Embedded Systems

Assignment 2

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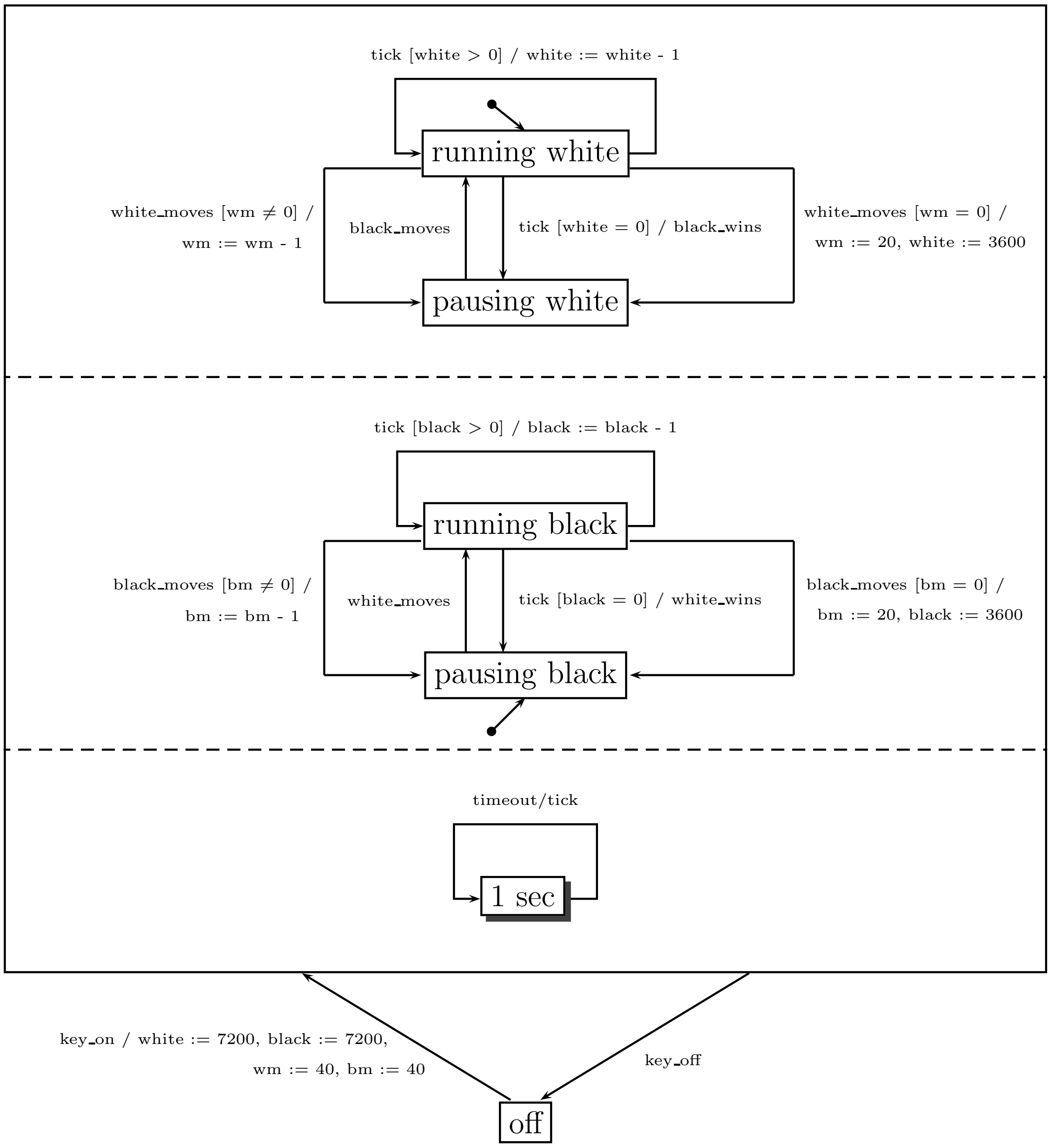
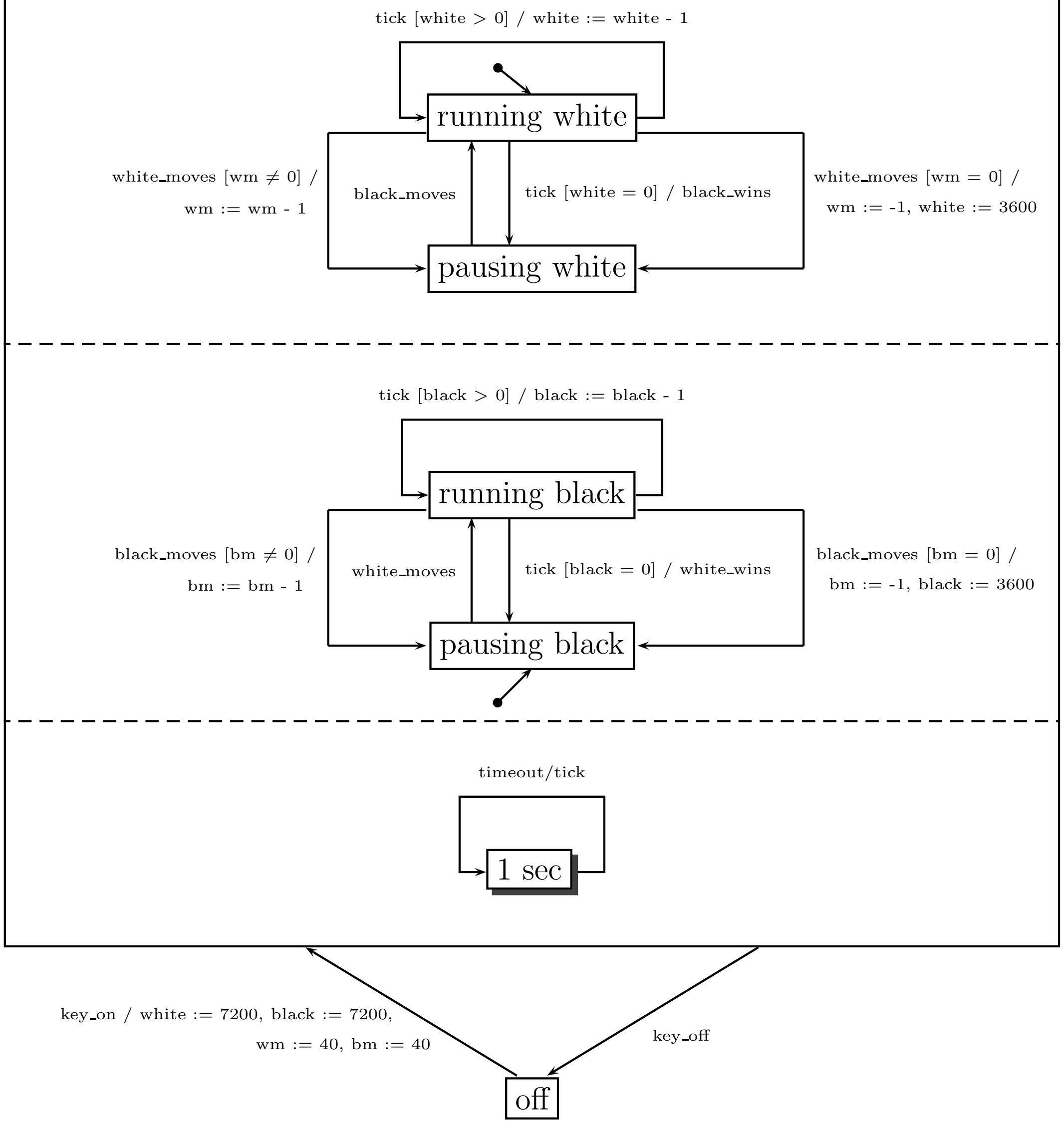
2.1 Statecharts

