

Software Verification

Exercise: Testing Criteria

For each of the following algorithms, answer the 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
```

Branch and path coverage

- How many branches are present?
- Is it possible to test every branch? Provide a set of tests to exercise as many branches as possible.
- How many paths are present?
- Which path(s) remain untested by your tests of (b)?
- Is it possible to test all the paths? Add tests, if required, to do so.

Predicate coverage

- Write down the predicates that occur in the code.
- Is it possible to obtain full predicate coverage? Provide a set of tests which will obtain the highest predicate coverage.

Clause coverage

- Write down the clauses appearing in the code.
- Can we exercise full clause coverage? Write tests for maximal clause coverage.