int size) {…}
```

that returns a square matrix with the size equal to size and in which the elements increase following a decreasing spiral.

Eg for size = 4 the result is

1 2 3 4

12 13 14 5

11 16 15 6

10 9 8 7

Exercise 3

Write a class `MatrixCalculations` in which you implement the methods:

```
public static int sumMainDiagonal(int m[][])
```

that returns the sum of the elements on the main diagonal of a square matrix:

Eg for the matrix

1 2 3 4

12 13 14 5

11 16 15 6

10 9 8 7

the result is 1+13+15+7

```
public static int sumUnderMainDiagonal(int m[][])
```

that returns the sum of elements under (and including) main diagonal of a square matrix:

Eg for the matrix

1 2 3 4

12 13 14 5

11 16 15 6

10 9 8 7

the result is 1+12+13+11+16+15+10+9+8+7

```
public static int[][] matrixMultiplication(int a[][], int b[][])
```

that returns the result of multiplying matrix a and b. The method should print an error message if the multiplication cannot be done (what is the test?) and return null.