that $\alpha \in \mathcal{L}(\mathcal{A})$.

☐ True

□ False

Warm-up Questions 4 Discussions: May 20th, 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. A method to complement Büchi automata was first discovered: □ 1847 \Box in the 1960s \Box in the 1980s \square 2009 \square 2015 2. A run DAG of a Büchi automaton \mathcal{A} on a word $\alpha \in \Sigma^{\omega}$ is a ☐ directed acyclic graph. □ acyclic non-directed graph. □ undirected cyclic graph. ☐ directed cyclic graph. \square acyclic directed graph. \square directed acyclic tree. 3. Let \mathcal{A} be the Büchi automaton shown below and $\alpha = ababbabbabbbabbba \dots$ Which of the following are run DAGs of \mathcal{A} on α ? h a 4. For each $\alpha \in \Sigma^{\omega}$ and a given complete Büchi automaton \mathcal{A} the number of run DAGs of α on \mathcal{A} is \square infinite. \square at least one. \square at most one. \square 42. \square finite. 5. A ranking for a run DAG is a function $f: V \to \{0, \dots, 2 \cdot |Q|\}$ such that for all $\ \, \Box \ \, (q,i) \in V \text{, if } f(q,i) \text{ is odd then } q \notin F$ $\Box ((q,i),(q',i')) \in E, f(q',i') \ge i$ \square $((q,i),(q',i')) \in E, f(q',i') \le f(q,i)$ \square $(q,i) \in V, \text{ if } q \in F \text{ then } f(q,i) > 0$ $\square \ ((q,i),(q',i')) \in E, (q'',i'') \in V, f((q'',i)) \le f((q'',i'))$ 6. If there are infinitely many safe vertices in a run DAG, then there is a path which never visits $F \times \mathbb{N}$. ☐ True □ False 7. There is a complete Büchi automaton \mathcal{A} and a word $\alpha \in \Sigma^{\omega}$ s.t. for the run DAG of \mathcal{A} on α \Box there exists exactly one safe vertex. \square all vertices are safe. \Box there exist only endangered vertices. \Box there exists exactly one endangered vertex. 8. In a run DAG a state can be both: endangered and safe ☐ True □ False 9. A Büchi automaton \mathcal{A} does not accept a word α iff there is an odd ranking for the run DAG of α on \mathcal{A} . ☐ True □ False

10. The existence of an odd ranking for a run DAG G of a Büchi automaton A on a word $\alpha \in \Sigma^{\omega}$ implies