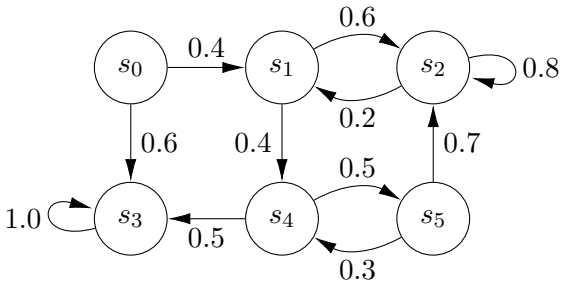
Technische Universität München
Institut für Informatik I07
Theoretical Computer Science

Quantitative Verification 8

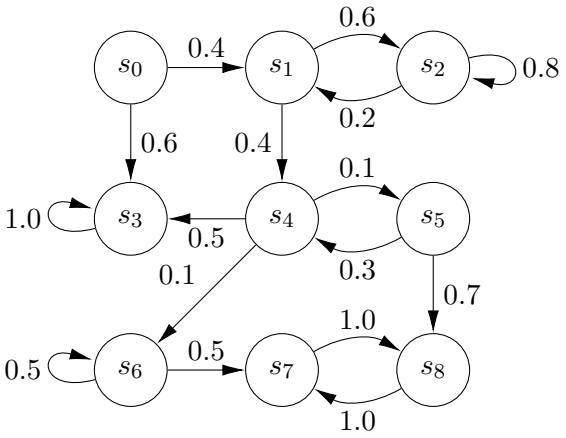
Ex 1: Reachability

Compute the probability of reaching the set $\{s_1, s_4\}$ in the following Markov Chain, using the method from the lecture.



Ex 2: Connected Components

For the following Markov Chain, determine the set of its strongly connected components and identify which are "bottom".



Ex 3: Proof

Prove that a finite DTMC is irreducible iff its induced graph is strongly connected.

Ex 4: Cost-Bounded Reachability

Consider a finite Markov Chain with non-negative, integer (state)rewards. Given a state set B and threshold T, how can you (algorithmically) compute the probability of reaching B while not exceeding a total accumulated cost of T? What happens if we allow non-negative, rational rewards?