Prof. Dr. Peter Thiemann
Sergio Feo-Arenis
Sergiy Bogomolov

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Software Engineering

http://proglang.informatik.uni-freiburg.de/teaching/swt/2014/

Exercise Sheet 9

Exercise 1: dd_{Min} Algorithm (10 Points)

Consider the input string $s=$"xxmxoxnxtxxaxgxx". Apply the delta debugging algorithm $dd_{Min}(s, 2)$ as presented in the lecture to identify a minimal failing input, where an input string c fails if all characters in "montag" are contained in c. More precisely, the test function call $test(c)$ returns *FAIL* if all characters in "montag" are contained in c, and *PASS* otherwise. For each step of the algorithm, describe the input and the test outcome.

Exercise 2: Triangle Classification (10 Points)

In this exercise, we recapitulate the task of triangle classification based on the length of its sides. In particular, we distinguish between the following cases:

1. Scalene - all sides are different.

2. Isosceles - two sides are equal.

3. Equilateral - all three sides are equal.

Please have a look at the code provided below and rewrite it by using the best practices presented in the lecture (i.e., component design with low coupling, etc.) in order to ensure that it is easy to provide a set of unit tests.

In the lecture, we discussed the preconditions for classifying three numbers as a triangle extensively. Currently, the code does not check these conditions at all. Explain where these checks have to be in the program and insert them in the correct place in your rewrite.

```java
import java.util.Scanner;

class Triangles {
  public static void main(String[] args) {
    Scanner s = new Scanner(System.in);
    double a,b,c;

    do {
      System.out.println("Please enter the lengths of triangle sides a,
          b and c (a=-1 to exit):");
      a = s.nextDouble();
      b = s.nextDouble();
      c = s.nextDouble();

      if (a==-1) continue;

```

```
16        if (a==b && b==c)
17          System.out.println ("The triangle is equalateral.");
18        else if (a==b || b==c || c==a)
19          System.out.println ("The triangle is isosceles.");
20        else
21          System.out.println ("The triangle is scalene.");
22      } while (a != −1);
23    }
24 }
```

Submission

- Submit this sheet *before* the lecture of Thursdays.

- Late submissions will not be accepted.

- Deadline: Thursday 11:59 a.m.