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LEHRSTUHL FÜR INFORMATIK 2
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Introduction to Model Checking
Winter term 2011/2012

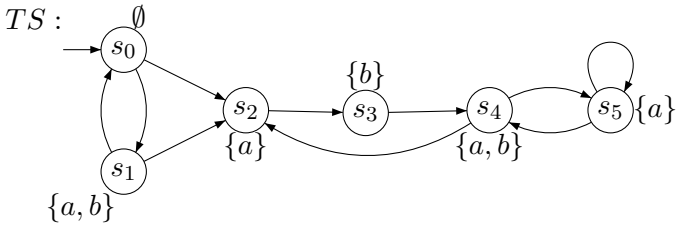
– Series 13 –

Hand in on January 31th before the exercise class.

Exercise 1 (5 points)

Consider the transition system TS, the strong fairness assumption $sfair$ and the CTL formula Φ:

$$sfair = \Box\Diamond\big(\exists\bigcirc(a \wedge \neg b)\big) \rightarrow \Box\Diamond\big(\exists\bigcirc \neg a\big)$$
$$\Phi = \exists\Diamond\exists\Box a$$



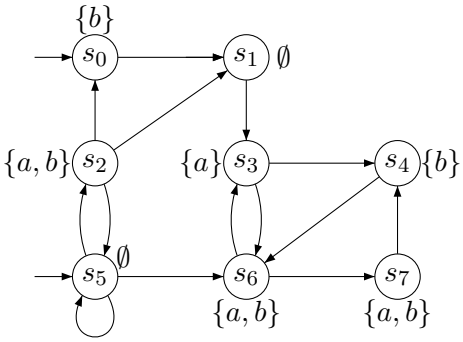
Apply the fair CTL model checking algorithm from the lecture to check $TS \models_{sfair} \Phi$.
Sketch its main steps.
Hint: You do not need to formally apply the basic CTL and LTL model checking algorithms!

Exercise 2 (5 points)

Consider the CTL*-formula (over $AP = \{a, b\}$)

$$\Phi = \forall\Diamond\Box\exists\bigcirc\big(a\mathsf{U}\exists\Box b\big)$$

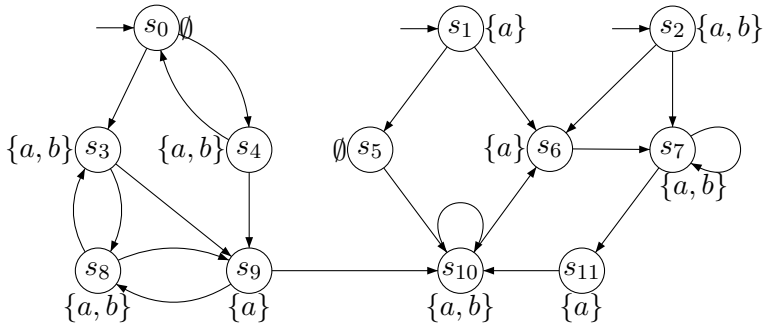
and the transition system TS outlined below:



Apply the CTL* Model Checking Algorithm to compute $Sat(\Phi)$ and decide whether $TS \models \Phi$.
Hint: You may infer the satisfaction sets for LTL formulas directly.

Exercise 3(Optional) (0 points)

Consider the transition system TS over $AP = \{a, b\}$ outlined below:



a) Determine the bisimulation equivalence $\sim_{TS}$ and depict the bisimulation quotient system $TS/\sim$.

b) Provide CTL master formulas Φ_C for each bisimulation equivalence class C.