

ISYS1118 - Software Engineering Fundamentals

Tutorial 1

In this tutorial you will:

- 1) meet your tutor.
- 2) discuss basic concepts of software engineering
- 3) set up your environment and refresh basic java programming.
- 4) work in a group to perform tutorial activities.

Note: These exercises are important as you will be having similar discussions for team-based assignments

Part A: Discussion

1. In your opinion,
 - a. what is the most important difference between generic software product development and custom software development?
 - b. what might this mean in practice for users of generic software products?
 - c. Is there software that contains both generic and custom features?
2. Assume an app that could be used to get food delivered. How will you know whether the app is of bad or good quality?
3. Why following are examples of ethical dilemma
 - a. Saving log files
 - b. Reusing a patented technology
 - c. Using social media data to create an AI-based system for face detection
 - d. Hard coding the output of the software to hide a bug
4. Discuss the testing cost and effort in the following software systems? In which system the testing cost and effort are more? Why?
 - a. Real-time software in an aircraft
 - b. Video editing software
 - c. Mobile banking apps

Part B: Environment Setup

- 1) Install JDK 11¹
- 2) Install IDE for Java (I would recommend eclipse)
- 3) Review the main commands and tools² (i.e. java, javac, Javadoc, etc)

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>



Part C: Implement Bubble Sort

Bubble sort³ 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 follows⁴:

```
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 a method called "sort" that takes an array of Integers (i.e. Integer[])
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
 - e. 37,57,40,13,50

Part D: Groups Formation - 10 minutes

You will be split into groups. The tutor will split the students into groups so that can work on Part D. You are given 10 minutes so all the team members can introduce themselves. This will allow you to know your fellow colleagues and learn to work in a group.

Note: Please communicate with your tutor if you have any questions.

Part E: Discussion

With your group discuss the following points:

- 1) 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?
- 2) If you need to share your 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 know something changed?