

Exercise Sheet 11

Exercise 11.1 PDS Modeling

Consider the following C-like code, in which `int r()` is a function that randomly returns 0 or 1. Give a pushdown system that models the program. Thereby, describe how you decided to represent the program counter and the value of variable `x`.

Hint: In a first step, assign each line in the code a unique label.

```

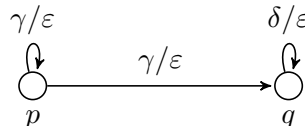
void m()                                void s()                                int x=0;
{                                        {                                        void main()
    x=1;                                  {                                        {
    if(r()==1) s();                       x=0;                                  {
}                                          }                                        m();
}                                          }                                        }
    
```

Exercise 11.2 pre^+ Method

The set $\text{pre}^+(C)$ can be calculated by determining $\text{pre}^*(C)$ and then $\text{pre}(\text{pre}^*(C))$. Thus, it may be necessary to have a method to compute $\text{pre}(C)$ for a given set C . Present a general description of such a method. *Hint: Look at the example given in the lecture.*

Exercise 11.3 pre^* Computation

Use the algorithm given in the lecture to determine $\text{pre}^*(C)$ in the pushdown system below, where $C = \{(q, w) \mid w \in \{\gamma, \delta\}^* \text{ and } |w| \text{ is even}\}$.



Exercise 11.4 pre^* Computation

Compute A_{pre^*} starting from A (left) and P (right) given below.

