Exercises 5: advanced loops

Exercise 5.1

Give the execution trace of the following program. What is displayed ?

```
1  public class Prog1 {
2      public static void main(String args[]) {
3          for (int i= 1; i <= 2; i++) {
4              for (int j= 1; j <= i; j++) {
5                  int k= i*j;
6                  if (k < 10)
7                      Terminal.ecrireChar('0');
8                  Terminal.ecrireString(k + "␣");
9              }
10             Terminal.sautDeLigne();
11         }
12     }
13 }
```

Exercise 5.2

Question 5.2.1- Drawing a square

Write a program that displays a square composed of characters '*', whose size is entered by the user.
For example, for a size 4, it will display:

****
****
****
****

There are several ways to achieve this. One way is to use a single loop, another uses two nested loops , one in the other one. Take a method that uses two loops.

Question 5.2.2 - Drawing a triangle

Now it is time to draw a triangle with the tip facing upwards.
For the triangle, we ask the user to enter the number of lines. For each row, it will display a number of spaces, and a number of stars, then NEW_LINE. You will need to demonstrate a relationship between the line number, the number of spaces and the number of stars.

Exercise 5.3

Question 5.3.1 (single loop)

Make a program that will tell if a typed number is primary number. To do this, we'll see if it is divisible by at least one number **between 2** and **number - 1**. For example, 5 is prime because it is divisible neither by 2 nor 3 nor 4.
Notes: 1 is not considered prime.
Whether a is divisible by b, it suffices to test if **a% b == 0**

Question 5.3.2 (nested loops)

Write a program that displays the first 100 prime numbers (be careful, we did not say the prime numbers smaller than 100).
Think about the type of loop that is most appropriate for the outer loop.
Give another **simpler program** to achieve the same result.

```
1  public class Puis
{
2      public static void main(String args[]) {
3          int a,b;
4          Terminal.ecrireString("entrez a ");
5          a= Terminal.lireInt();
6          Terminal.ecrireString("entrez b ");
7          b= Terminal.lireInt();
8
9          int r= 1;
10         while (b != 0) {
11             if (b % 2 == 0) {
12                 a= a*a;
13                 b= b/2;
14             } else {
15                 r= r*a;
16                 b= b-1;
17             }
18         }
19         Terminal.ecrireStringln("résultat " + r);
20     }
21 }
```