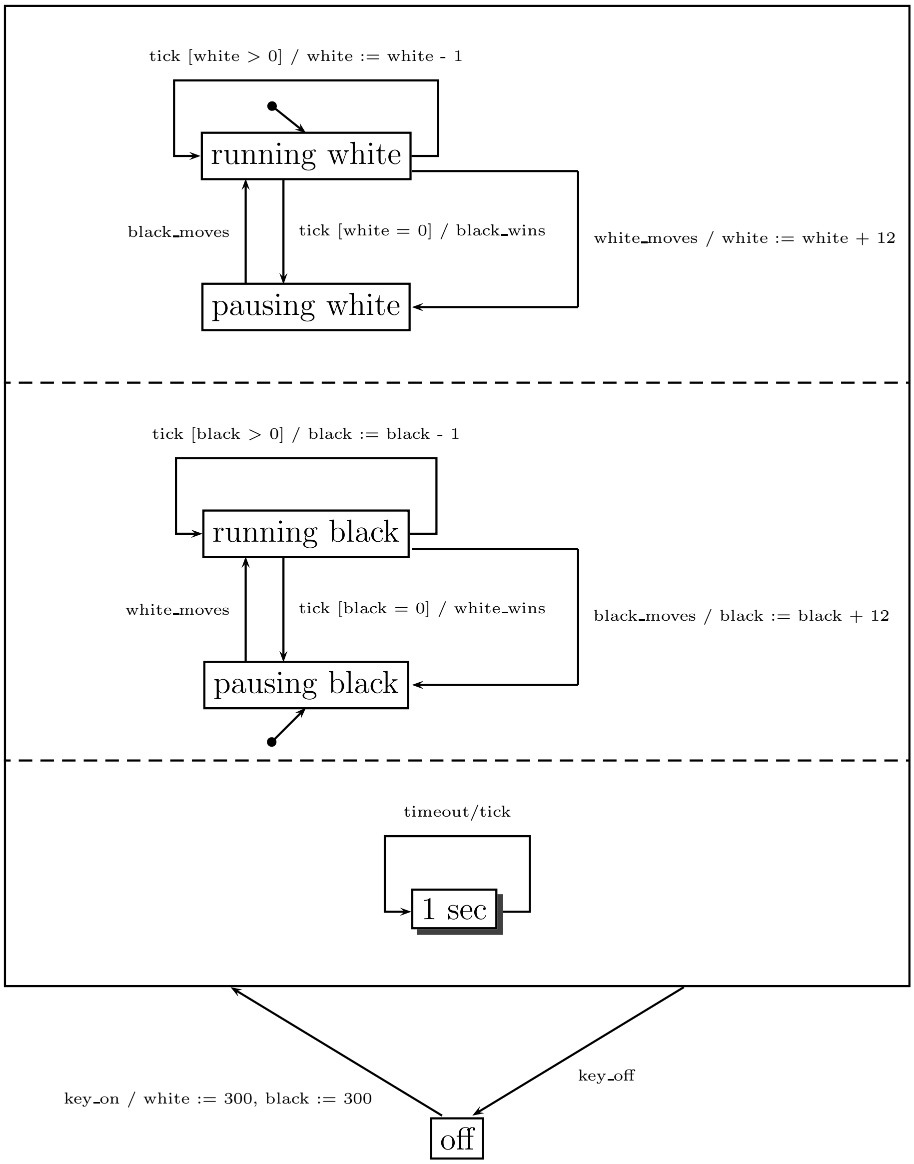
a.



