
Softwaretechnik

<http://proglang.informatik.uni-freiburg.de/teaching/swt/2011/>

Exercise Sheet 9

Exercise 1 (20 points)

The paper "DART: Directed Automated Random Testing" written by Patrice Godefroid, Nils Klarlund, and Koushik Sen presents a tool for automatically testing software.

- (i) Read the *DART* paper.
- (ii) Apply *DART* on method *medianOf3*.
Compute a set of tuples of input values (x, y, z) that covers all paths of *medianOf3*. Each tuple (x, y, z) is a test case which covers one path of *medianOf3*. Provide the concrete execution, the symbolic execution and the path constraints.
- (iii) For each generated test case, determine *your* expected return value of *medianOf3* (i.e. the test oracle is you). Is method *medianOf3* faulty? If so, name the test case generated in (ii), that reveals the bug.
- (iv) Assume a program P contains loops or function calls (which return non-deterministic values). Is *DART* able to deal with those issues? If not, what are your suggestions?

```
1 int medianOf3(int x, int y, int z) {
2     int m;
3     m = z;
4     if ( y < z ) {
5         if ( x < y ) {
6             m = y;
7         } else if ( x < z ) {
8             m = y;
9         }
10    } else {
11        if ( x > y ) {
12            m = y;
13        } else if ( x > z ) {
14            m = x;
15        }
16    }
17    return m;
18 }
```