Probabilisitc Programming Exercises 2 – Jan Boerman, Jasper van Rooijen

**Exercise 1**

x := 10;

y := 20;

while (x > 0 || y > 0) {

{ x := x-5 } [1/2] { { x := x\*2 } [2/3] { { y := y-2 } [3/5] { y := y+1 } } }

}

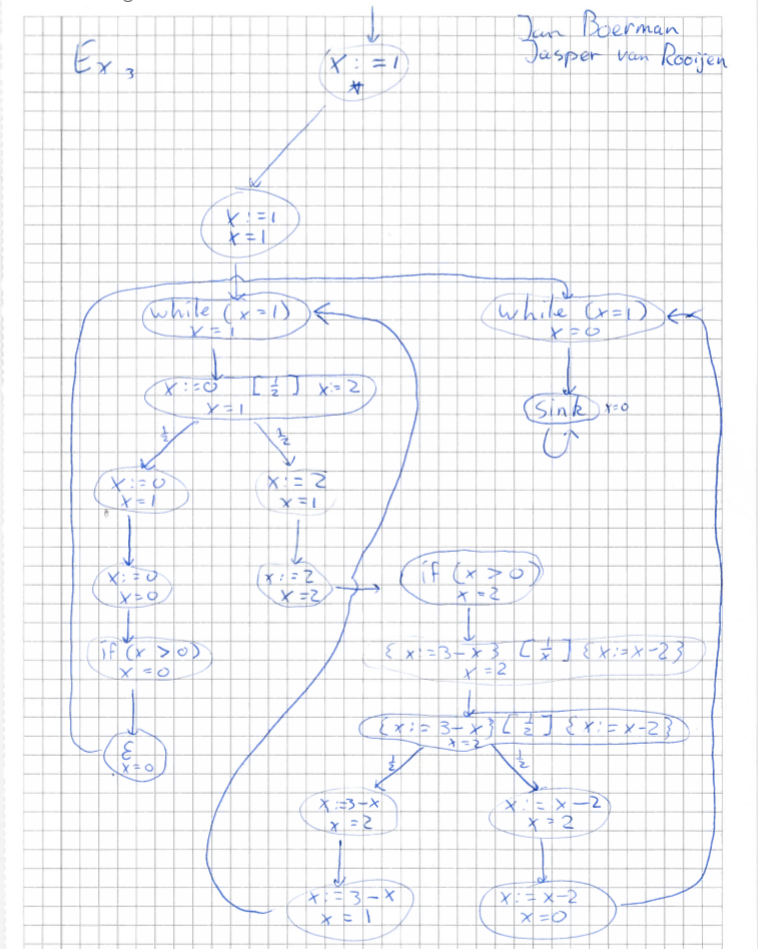
**Exercise 2**

Such that holds:

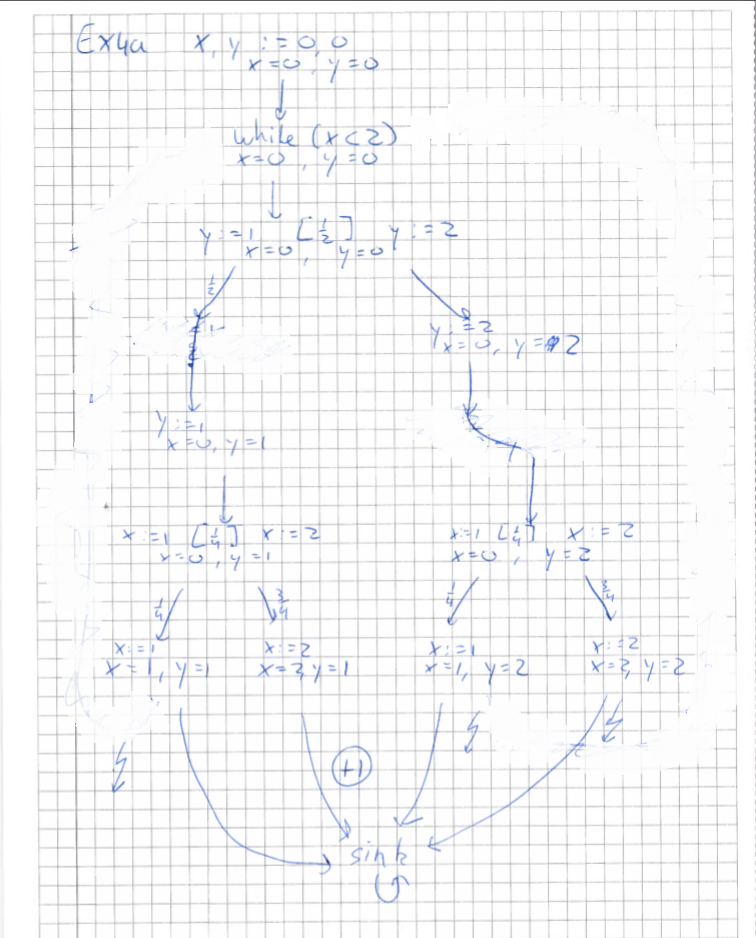
Gaussian elimination yields:

Thus the probability of reaching state 6 from state 1 is the probability as yielded by the elimination: 14/19, thus 73,7%.

**Exercise 3**



**Exercise 4a**



**Exercise 4b**

The expected value is defined as (probability of a valid path \* value for that path) / (1 – probability of an invalid path)

Thus the expected value of x + y

= ((1/2)\*(3/4)\*(2+1)) / (1 – ((1/2)\*(1/4) + (1/2)\*(1/4) + (1/2)\*(3/4)))

= ((3/8)\*3) / (1 – (1/8 + 1/8 + 3/8)) = (3\*(3/8)) / (1 – 5/8)

= (3 \* (3/8)) / (3/8)

= 3