Business Processes Modelling

MPB (6 cfu, 295AA)

Roberto Bruni
http://www.di.unipi.it/~bruni

12 - Strong Connectedness

Object

$$N \vdash \psi$$

We survey
two connectedness theorems

Free Choice Nets (book, optional reading)
https://www7.in.tum.de/~esparza/bookfc.html

Two theorems on strong connectedness (whose proofs we omit)

Strong connectedness theorem

Theorem: If a weakly connected system is live and bounded then it is strongly connected

Consequences

If a (weakly-connected) net is not strongly connected

then

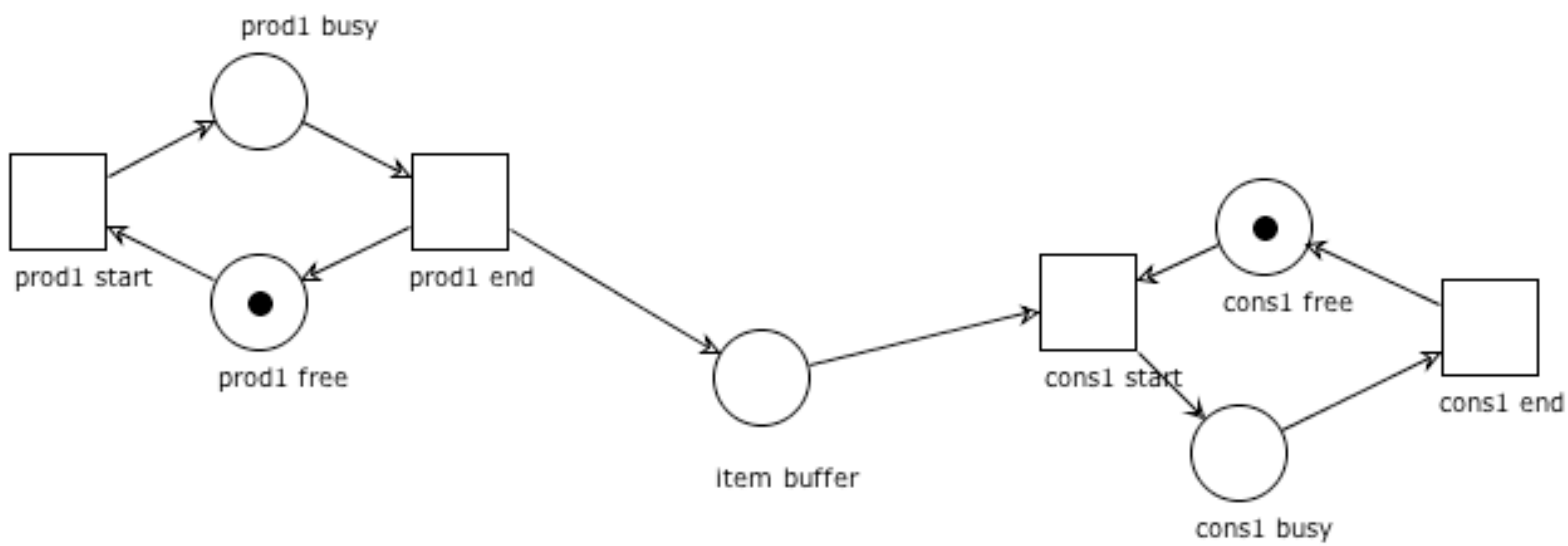
It is not “live and bounded”

