Solution proposal to selected exercises from Lecture 6

Jens Chr. Godskesen
IT University of Copenhagen

Exercise 2, Liveness Property and Dining Philosophers

$L(\phi) = \mu X.(\phi \vee \bigvee_{a \in \mathcal{A}} \langle a \rangle X)$ and $\phi = \langle e_1 \rangle tt$: in some state philosopher number 1 will eat.

$L(\langle e_1 \rangle tt \wedge [e_1] L(\langle e_2 \rangle tt))$: there is a path where first philolosospher 1 and then philosopher 2 eats.

$L(\langle e_1 \rangle tt \wedge [e_1] L(\langle e_2 \rangle tt \wedge [e_2] L(\langle e_3 \rangle tt \wedge [e_3] L(\langle e_4 \rangle tt \wedge [e_4] L(\langle e_5 \rangle tt)))))$: there is a path where all philolososphers eat in order 1 to 5.

All the properties above holds, even in the model that deadlocks.

Exercise 2 (continued), Strong Liveness Property and Dining Philosophers

$SL(\phi) = \mu X.(\phi \vee (\bigvee_{a \in \mathcal{A}} \langle a \rangle tt \wedge \bigwedge_{a \in \mathcal{A}} [a] X))$ and $\phi = \langle e_1 \rangle tt$: in every trace philosopher number 1 will eat. (Doesn't hold.)

$SL(\langle e_1 \rangle tt \vee \langle e_2 \rangle tt \vee \langle e_3 \rangle tt \vee \langle e_4 \rangle tt \vee \langle e_5 \rangle tt)$: in every trace one of the philosophers will eat. (Does hold in the asymmetric model, but not in the timeout model.)