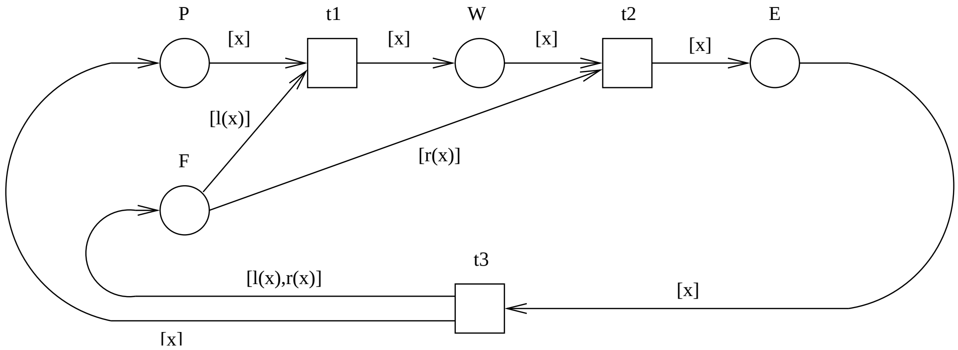
Department of Computer Science
Laboratory for Theoretical Computer Science
T-79.231 Parallel and Distributed Digital Systems

Tutorial 3
Oct 7th 2002

1. Perform reachability analysis to the 2 philosophers net given below:



   Where the initial marking is $P = [ph_1, ph_2]$, $F = [f_1, f_2]$ and $l(ph_i) = f_i$, $r(ph_i) = f_{(i \,\mathbf{mod}\, 2)+1}$. Is it possible for one of the philosophers to starve?

2. In a system we have n writer processes and m 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 an algebraic net.

3. Model the following *Peterson's mutual exclusion algorithm* with an algebraic net. The processes $P0$ and $P1$ are concurrent processes both trying to enter the critical section CS. The variables `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
```