

Problem Sheet 10: Testing

Chris Poskitt*
ETH Zürich

For both of these excerpts of code, answer the coverage-related questions that follow:

Algorithm 1:

```
String function(int x, int y)
{
    boolean z;

    if (x < y)
        z := true
    else
        z := false

    if (z && x+y == 10)
        result := "a"
    else
        result := "b"
}
```

Algorithm 2:

```
if x > 0 then
    y := x + x
    while y < 15 do
        y := y + 2
    end
else
    if x = 0 then
        y := 1
    else
        y := x * x
    end
end
```

1 Branch and Path Coverage

- i. How many branches are present?
- ii. Is it possible to test every branch? Provide a set of tests to exercise as many branches as possible.
- iii. How many paths are present?
- iv. Which path(s) remains untested by your tests in part (ii)?
- v. Add tests, if needed, to achieve path coverage.

2 Logic Coverage

- i. Write down the predicates that occur in the code.
- ii. Is it possible to obtain full predicate coverage? Provide a set of tests that will obtain the highest possible predicate coverage.
- iii. Write down the clauses appearing in the code.
- iv. Can we exercise full clause coverage? Write tests for maximal clause coverage.
- v. In general, does predicate and/or clause coverage imply branch coverage?

*Exercise sheet adapted from an earlier version by Stephan van Staden.