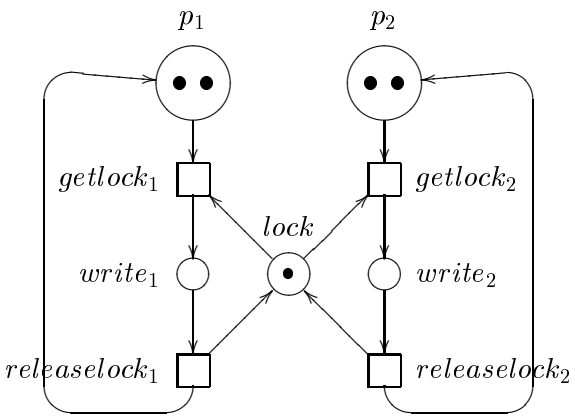
Tik-79.231 Parallel and distributed systems

Tutorial #6
Nov 10, 2000
KH, transl. EK

1. Let us consider the stochastic Petri net given below:

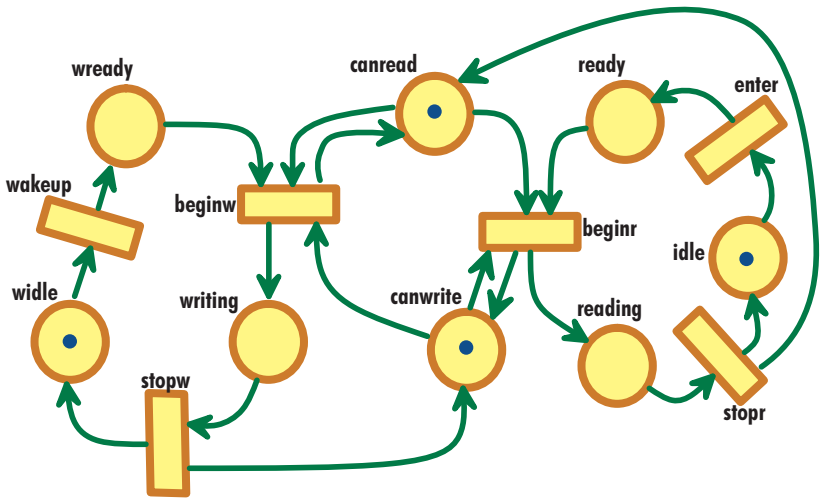


The firing rates of the transitions: $\Lambda(getlock_1) = 5, \Lambda(getlock_2) = 10, \Lambda(releaselock_1) = 20, \Lambda(releaselock_2) = 5$.

Construct and solve the steady state equation. Compute the average of tokens in the places p_1 and p_2. How does a change in the firing rate of the transition $releaselock_1$ affect the above averages?

N.B.: Actually, this is a timed Petri net. If it were the case that the firing rates were exponentially distributed, we would be talking about stochastic Petri nets here. However, in order to solve the problem, we would have to construct and solve a system of differential equations which is admittedly a wee bit tougher than with timed Petri nets. For the purposes of this course, we hope that the student gains sufficient insight from this simple exercise.

2. Let us consider the mutex properties of the P/T net given below:



In the figure, depicted is *The state testing mutex algorithm*. The local states `canwrite` and `canread` can be considered as flags, allowing the respective partner to go into its critical state (modelled with the places `writing` and `reading`, respectively). E.g., when the writer process moves to `writing` by firing `beginw`, it needs to test also `canread`. The net is unfair as infinitely many firings of `beginw` prevent `beginr`, and vice versa.

The mutual exclusion property (abbr. mutex) is, of course, to show that only one (or none) of the processes is in the critical section (`writing` and/or `reading`) at any time.