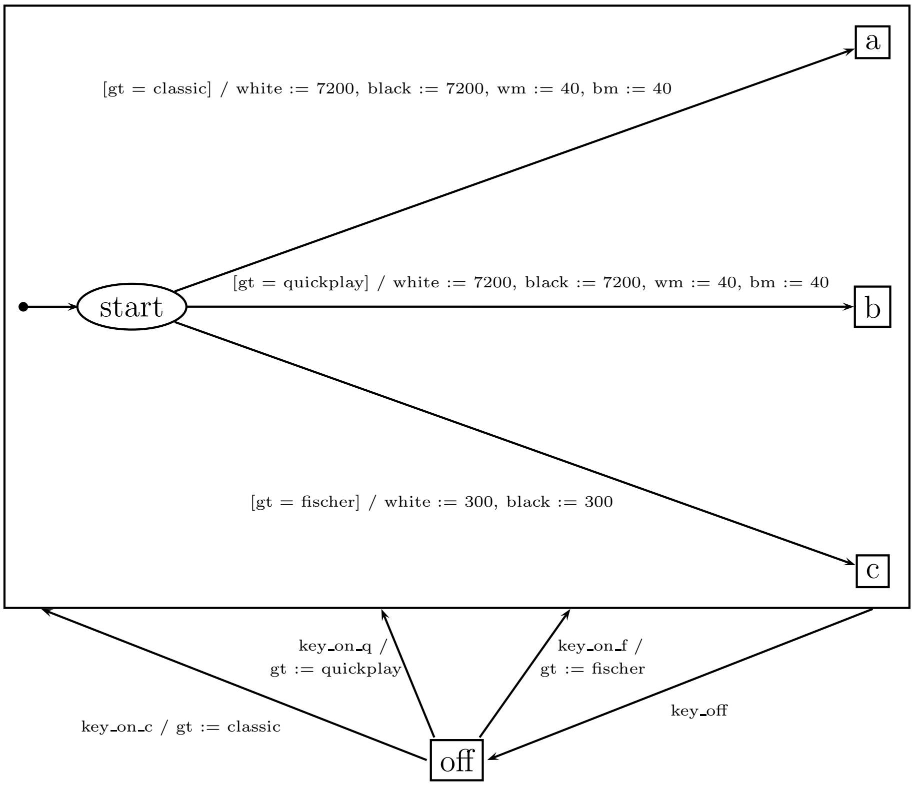
b.


