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Summer term 2013
Problem Set 11
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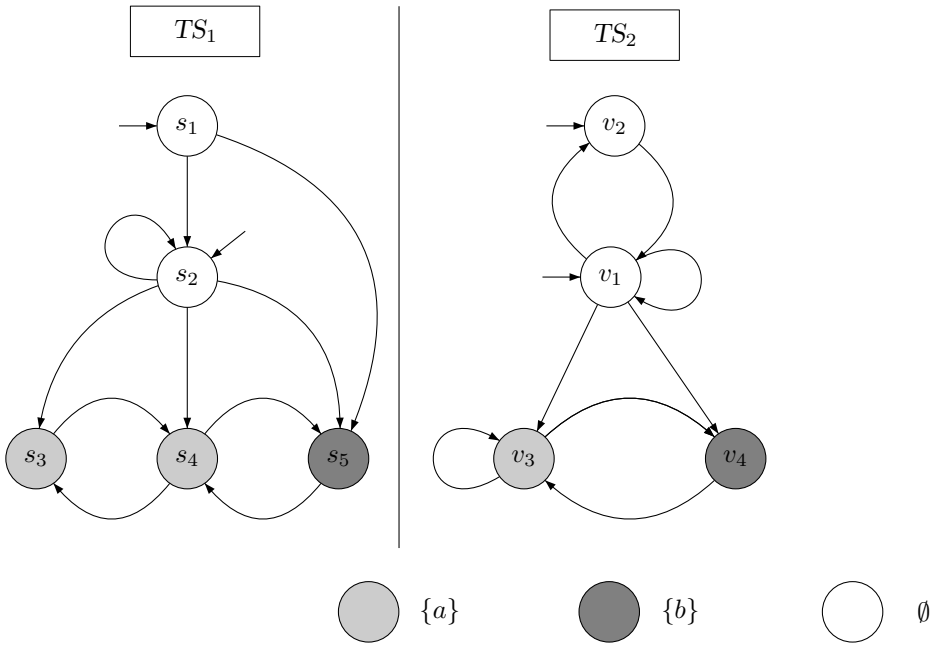
Verification

Problem 1: Simulation Order [10 Points]

Consider the transition systems TS_1 and TS_2 over $AP = \{a, b\}$ shown in the figure below:

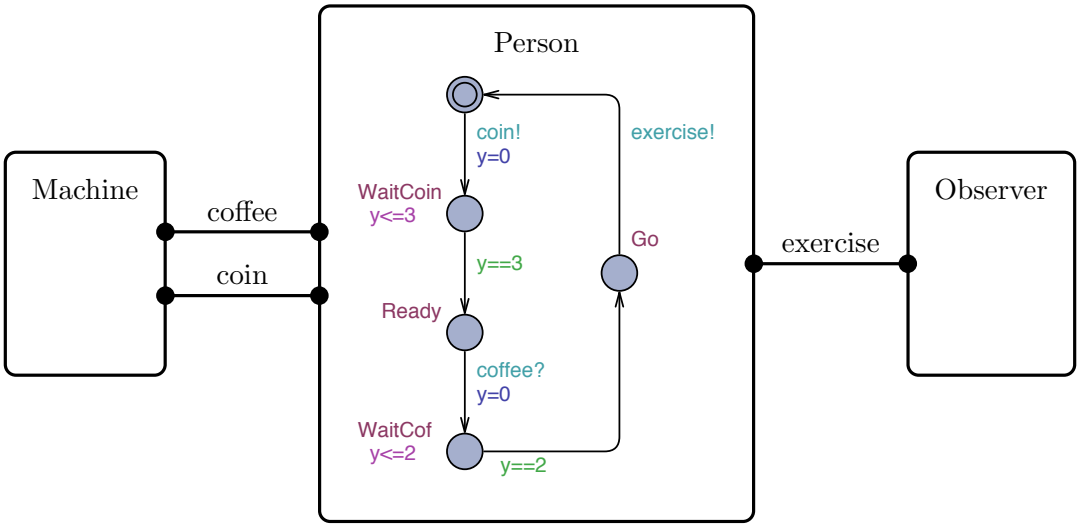


a) Determine whether $TS_1 \preceq TS_2$ and whether $TS_2 \preceq TS_1$. [4 Points]

b) For each case $TS_i \not\preceq TS_j$, $i, j \in \{1, 2\}$, give a $\forall CTL$ - formula that distinguishes TS_i and TS_j. [6 Points]

The following exercises belong to the afternoon session.

Problem 2: Coffee Machine [10 Points]



In this exercise we want to build a controller for a coffee machine. A **Person** (the environment) repeatedly inserts a coin, extracts a coffee and solves a Verification exercise afterwards. Between two actions the person needs a given time delay before being ready to start the next action.

You should implement the **Machine** (the controller) that takes a coin, brews a coffee (the duration is given by *brewTime*), and waits until the person extracts it coffee. After a given period (*timeOut*), the coffee machine resets when the coffee was not taken.

Lastly, you should build an **Observer** that takes care that there is a constant flow of exercises. There should be at most 8 time units between two consecutive exercises. Verify that your system fulfills this requirement and determine the longest possible brewing time that preserves this requirement.

The exercise template can be downloaded from the lecture website.