



Tutorial for Program Verification

Exercise Sheet 18

In this exercise sheet we will work with abstract reachability graphs. We will see that there are programs that have an infinite reachability graph but there exists a finite precise abstract reachability graph.

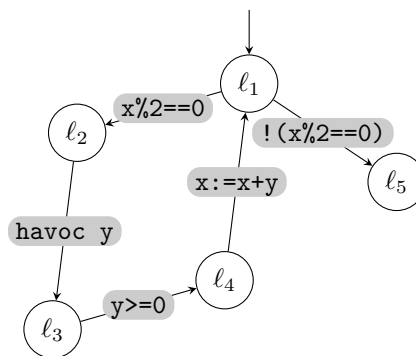
Submit your solution by uploading it as PDF in ILIAS.

Exercise 1: Precise Abstract Reachability Graph

2 Points

Consider the control flow graph depicted on the right, that was constructed for the the program $P = (V, \mu, \mathcal{T})$ with $V = \{x, y\}$, $\mu(x) = \mu(y) = \mathbb{Z}$ whose code is shown on the left.

```
1 while (x % 2 == 0) {  
2   havoc y;  
3   assume y >= 0;  
4   x := x + y;  
5 }
```



Draw the precise abstract reachability graph for this control-flow graph and the precondition $x \geq 0$.