



## TP4 Functions

### Ex 4.1 Drawing

1. Write a function **DrawSquare** that allows you to display a square with side  $n$ . knowing that the drawing character and the integer  $n$  are passed as parameters.

*Example.* Calling **DrawSquare (4, '#')** displays the square on the right.

```
####
####
####
####
```

2. Write a function **DrawTriangle** that allows you to display a right-angled triangle instead of a square.

*Example.* Calling **DrawTriangle(3, '\$')** displays the triangle beside.

```
$
$$
$$$
```

3. Modify the function **DrawTriangle** by adding a direction parameter to take into account the orientation of the hypotenuse of triangle. If this parameter is 0, the hypotenuse is faces upwards, as in the previous example. If the parameter is 1, it is turned downwards.

*Example.* Calling **DrawTriangle (5, '&', 1)** displays the triangle beside.

```
&&&&&
&&&&
&&&
&&
&
```

4. Using only the function **DrawTriangle**, write a function **DrawTriangle2**, which displays a triangle as shown in the example on the right.

*Example.* Calling **DrawTriangle2(4, '\$')** displays the triangle beside.

```
$
$$
$$$
$$$$
$$$$
$$$$
$
```

5. Test each of the above functions in the main() function.

### Ex 4.2 Pascal's Triangle

1. Write a function **fact** that calculates and returns the factorial of an integer  $n$  passed as a parameter.

2. Write a function **Pascal** that calculates and displays Pascal's Triangle by calculating binomial coefficients using the following formula:

$$C_p^q = \frac{p!}{q!(p-q)!}$$

*Example.* Calling **Pascal (5)** displays:

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
```

### Ex 4.3 Next Prime Number

1. Write a function **IsDivisible(n,m)** that returns **1** if **n** is divisible by **m** and **0** otherwise.
2. Write a function **sumDivisors** that returns the sum of the divisors of a number passed as a parameter.
3. Write a function **Prime** with an integer parameter **n** that returns **1** if the number **n** is prime and **0** otherwise.
4. Write a function **NextPrime** taking an integer parameter **n** and returning the smallest prime number greater than or equal to **n**.
5. Write a program that asks the user for an integer **n** and displays the first prime number greater than or equal to **n**.

### Ex 4.4 Swaping

Write a program that requires two values, **a** and **b**, entered by the user and calls a function that swaps the values of **a** and **b**, passed as parameters to this function.

Notice and try to explain what happened after running this program.