

MPB 2014/15 – Nov 7, 2014

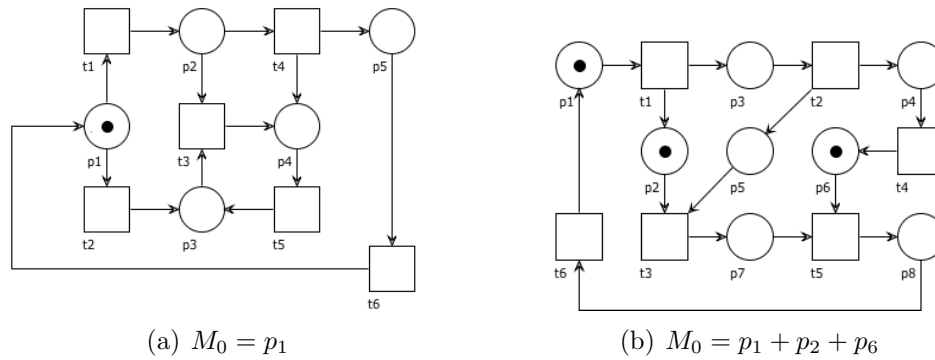


Figure 1: Two net systems

[Ex. 1]

Explain the meaning of the following terms in the context of business process management: “task”, “resource”, “activity”, “principal”, “contractor”.

[Ex. 2] Consider a net system (P, T, F, M_0) .

Give a formal definition of each of the following three statements: “a deadlock state is reachable”; “the place p is dead”; “the transition t is not live”.

[Ex. 3] Consider the net system in Figure 1(a).

Prove that the system is not deadlock-free.

Is the system live (explain)?

Is the system free-choice (explain)?

Prove that the place p_3 is unbounded by exploiting the Monotonicity Lemma (hint: find two suitable reachable markings $M \subset M'$ such that $M' \in [M]$).

[Ex. 4] Consider the net system in Figure 1(a).

Exploit the Marking Equation Lemma to find the marking reached after firing the sequence $\sigma = t_1 t_4 t_6 t_1 t_5 t_4 t_5 t_6 t_1 t_4 t_6 t_2$.

Exploit the Marking Equation Lemma to justify the fact that the firing sequence $\sigma' = t_1 t_4 t_6 t_1 t_5 t_3 t_5 t_4 t_6 t_1 t_3 t_4$ is not enabled.

[Ex. 5] Consider the net system in Figure 1(b).

Prove that the system is bounded by exhibiting a suitable S-invariant.

Exploit the fundamental property of S-invariants to prove that the marking $M = p_2 + p_4 + p_6 + p_8$ is not reachable.

[Ex. 6, Optional]

Describe the “Design & Analysis” phase of the business process lifecycle.