T-79.231 Parallel and distributed systems

Tutorial 3
Oct 9, 2001
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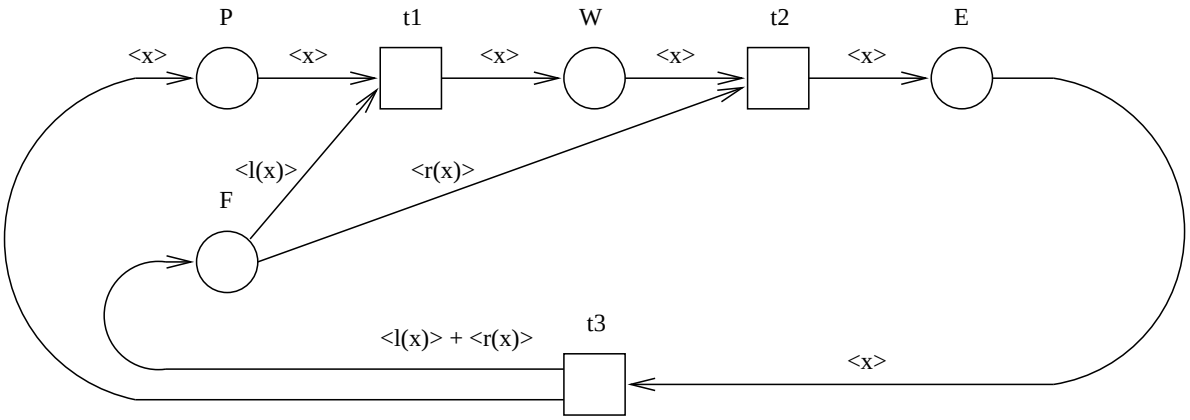
1. Perform reachability analysis to the 2 philosophers net given below:



where the initial marking $P \mapsto \{ph_1, ph_2\}$, $F \mapsto \{f_1, f_2\}$ ja $l(ph_i) = f_i$, $r(ph_i) = f_{(i \bmod 2)+1}$. Is it possible for one of the philosophers to starve?

2. In a system we have W writer processes and R reader processes. Any number of readers can read concurrently but if a single writer wants to write no other process can read or write. Model the system with a Pr/T net.

3. Convert the Peterson's mutual exclusion algorithm into a Pr/T net. The processes $P0$ and $P1$ are concurrent processes trying to enter the critical section CS. The variable `in0`, `in1`, and `turn` are shared between the processes. Make the assumption that the assignments and tests are atomic. Perform reachability analysis to check the correctness of your net.

```
P0 :
WHILE true
  in0 := 1;
  turn := 1;
  WHILE in1 = 1 AND turn = 1
    skip;
  ENDWHILE
  CS();
  in0 := 0;
  NCS0();
ENDWHILE

P1 :
WHILE true
  in1 := 1;
  turn := 0;
  WHILE in0 = 1 AND turn = 0
    skip;
  ENDWHILE
  CS();
  in1 := 0;
  NCS1();
ENDWHILE
```