

Advanced Model Checking
 Summer term 2012

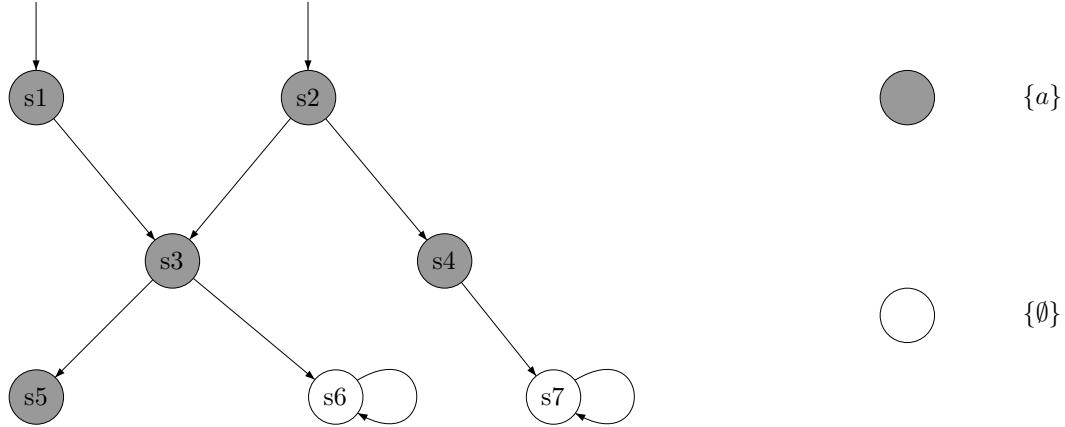
– Assignment 5 –

Hand in on May 23'th before the exercise class.

Exercise 1

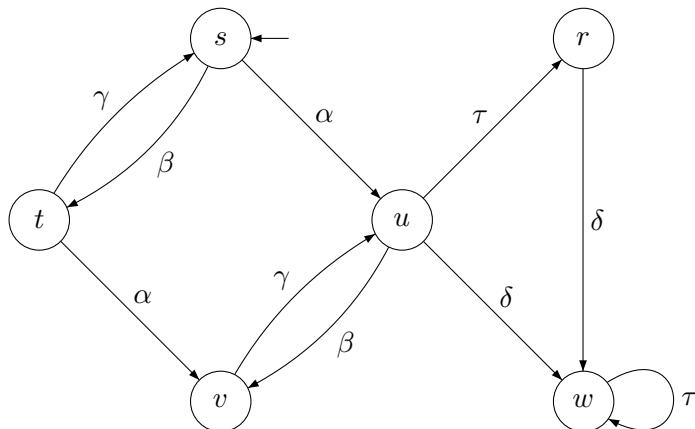
(2 + 1 points)

Consider the transition system TS shown in the figure below:


 Compute the simulation order \preceq_{TS} by using the HHK-algorithm (Algorithm 36, page 526 in the book). Sketch the first four outerest iteration steps.

Exercise 2

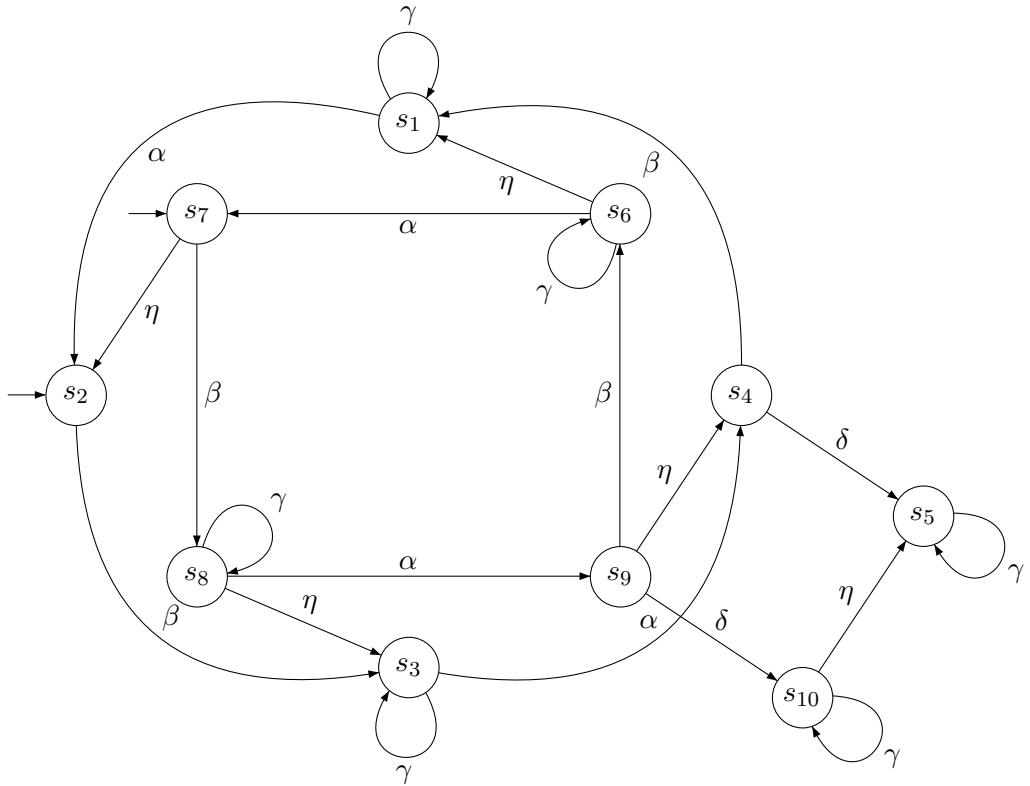
(3 points)

 Given a transition system TS in the following figure with action set $Act = \{\alpha, \beta, \gamma, \delta, \tau\}$. Determine the pairs of independent actions.


Exercise 3

(4 points)

Consider the transition system below:



The states labeling is as follows:

- $L(s_{10}) = \emptyset$
- $L(s_6) = L(s_7) = \{a\}$
- $L(s_3) = L(s_4) = L(s_5) = L(s_8) = L(s_9) = \{b\}$
- $L(s_1) = L(s_2) = \{a, b\}$

Prove or disprove that each of the following *ample sets* satisfy requirements *A1* through *A3* on the *ample sets*, also check whether the requirement *A4* holds:

- $ample(s_6) = \{\gamma, \alpha\}$
- $ample(s_7) = \{\beta\}$
- $ample(s_8) = \{\alpha\}$
- $ample(s_9) = \{\alpha, \beta, \delta\}$
- $ample(s_{10}) = \{\gamma, \eta\}$

In case some of the conditions *A1* through *A4* do not hold, modify the *ample sets* in an appropriate way to fix it. Clarify your changes.