Concurrency theory
Exercise sheet 6

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Out: November 23 Due: November 28

Submit your solutions until Tuesday, November 28, during the lecture. You may submit in groups up to three persons.

Exercise 1: Well quasi orderings

Prove or disprove that $(Bin, \leqslant)$ is a well-quasi ordering, here Bin represents set of all binary numbers $Bin = \{0, 1\}^*$ and $\leqslant$ is the lexicographing ordering with $0 \leqslant 1$.

Exercise 2: Downward closed sets

Prove that for any wqo $(A, \leqslant)$ and for every infinite decreasing sequence $D_0 \supseteq D_1 \supseteq D_2 \supseteq \ldots$ of downward closed sets, there is a $k \in \mathbb{N}$ such that $D_k = D_{k+1}$

Exercise 3: WSTS

Given a wsts $(\Gamma, \to, \gamma_0, \leqslant)$, describe an algorithm to decide if every run from γ_0 is terminating or not. Assume the wsts to be finitely branching, i.e., for every configuration $\gamma_1 \in \Gamma$ there are finitely many $\gamma_2 \in \Gamma$ with $\gamma_1 \to \gamma_2$. Prove correctness of your algorithm.
Hint: start from the reachability tree for Petri nets and lift the construction for wsts.