

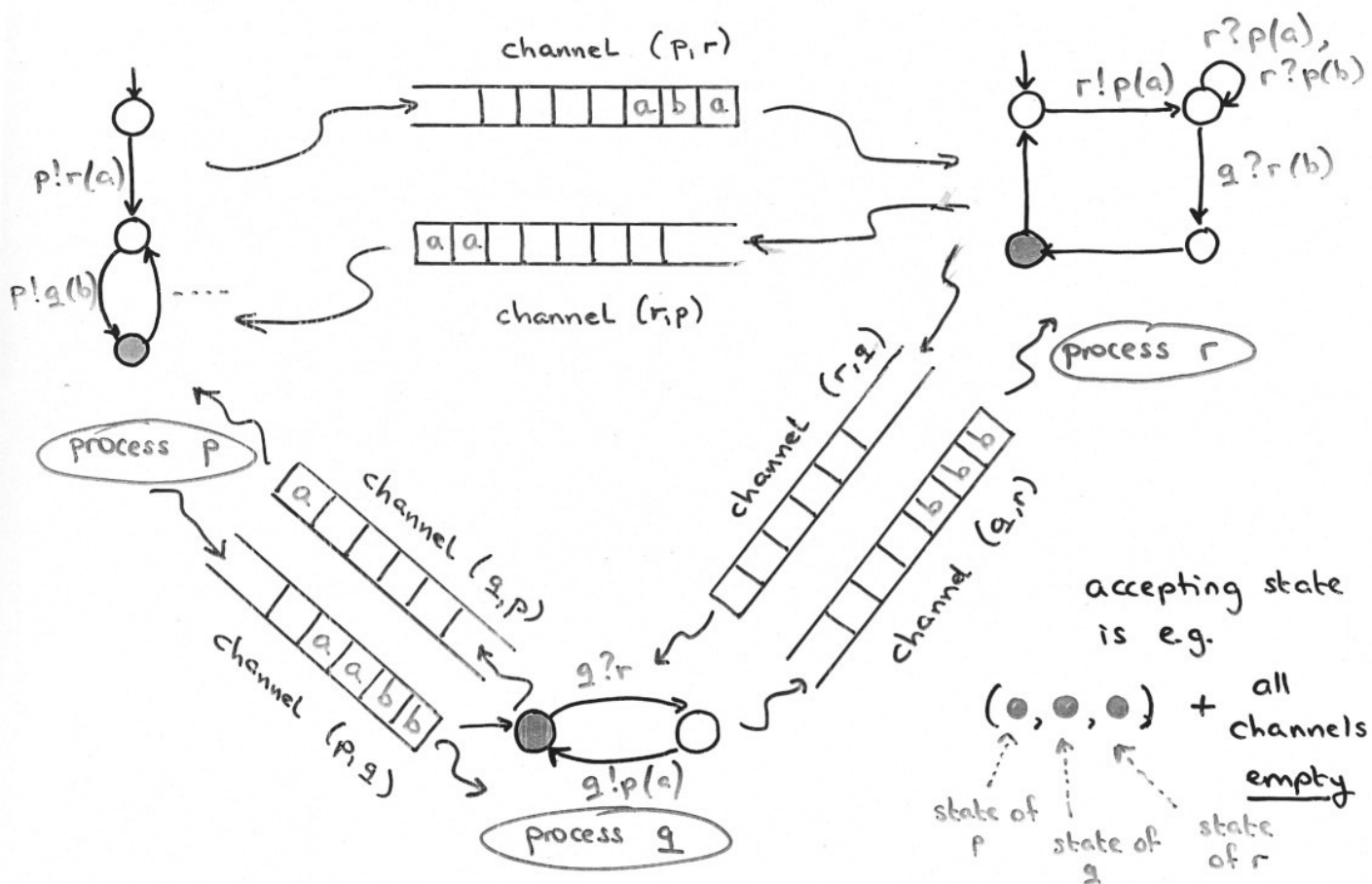
MESSAGE PASSING AUTOMATA

- Consider (C)MSG models as complete system specification
- They describe example system scenarios
- Can we obtain "realizations" that exhibit all these scenarios?
- First let us fix: which model to use for system "realizations"?

