



Tutorials for Model Checking Exercise sheet 6

Exercise 1: Pushdown systems

Construct a PDS whose behavior corresponds to the following program where m_0 is the initial state and $flag$ is a boolean global variable (i.e. the PDS will have two control locations T (corresponds to $flag = true$) and F).

```
procedure  $p$ ;  
 $p_0$ :  $flag := true$ ;  
 $p_1$ : return;  
procedure  $s$ ;  
 $s_0$ : if  $flag$  then return; end if;  
 $s_1$ : call  $p$ ;  
 $s_2$ : return;  
  
procedure  $main$ ;  
 $m_0$ :  $flag := false$ ;  
 $m_1$ : call  $s$ ;  
 $m_2$ : return;
```

Exercise 2: Tree automata

Define a tree automaton over $\Sigma = \{a, b\}$ which accepts

- complete binary trees (e.g. each node is either leaf or has two children) where nodes on odd levels are labeled with a and nodes on even levels are labeled with b (root has level 1, children of root have level 2 and so on).
- complete binary trees which have even number of a 's.