



**Advanced Model Checking
Summer term 2014**

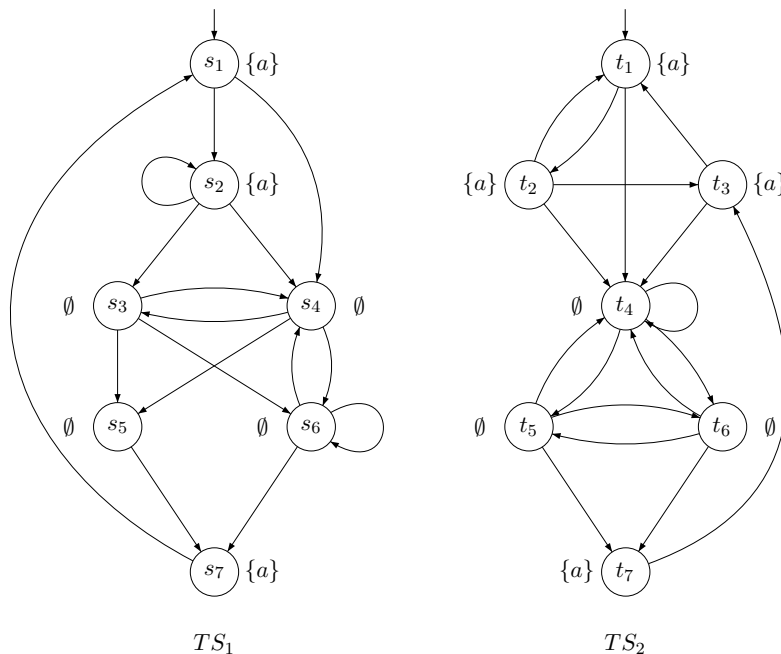
– Series 2 –

Hand in on April 30'th before the exercise class.

Exercise 1

(1 + 1 points)

(a) Given transition systems TS_1 and TS_2 , determine whether $Traces(TS_1) = Traces(TS_2)$.