- (1) Model a process by an automaton
- (2) let processes communicate via FIFO channels

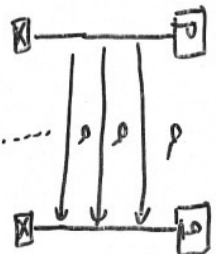
Message Passing Automaton (MPA)
= set of finite-state automata
+ communication channels

MESSAGE PASSING AUTOMATON

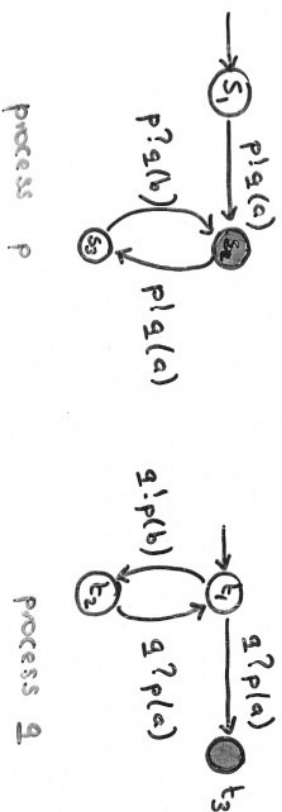


INTUITION

Example 1:

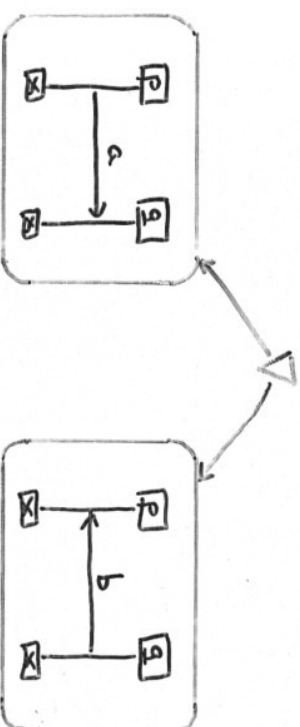


Example 2



THE NEED FOR SYNC MESSAGES

Suppose we need to "realize":



Naively, this would yield:



Final states $\{ (\text{shaded circle}, \text{shaded circle}), (\text{shaded circle}, \text{shaded circle}) \}$

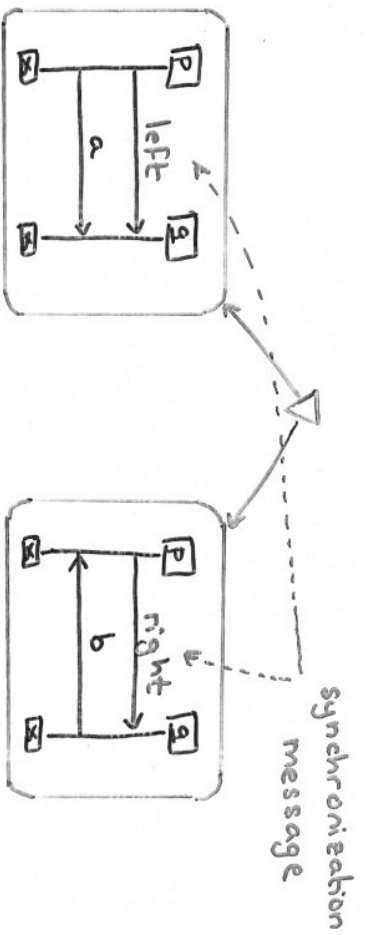
+ channels empty

THIS MPA MAY YIELD A DEADLOCK

since (global) state

$(\text{shaded circle}, \text{shaded circle}, \text{|||||a}, \text{|||||b})$ is reachable

THE NEED FOR SYNC MESSAGES

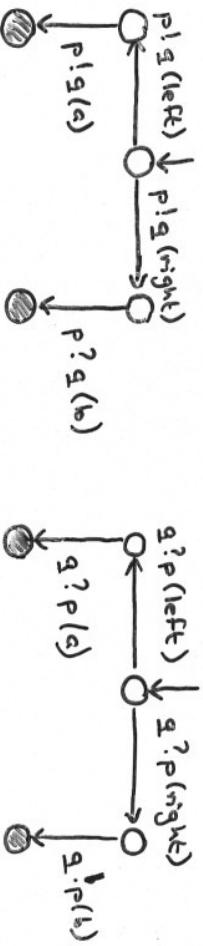


P informs Q about behaving like

MSC_{left} or MSC_{right}

(note: without the data "left", "right" a similar problem as on previous slide may occur)

This yields:



process P

process Q

No deadlock is possible any more