Prof. Dr. Christoph Bockisch
MSc Steffen Dick
Fachbereich Mathematik und Informatik
AG Programmiersprachen und -werkzeuge

Tutorial exercises
Objektorientierte Programmierung: Wintersemester 2021/2022
Nr. 11

Task 11.1: Bottleneck

In this task, you are supposed to fill drinks into bottles and we want to generalize this later on. First of all, assume that there is an abstract class `Beverage`, as well as sub-classes `Water`, `Cola`, `Juice` and `Beer`. Now we want to implement the class `Bottle` that has methods like `break`, `fill` or `empty`.

a) Conceptualize a draft for the class `Bottle` that can hold drinks.

b) Think about how it is possible to have a bottle with any content (for instance, Gas, Sand or French Fries). Rework your draft to include this. Bottles that are meant to contain drinks should not be filled with anything else. This, of course, is also true for the reverse.

c) Write a code-snippet to create a bottle of Cola and a bottle of French Fries.

Task 11.2: Tom Bronson

For every line (beginning at line 2) in the below code-blocks, answer if that particular line of code can be translated by the compiler. Should an error occur, give a reason for that error.

a)
```
1 List<? super Integer> d = new LinkedList<Number>();
2 Number i = d.get(0);
3 Object o3 = d.get(0);
4 d.add(new Integer(5));
5 Number n = new Long(5);
6 d.add(n);
```

b)
```
1 List<? extends Number> d = new LinkedList<Integer>();
2 d.add(Integer.valueOf(5));
3 d.add(null);
4 Number n = d.get(0);
5 Integer i = d.get(0);
```