Department Mathematik/Informatik, Abteilung Informatik
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Lecture Object-Oriented Software Engineering, SS 2024

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Extra Exercises 1. Object-Oriented Programming

General Remark: These extra exercises are intended for you to train your understanding of the course material. There will be no grading of these exercises (points on the sheet $\neq 0$ are just to show you how we could grade the exercise with regard to the exam). Feel free to ask questions about these exercises, but solutions will be provided (Attention! Remember what we said about solutions in the first lecture!).

Exercise 1. Generics

Modify the following Bubblesort implementation, also available in https://github.com/AdrianBajraktari/oose24.git, to accept any type of array.

```
1  public static void sort(int[] array) {
2          for(int i = 0; i < array.length; i++) {
3                  for(int j = i; j < array.length; j++) {
4                          if(array[i] > array[j]) {
5                                  int temp = array[i];
6                                  array[i] = array[j];
7                                  array[j] = temp;
8                          }
9                  }
10         }
11 }
12
13 //main
14 int[] array = new int[]{6,2,4,8,3,1,10,5};
15 GenericSortTemplate.sort(array);
16 System.out.println(Arrays.toString(array));
```

[0 points]

Exercise 2. Generic Programming

If you have not already, change the list of lectures and list of students in your `Professor` class (from Extra Sheet 1) to use the generic `List<classname>`. As realization, you may use `ArrayList` like so:

`List<Student> students = new ArrayList<>(...);`.

Then, Derive classes `BachelorStudent`, `MasterStudent`, `PhDStudent`, and `StudentAssistant`, from `Student`. Create instances of these classes and try to add them to the students list:

`students.add(new BachelorStudent(...))`.

What do you observe? How does this correlate with what we discussed in the lecture about subtyping in generics?

[2 points]

$\sum$ **2.0 points**