tick [white > 0] / white := white - 1
running white
white_moves [wm ≠ 0] /
wm := wm - 1
black_moves
tick [white = 0] / black_wins
white_moves [wm = 0] /
wm := -1, white := 3600
pausing white
tick [black > 0] / black := black - 1
running black
black_moves [bm ≠ 0] /
bm := bm - 1
white_moves
tick [black = 0] / white_wins
black_moves [bm = 0] /
bm := -1, black := 3600
pausing black
timeout/tick
1 sec
key_on / white := 7200, black := 7200,
wm := 40, bm := 40
key_off
off

c.


tick [white > 0] / white := white - 1
running white
black_moves
tick [white = 0] / black_wins
white_moves / white := white + 12
pausing white
tick [black > 0] / black := black - 1
running black
white_moves
tick [black = 0] / white_wins
black_moves / black := black + 12
pausing black
timeout/tick
1 sec
key_on / white := 300, black := 300
key_off
off

d. We create one big OR superstate which contains the AND superstates of the exercise parts a, b and c. These are marked as boxed letters for the sake of readability. Our solution looks like this:



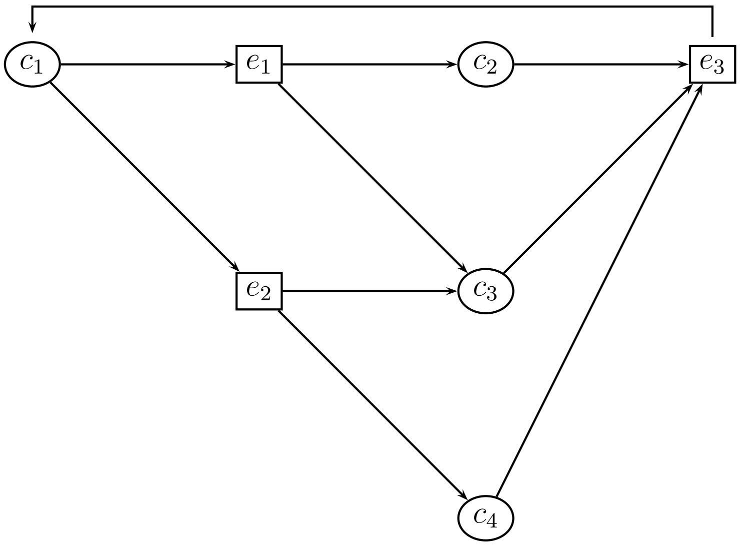
In this (whole) exercise we used some variables, which we want to explain here:

- white, black
  The number of seconds left to the white and the black player.

- wm, bm
  The number of moves left to the white and the black player. This is needed to determine whether the player is still whithin his first 40 moves or not.

- gt
  This simply stands for gametype.

