Homework 8

To hand in on December 12th at the beginning of the exercise session, or by email to `dghosh@lmf.cnrs.fr` by the end of the day.

Answers can be written in French or in English.

Exercise 1. Consider the following program with a global boolean variable `x`.

```
bool x;

function main ()
m0 : x = true;
m1 : level1();
m2 : return;

function level1 ()
a0 : level2();
a1 : level2();
a2 : return;

function level2 ()
b0 : x:=not x;
b1 : return;
```

1. Translate the program into a pushdown system with two control states $\top$ and $\bot$, representing the values of `x`, and the given line numbers as the stack alphabet. (Use example 2 of the slides as motivation.)
2. Using the pre^* algorithm, compute the predecessors of the state where the program has ended.

Exercise 2. The pre^* algorithm requires to start with an automaton where no edge leads into an initial state. Show that this condition is necessary, i.e., find an automaton not respecting this condition and a PDS such that the algorithm applied to that instance yields a wrong result.