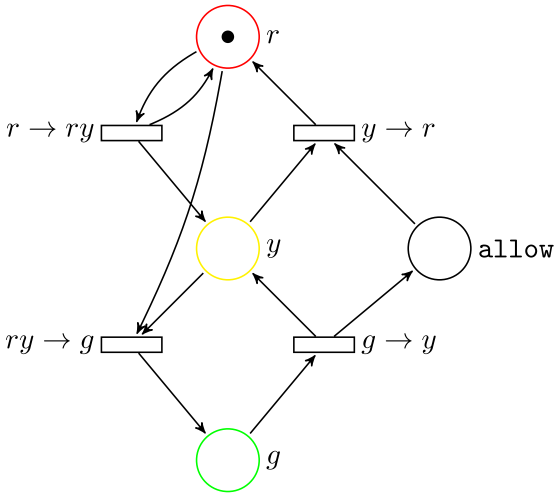
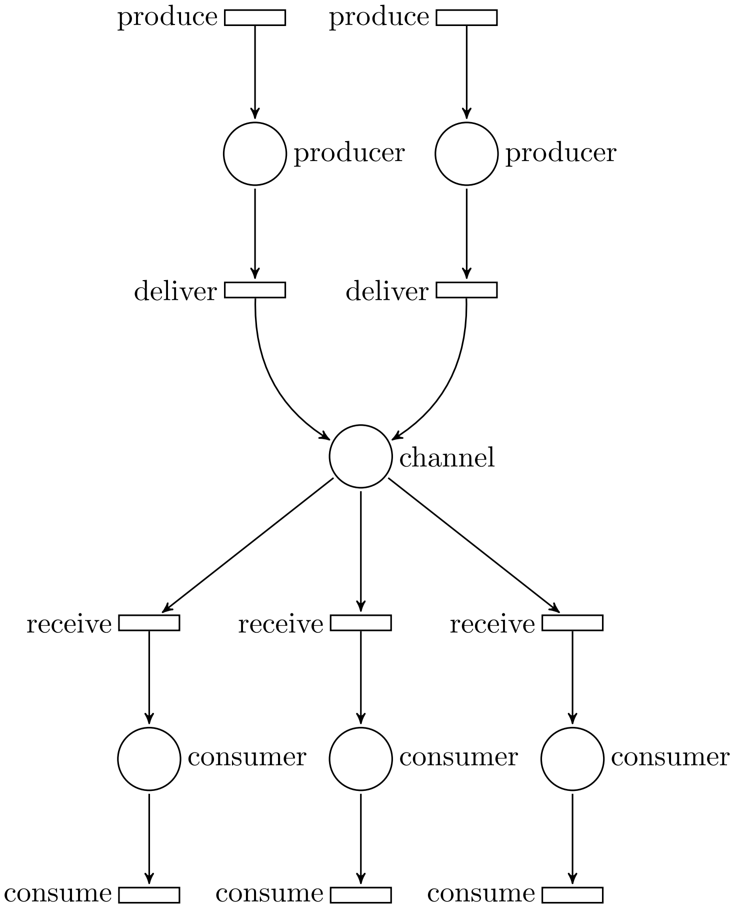
TD 9: Petri Nets
Solutions

Exercise 1

1. 

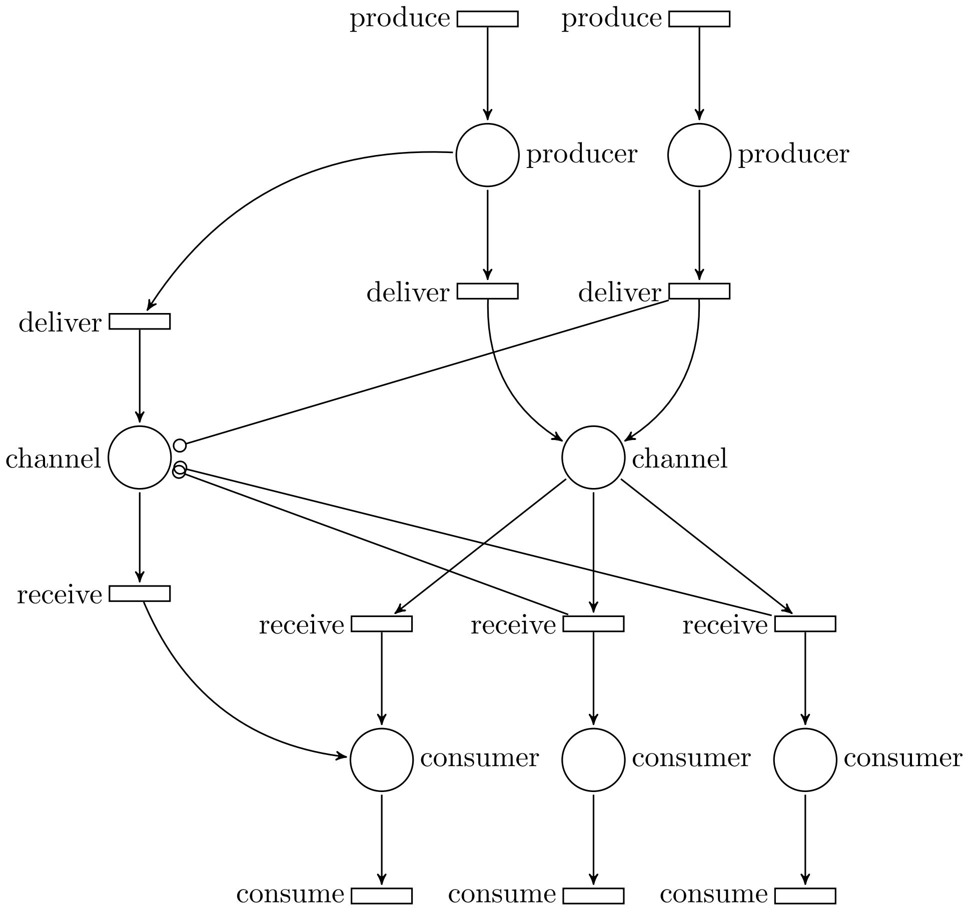
We add a place `allow` preventing the firing of $y \to r$ before re-firing $ry \to g$.

Exercise 2

1. 

   To enforce a maximal capacity of ten items on the channel, we use an additional place filled with ten tokens at the beginning. Each "deliver" transitions takes out one item from this place, and each "receive" transition re-fills it.

2.



Exercise 3

1. The Büchi automaton is exactly the reachability graph, with outgoing transitions from a marking m labeled by m.

2. One can easily turn a Minsky machine with two counters into a Petri net:

   - the states of the machine are places;
   - the two counters are represented by two additional places;
   - only one "state" place can contain a token at any given time, this corresponds to the state the machine is currently in;
   - the transitions of the machine are simulated by transitions in the Petri net, moving the "state" token along the net, incrementing/decrementing the counter by adding/removing tokens, and testing if a counter contains zero by using inhibitor arcs.

3. The proof is similar to question 1 only we label the transitions of the automaton with the labeling homomorphism.