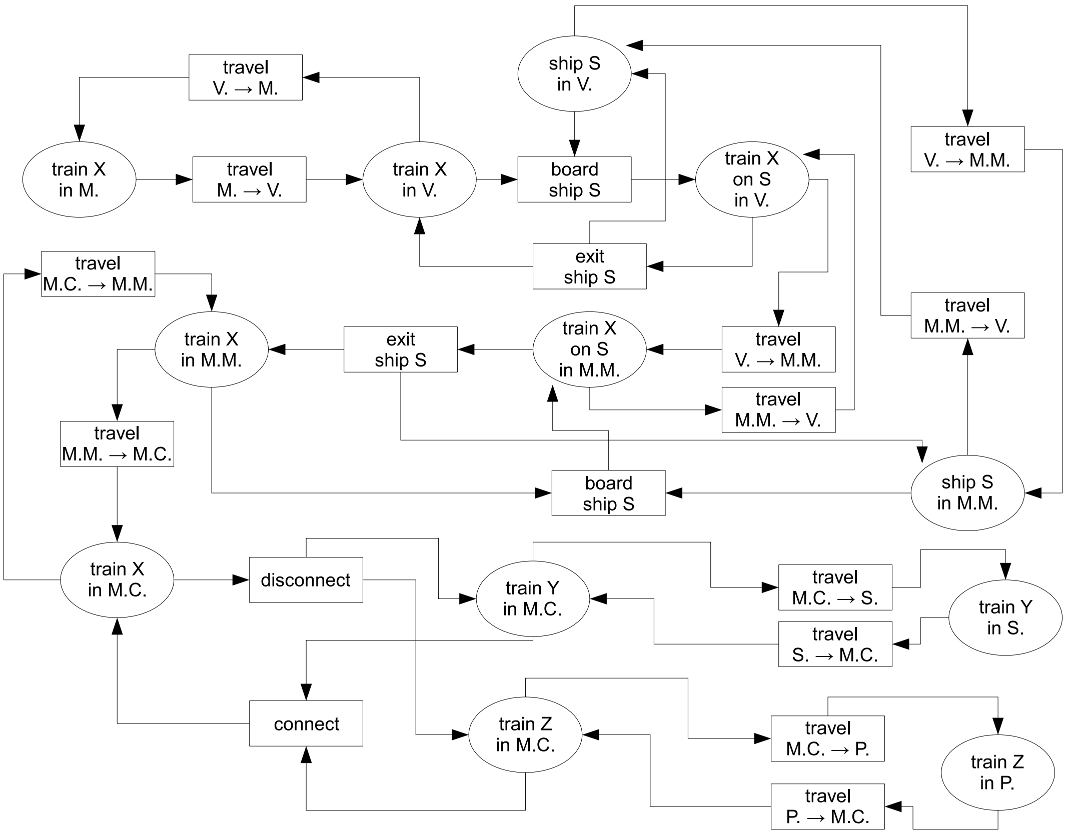
2.2 Petri nets



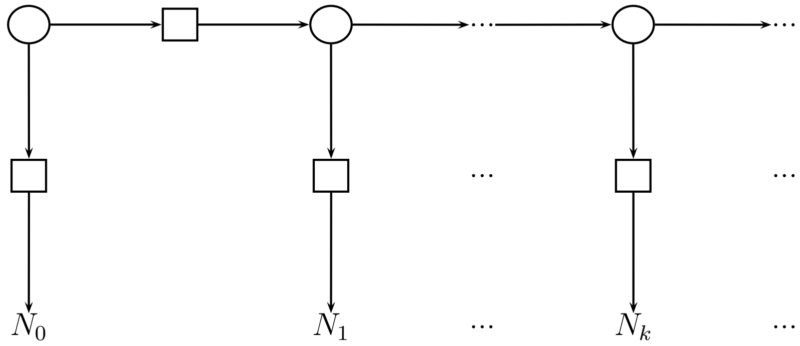
The preconditions of e_3 are: $\{c_2, c_3, c_4\}$.
The postconditions of e_1 are: $\{c_2, c_3\}$.
The net is pure, because it does not contain any loops. The net is simple, because e_1 and e_2 have the same set of preconditions, namely $\{c_1\}$, but do not have the same set of postconditions.

2.3 Petri nets

The following abbreviations are used:
M. for Milan, V. for Villa San Giovanni, M.M. for Messina Marittima, M.C. for Messina Centrale, S. for Siracusa and P. for Palermo.

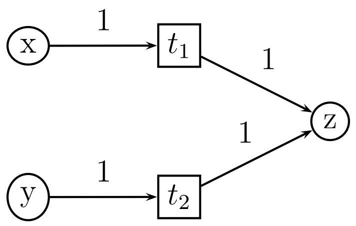


2.4 Petri nets

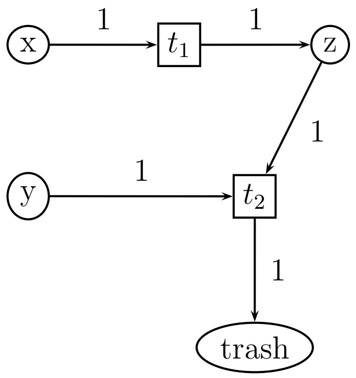


2.5 Petri nets

a.



b.



c.