Task #1: Familiarise yourself with the Scala worksheet

Start Scala IDE, for example, by issuing Windows key and typing "scala" or look for it from Applications menu (Applications -> Programming -> Scala IDE) in class TC217 or linux-desktop.tuni.fi.

Create a new Scala project "DIP" (File->New->Scala Project). Create a new Scala Worksheet: DIP->New->"Scala Worksheet". You can name it "ex1", for instance. Scala code can be written in the worksheet.

The code should be evaluated when the sheet is saved. Unfortunately, sometimes the worksheet is sticky and buggy, and fails to evaluate the code.

Write a simple function sum, that takes two integer parameters and returns their sum. Test the sum function:

val s = sum(20, 21)

If the worksheet works, the result will be shown in the following way after saving: the value of s appears automatically to the code file as a comment.

val s = sum(20, 21)   //> s : Int = 41

Task #2: Pascal's triangle

In mathematics, Pascal's triangle (https://en.wikipedia.org/wiki/Pascal%27s_triangle) is a triangular array of the binomial coefficients:

```
   1
  1 1
 1 2 1
1 3 3 1
1 4 6 4 1
   ...
```

Write a recursive function 'pascal' for calculating the value for certain column and row pair.
The top-most 1 is at row 0 and column 0.

def pascal(column: Int, row: Int): Int = ???

Task #3: Parsing

Write a recursive function for testing that parenthesis are balanced in a string (i.e. there are as many '(' and ')' characters in a string).

def balance(chars: List[Char]): Boolean = ???

Task #4: Higher order functions 1

Assume you have an integer array:

val a = Array(1,2,3,4,5)

Use functions map and reduceLeft to compute the sum of squares of the values in the array.

Task #5: Higher order functions 2

Explain the following code snippet. You can try the snippet piece by piece in the worksheet or search help from Scaladoc (https://www.scala-lang.org/api/2.11.12/#package).

```
"sheena is a punk rocker she is a punk punk".split(" ").map(s => (s, 1)).
      groupBy(p => p._1).mapValues(v => v.length)
```

what about

```
"sheena is a punk rocker she is a punk punk".split(" ").map((_, 1)).
      groupBy(_._1).mapValues(v => v.map(_._2).reduce(_+_))
```