

# Problem Sheet 11: Testing

## Sample Solutions

Chris Poskitt\*  
ETH Zürich

### 1 Branch and Path Coverage

- i. (a) 4.  
(b) 6.
- ii. (a) Yes, e.g. `function(4,6)` and `function(6,4)`.  
(b) Yes, e.g. `x := 1`, `x := 0`, and `x := -1`.
- iii. (a) 3.  
(b) 10.
- iv. (a) `z := true → result := "b"`  
(b) `y := x + x (→ y := y + 2)n` for  $0 \leq n \leq 6$ .
- v. Yes in both cases. A path is a feasible execution path: we can always execute all of them.
  - (a) For full path coverage we add the test `function(1,2)`.
  - (b) For full path coverage we add the tests: `x := 2`, `x := 3`, ... `x := 8`.

### 2 Predicate Coverage

- i. (a) `x < y` and `z && x + y == 10`.  
(b) `x > 0`, `y < 15`, and `x = 0`.
- ii. Yes: we can use the same tests as we used for branch coverage (this definition of predicate coverage is equivalent).

### 3 Clause Coverage

- i. (a) `x < y`, `z`, and `x + y == 10`.  
(b) `x > 0`, `y < 15`, and `x = 0`.
- ii. Yes in both cases.
  - (a) For full clause coverage we can use the tests `function(4,6)` and `function(1,2)`.
  - (b) For full clause coverage we can use the tests `x := 1`, `x := 0`, and `x := -1`.

---

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