Lab lecture exercises – 25 November 2016

1. Write a class `Measure` with two field variables `private String description` and `private int value`, where a value is always non-negative (e.g., this could be films with a rating, bank accounts with a non-negative balance, processes with times needed to complete them, customers and their age, and so on).

2. Assume now a variable `private ArrayList<Measure> measures` which collects several of these measures of the same type.

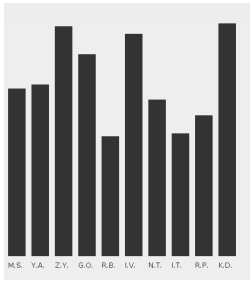
   Create a class `BarChart` for a visual presentation of the measures by creating vertical bars (see, e.g., http://www.mathsisfun.com/data/bar-graphs.html) from a given `private ArrayList<Measure> measures`.

   To this end:

   (a) Compute the maximum of `measures`. If it is non-zero, normalize the values so that the maximal bar is represented by a given number of pixels such as `int yNumberOfPixels = 400`. The panel should have a size of 800 times 500 pixels.

   (b) Write a method `public static ArrayList<Measure> randomMeasures(int n, int low, int high)` that generates an ArrayList of type `Measure` with length `n` and random values between `low` and `high`.

   (c) For a "short" ArrayList (i.e., size less than or equal to 10) present the bar chart by bars of width `30` pixel and the empty space between two bars by `10` pixels.



   (d) If the ArrayList is bigger (i.e., sizes greater than 10 but less than or equal to 100) reduce the width of the bars and the gaps down to `3` and `1` for an ArrayList of size 100; and to something in between `3` and `30` for the width of the bars (in between `1` and `10` for the gaps) for not quite so long ArrayLists.

   (e) For ArrayLists with sizes less than or equal to 30 display a `description` below the bars.

   (f) If the ArrayList is even bigger (i.e., greater than 100 elements, but less than or equal to 600 pixels) use the `fillPolygon` method to display the values.

   (g) If the ArrayList is even bigger (greater than 600 pixels) print just out a warning that the ArrayList cannot be displayed.