

Exercise 3:

Exercise 3: Petri Net

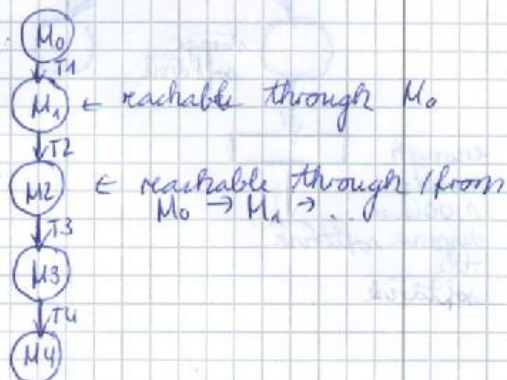
Bigg Duyen
Lip

- a) **Safety**: Every place in the Petri Net is 1-bounded, each place consist of one ~~token~~ ^{place}
- liveness**: A transition is deadlocked, if it's not possible for the transition to firing a token. If it can firing the token, it can never have a deadlocked, under the condition that every transition can fire. If every transitions can fire, we call the action liveness.

b)

places have 0 or 1
 $x \leq k$
 $x \leq 1$
 $0, 1$

$M_0 = (1, 0, 1, 0, 1, 0)$
 $M_1 = (0, 1, 1, 0, 0, 0)$
 $M_2 = (1, 0, 1, 0, 0, 1)$
 $M_3 = (1, 0, 0, 1, 0, 0)$
 $M_4 = (1, 0, 1, 0, 1, 0)$



The condition "safety" is fulfilled, because the 1-bounded condition of each place is fulfilled. Each place has the possibility to have 0 or 1 token, because of this formula:

k -bounded \rightarrow ~~at most~~ ^{at most} k tokens

$\Rightarrow x = \text{numbers of tokens}$

$x \leq k$, $k \geq 0$ (nonnegative number of ~~place~~ ^{place})

$x \leq 1 \Rightarrow 0 \text{ or } 1 \Rightarrow M_0, M_1, \dots, M_4 \Rightarrow$ all of them has place = 0 or 1

2 condition: reachable from M_0

\Rightarrow If you are starting from M_0 , you can reach every marking M_i , $i = 1 \dots 4 \Rightarrow$ our example

Liveness is also fulfilled, because every transition could fire the token, so we have a deadlock free process.

Exercise 8: Selling machine