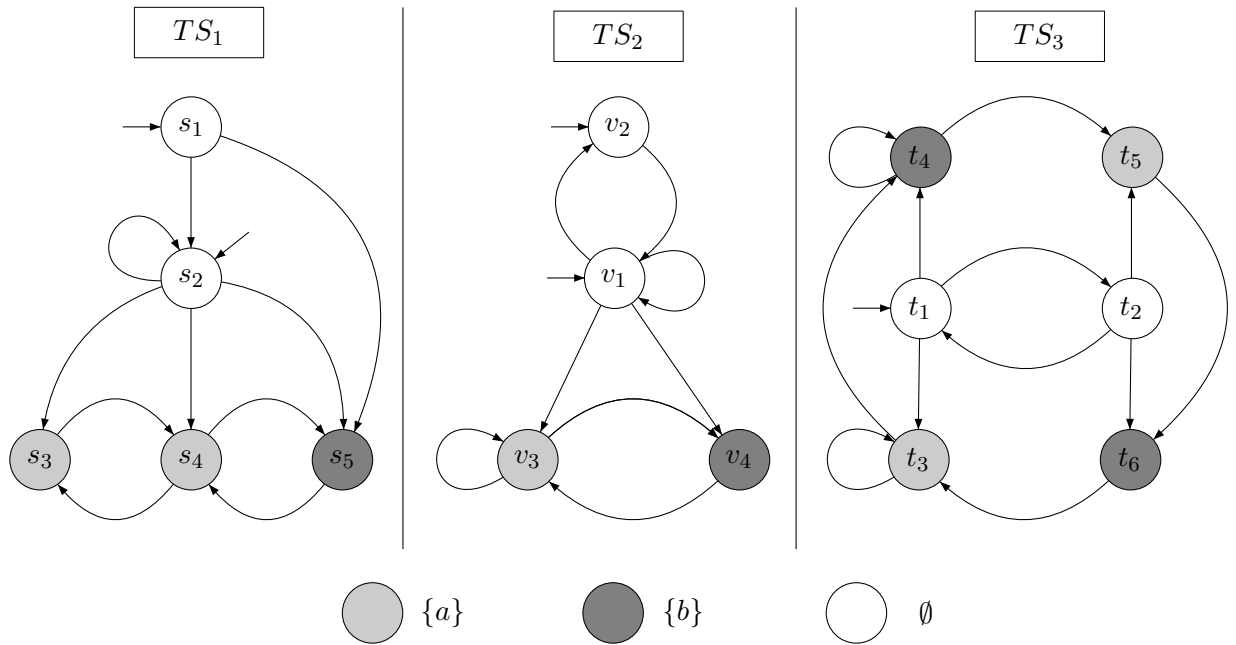


(b) Provide two transition systems TS'_1 and TS'_2 such that $Traces_{fin}(TS'_1) = Traces_{fin}(TS'_2)$, but $Traces(TS'_1) \neq Traces(TS'_2)$.

Exercise 2

(1 + 1 points)

Consider the transition systems TS_1, TS_2, TS_3 over $AP = \{a, b\}$ shown in the following figure:



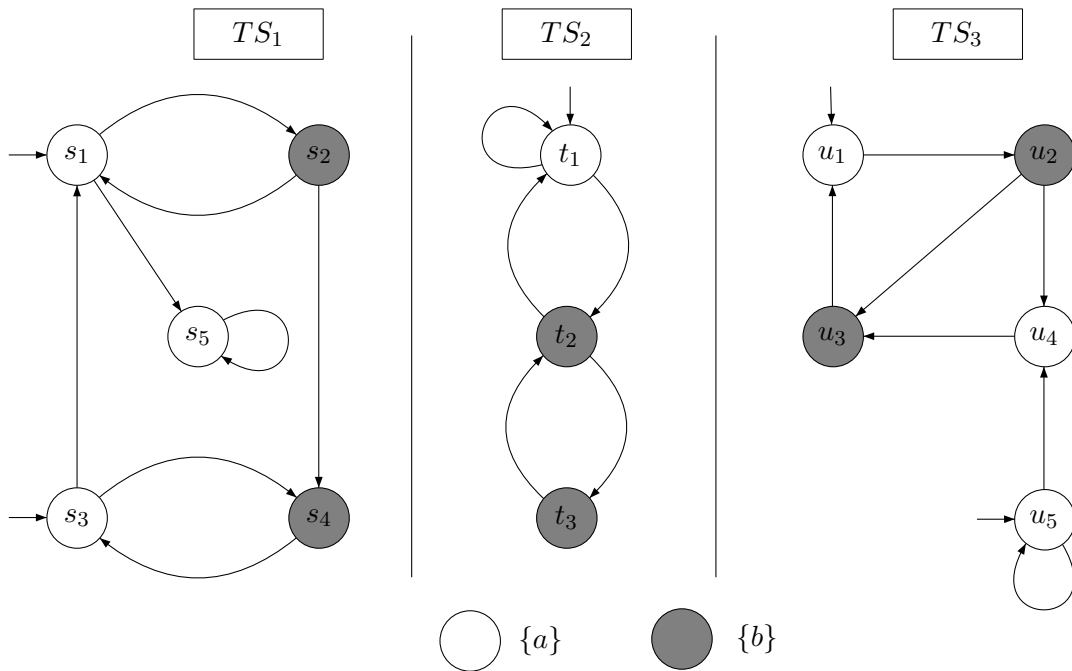
Questions:

- (a) for each $i, j \in \{1 \dots 3\} \times \{1 \dots 3\}$, $i \neq j$, determine whether $TS_i \preceq TS_j$
- (b) for each case $TS_i \not\preceq TS_j$, give a $\forall CTL_{\cup}$ - formula that distinguishes TS_i and TS_j .

Exercise 3

(2 points)

Consider three transition systems given on the next Figure:



For each $i, j \in \{1 \dots 3\} \times \{1 \dots 3\}$, $i \neq j$, determine whether $TS_i \cong TS_j$, $TS_i \preceq TS_j$ or $TS_i \not\preceq TS_j$. Justify your answer.

Exercise 4

(4 points)

Let φ be an LTL formula such that $Word(\varphi)$ is stutter insensitive. Show that φ is equivalent to some $LTL_{\setminus \circ}$ formula ψ .