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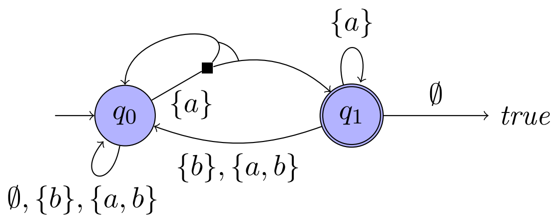
Warm-up Questions 10
Discussions: July 1th, 2015

Automata, Games, and Verification

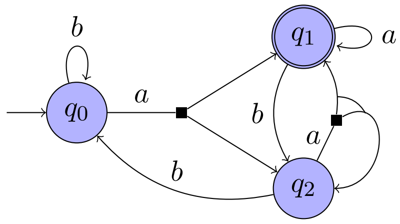
Please send a mail to `agv15@react.uni-saarland.de` if you can't make it to the discussion session.

1. Consider the LTL formula $\varphi = \square\Diamond(\neg(a\,\mathcal{U}\,b))$ over the alphabet $2^{\{a,b\}}$ and the alternating Büchi automaton $\mathcal{A}$ given below. Does $\mathcal{L}(\mathcal{A}) = \mathcal{L}(\varphi)$ hold?



☐ Yes ☐ No

2. Consider the alternating Büchi automaton $\mathcal{A}$ below. Which of the following are true?



☐ For all $\alpha \in \mathcal{L}(\mathcal{A})$ there is a run tree on α that is not memoryless.

☐ For all $\alpha \notin \mathcal{L}(\mathcal{A})$ there is a run tree on α that is not memoryless.

☐ There is some $\alpha \in \Sigma^\omega$ such that all run trees on α are memoryless.

☐ There is some $\alpha \in \Sigma^\omega$ such that all run trees on α are not memoryless.

3. Let $\mathcal{A}$ be some alternating Büchi automaton. Can there be words $\alpha \in \mathcal{L}(\mathcal{A})$ that have an accepting run tree on $\mathcal{A}$, but no accepting run DAG?

☐ True ☐ False

4. There is an alternating Büchi automaton $\mathcal{A}$ and some word α accepted by $\mathcal{A}$ via some memoryless run r, whose corresponding run DAG is finite.

☐ True ☐ False

5. Is there some accepting condition Acc and some alternating automaton $\mathcal{A} = (\Sigma, Q, q_0, \delta, Acc)$ such that $\mathcal{L}(\mathcal{A})$ is non-empty and no word α accepted by $\mathcal{A}$ has a memoryless run tree?

☐ Yes ☐ No

6. There is an alternating Büchi automaton $\mathcal{A}$ and some word α such that there are infinitely many accepting run DAGs of $\mathcal{A}$ on α.

☐ True ☐ False