If it is live, it is not bounded

If it is bounded, it is not live

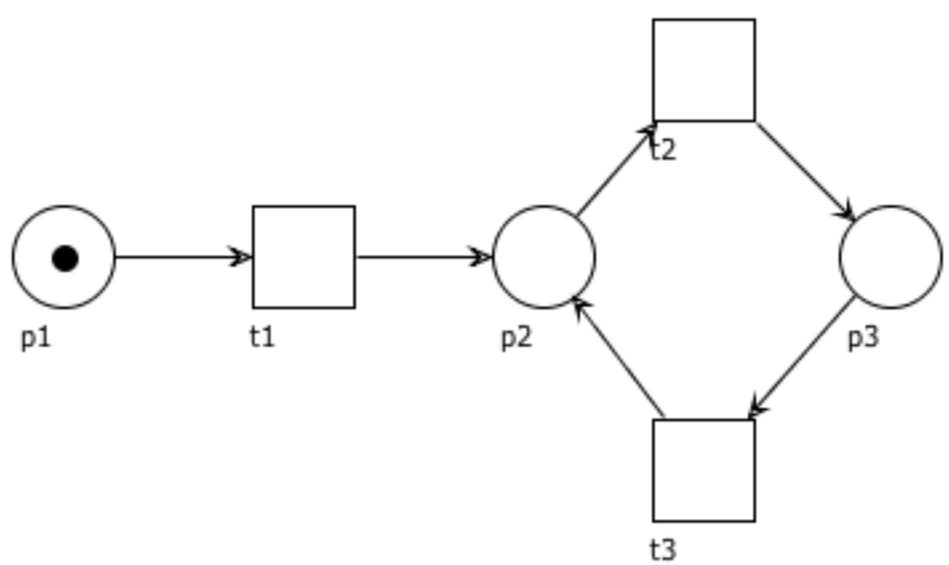
Example

It is now immediate to see that this system (weakly connected, not strongly connected) cannot be live and bounded (it is live but not bounded)



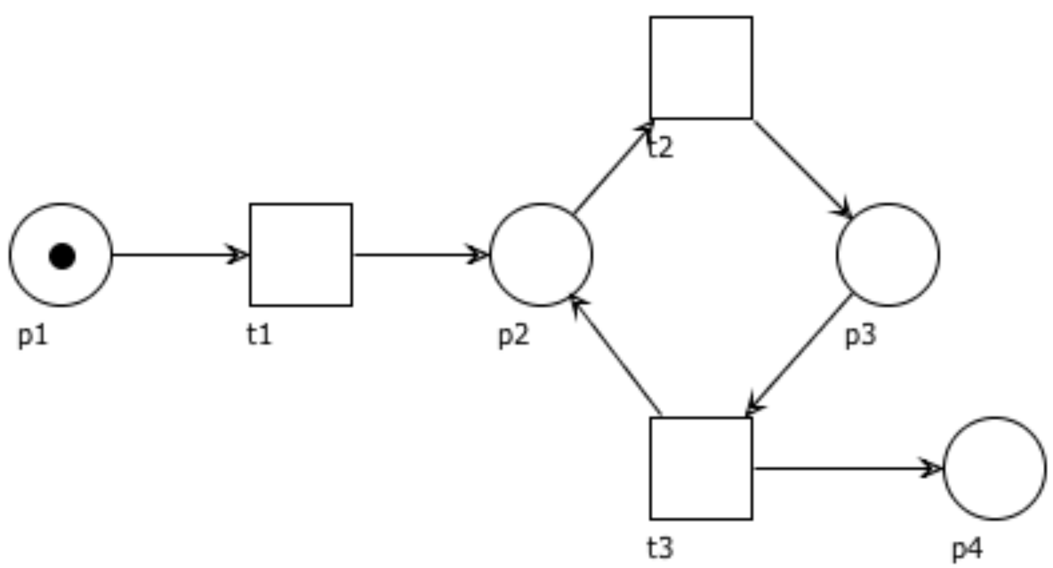
Example

It is now immediate to see that this system
(weakly connected, not strongly connected)
cannot be live and bounded
(it is bounded but not live)



Example

It is now immediate to see that this system
(weakly connected, not strongly connected)
cannot be live and bounded
(it is neither bounded nor live)



Strong connectedness via invariants

Theorem: If a weakly connected net has a positive S-invariant **I** and a positive T-invariant **J** then it is strongly connected

Consequences

If a (weakly-connected) net is not strongly connected

then

we cannot find (two) positive S- and T-invariants