Assignment 10: Petri Nets

ETH Zurich

1 Modelling Systems as Petri Nets

1.1 Background

These tasks have been adapted from [1] and are about modelling concurrent systems as Petri nets. We will use the elementary Petri net notation as given in the lecture slides:


1.2 Task

1. Consider the cookie vending machine Petri net we constructed in the lecture:

![Diagram of cookie vending machine Petri net]

Extend the Petri net such that:

- at most one token can be in the coin slot place at any time; and
- at most one token can be in the signal place at any time.
2. Consider the Petri net we constructed for mutual exclusion:

For each process $i$ add a place noncritical$_i$ that holds a token if and only if that process $i$ is not in its critical region.

3. Model as an elementary Petri net a gambling machine that has the following characteristics:

- a player can insert a coin, which should reach a “cash box”;
- at this stage, the machine enters a state in which it pays out a coin from the (same) cash box an arbitrary number of times (including zero); and
- eventually, the machine stops giving out coins and becomes ready for another game.
2 Reachability Graphs and Unfoldings

2.1 Background

These tasks have been partly adapted from [2], and are about the two semantics we assigned to Petri nets in the lecture: first, the semantics based on interleaving; second, the semantics based on true concurrency.

2.2 Task

1. Consider the Petri net below that models a producer-consumer scenario for a bounded buffer of capacity 1:

Construct a reachability graph for the Petri net, and prove that the buffer is never both full and empty.
2. For the Petri net below, iteratively construct its unfolding until there are 9 transitions:

References
