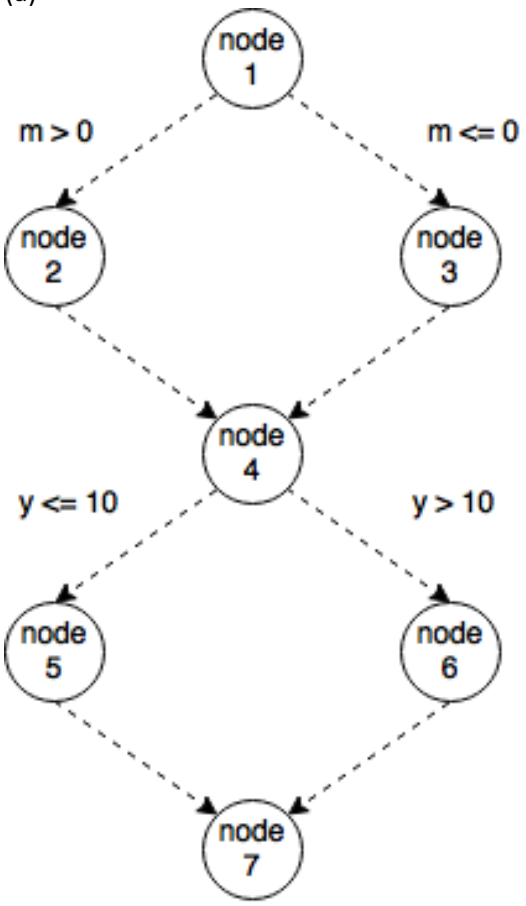
PSet2 – Sample Solutions*

Q1

(a) Fault: if (x < 0)
Fix: change the fault to if (x <= 0)
(b) positive(new int[]{});
(c) positive(new int[]{1});
(d) assertFalse(positive(new int[]{0}));

Q2

(a)



(b) node 1, node 2, node 3
(c) node 2, node 3, node 7

* Thanks to Oguz Demir and Yuanrui Ren

(d) No. To reach node 7, the path has to visit node 2 or node 3, which both define w. Therefore, there is no def-clear path from node 1 to node 7.

Q3

```
public boolean isSimple() {
    if (first == null) return true;
    Node n = first;
    HashSet<Node> set = new HashSet<>();
    while(n != null) {
        if (set.contains(n)) {
            return n.equals(first) && n.next == null;
        }
        set.add(n);
        n =  n.next;
    }
    return true;
}
```

Q4

Length 1	Length 2	Length 3	Length 4	Length 5	Length 6	Length 7
[1]	[1,2]!	[1,3,4]	[1,3,4,5]	[1,3,4,5,6]!	[1,3,4,5,7,8]	[1,3,4,5,7,8,9]!
[2]!	[1,3]	[3,4,5]	[1,3,4,9]!	[1,3,4,5,7]	[3,4,5,7,8,9]!	
[3]	[3,4]	[3,4,9]!	[3,4,5,6]!	[3,4,5,7,8]		
[4]	[4,5]	[4,5,6]!	[3,4,5,7]	[4,5,7,8,9]!		
[5]	[4,9]!	[4,5,7]	[4,5,7,4]*			
[6]!	[5,6]!	[5,7,4]	[4,5,7,8]			
[7]	[5,7]	[5,7,8]	[5,7,4,5]*			
[8]	[7,4]	[7,4,5]	[5,7,4,9]!			
[9]!	[7,8]	[7,4,9]!	[5,7,8,9]!			
	[8,9]!	[7,8,9]!	[7,4,5,6]!			
			[7,4,5,7]*			

Q5

a- For given p = [a && (!b || !c)]: if (!b || !c) is true, then p = a.
Therefore, values for b and c may be one of the following:
<b,c> = {<T,F>, <F,T>, <F,F>}

b- For RACC, the values for b and c should be same. There are 3 ways.
Pick one from: {<2,6>, <3,7>, <4,8>}

c- For CACC, the values may be picked different. There are 9 ways.
Pick one from {2, 3, 4} and pick one from {6, 7, 8}