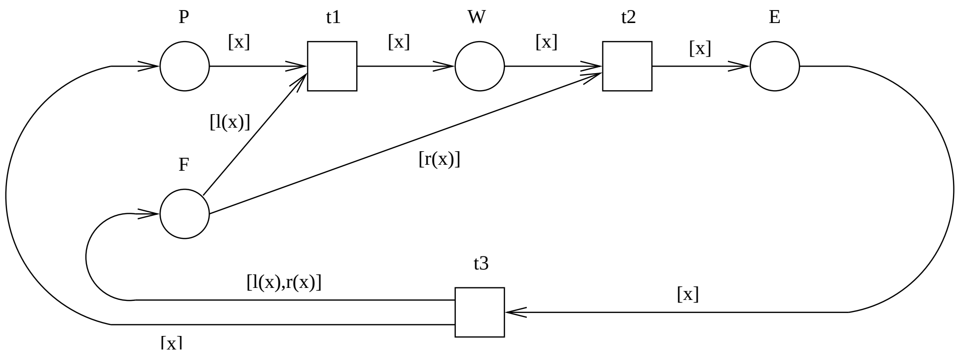
Department of Computer Science
Laboratory for Theoretical Computer Science
T-79.231 Parallel and Distributed Digital Systems

Tutorial 5
Oct 21st 2002

1. A solution to the 3 philosophers problem is given below:



Where the initial marking is $P = [ph_1, ph_2, ph_3]$, $F = [f_1, f_2, f_3]$ ja $l(ph_i) = f_i$, $r(ph_i) = f_{(i \bmod 3)+1}$.

Give the LTL formulae with which you can verify the properties given below. Create a Maria description of the net and use Maria to do the model checking.

(a) Two neigbouring philosophers cannot eat at the same time.
(b) There exists a state where the philosopher ph_1 is dining.
(c) The philosopher ph_1 may starve.
(d) If the philosopher ph_1 us dining, the forks f_1 and f_2 are not free.
(e) If the forks f_1 and f_2 are not free, the philosopher ph_1 is dining.

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. Below is a net modeling the system described above. Convert the net to Maria net description language and check that it works correctly. Use some reasonably small values for n and m, e.g. 3 or 4.