DIN61-222: Adv. Programming (Java)
Semester 1, 2019-2020

Exercises 1

Due in: Saturday, September 21st, 13:00 at the start of the class.
Worth: 10% of final grade. Marked out of 30.

Write in English. Include your name, student number, and course name/number at the top of the front page. The pages should be stapled together at the top-left corner. Each page should be numbered. Do not use a plastic cover. Do not waste trees by including cover sheets. Do not write out the questions as part of your answer.

All your answers must include **screenshots** showing code compilation and output generated on your machine. If your work does not include screenshots, then you will lose half marks.

Late submissions will lose half marks immediately, and a further 10 marks for each hour after that. *Cheating will result in 0 marks for all those involved*.

If you have any questions, please come to see me. Good luck ☺.

- Andrew Davison

Question 1

a) Implement a class called `Stats`, which generates statistics information.

After a `Stats` object is created, doubles can be added to it using the `Stats.nextNumber()` method, as shown below:

```
Stats s = new Stats();
s.nextNumber(1.1);
s.nextNumber(-2.4);
s.nextNumber(0.8);
```

`Stats` should include methods for the following:

- return the number of inputs (e.g. 3 for the example above);
- return the last number entered (e.g. 0.8 for the example above);
- return the sum of all the numbers entered (e.g. -0.5 for the example above);
- return the mean of all the numbers entered (e.g. -0.166667 (-0.5/3) for the example above);
- return the largest number entered (e.g. 1.1 for the example above)

Note that these methods can be called at any time, even if no numbers have been added to the `Stats` object with `nextNumber()`, and may be called again after more numbers have been added to the object.

Important: do **not** store all the number inputs in a data structure inside the `Stats` object. For example, do **not** use an array of doubles or an ArrayList to hold all the inputs inside the object.

Write a short main() function that shows how `Stats` can be used.

b) Explain in words why it is a *good* idea to implement `Stats` without storing all the numbers inputs in the object. Also, explain why it is a *bad* idea.

Question 2

a) Write a main() function and other static functions that use Java's Random class to create an ArrayList of randomly generated *integers*, which have values somewhere between -5 and 5. The program should finish by printing out a total of all the integers. The number of integers is supplied by the user when prompted by the program. *Hint*: use Java's Scanner class.

b) Does part (a) have to use an ArrayList, or could an array be utilized? Explain your answer in words.