ISY3413 - Software Engineering Fundamentals for IT

Tutorial 1

In this tutorial you will:

1) You will meet your tutor. Please make sure that you know your tutor's name, contact information, and consultation sessions.
2) You will setup your environment and refresh basic java programming.
3) You will form your group for the assignment.

Part A: Environment Setup (20 minutes)

1) Install JDK 11[1]
2) Install IntelliJ Community
3) Review the main commands and tools[2] (i.e. java, javac, Javadoc, etc)

Part B: Implement Bubble Sort (40 minutes)

Bubble sort[3] is a sorting algorithm that compares to adjacent elements in an array and swaps them if necessary. It will repeat this process until now more swaps can be made.

The pseudocode of the algorithm is as follows[4]:

```
procedure bubbleSort(A : list of sortable items)
    n := length(A)
        for i from 0 to N-1 do
            for j from 0 to N-i-1 do
                if a[j]>a[j+1] then
                    swap(a[j], a[j+1])
                endif
            endfor
        endfor
end procedure
```

Tasks

1. Implement the algorithm in a Class named BubbleSort
2. Implement the bubble sort algorithm in java in a method called sort a take an array of Integers (i.e. Interger[])
3. The method should return a sorted array
4. Create a Class App that uses the Sort class to sort the following arrays and prints the results to the console.
    a. 70,61,72,83,38
    b. 7,2,76,4,99
    c. 28,9,13,78,19
    d. 68,84,41,62,18

[1] https://docs.oracle.com/en/java/javase/11/
[2] https://docs.oracle.com/en/java/javase/11/tools/tools-and-command-reference.html
[3] More information: https://en.wikipedia.org/wiki/Bubble_sort
[4] Small animation of the algorithm: https://www.youtube.com/watch?v=9I2oOAr2okY

e. 37,57,40,13,50

Part C: Form Groups (10 minutes)

You must register your assignment group as soon as possible in Canvas.

Team/groups Requirements:

1) All member must come to the same T/L session until the end of the semester, please try to have a team in the same class.
2) Try to have a cross functional team, this is not a one-man project and team members contribution will be monitored through the semester by your tutor.
3) Exchange contact information with your teammates
4) You will have progress check and Scrum meeting every week from next week, and you may lose individual contribution mark for being absent in the meeting.
5) Please communicate with your tutor if you have any question.
6) All enquiries about changing teams or classes must be negotiated with tutors and head tutor by sending an email and cc your tutor and the head tutor.

Make sure that you have your first group meeting with your tutor, introduce your team to your tutor, explain your team cross functional skills and discuss about your goals towards this course.

Part D: Discussion (40 minutes)

With your group discuss the following points:

1) New Functionalities:
   a) User Input. We want the user to input the set of integers to sort.
      i) How would you read the input?
      ii) Where and how would you "parse" the input?
   b) Random Numbers. In order to test our algorithms, we want a Random Array Integer generator.
      i) What do you need as information to create this generator? Who decides?
      ii) Where would you place it?
2) Discuss your solution with your teammates:
   a) How do you represent the classes where each method is located?
   b) How do you explain when and how your code calls methods?
   c) How are you "making sure" your algorithm is sorting arrays correctly? How many cases are you running? And your random generator?
3) If you need to share you code with your teammates
   a) How would you share your source code today?
   b) If your teammates only need to use the compiled code, how could they access it?
   c) How would they now something changed?
4) Discuss how you organized you source code.
   a) What layout you selected?
   b) Do you have a "sources" folder?
   c) Where is it located? Why?
5) Learning more java:
   a) Where could you use Java Collections?[5]
   b) How would you change your code so that can sort different types of Objects? (i.e. String, Float, etc)

[5] Check the Collections Tutorials.