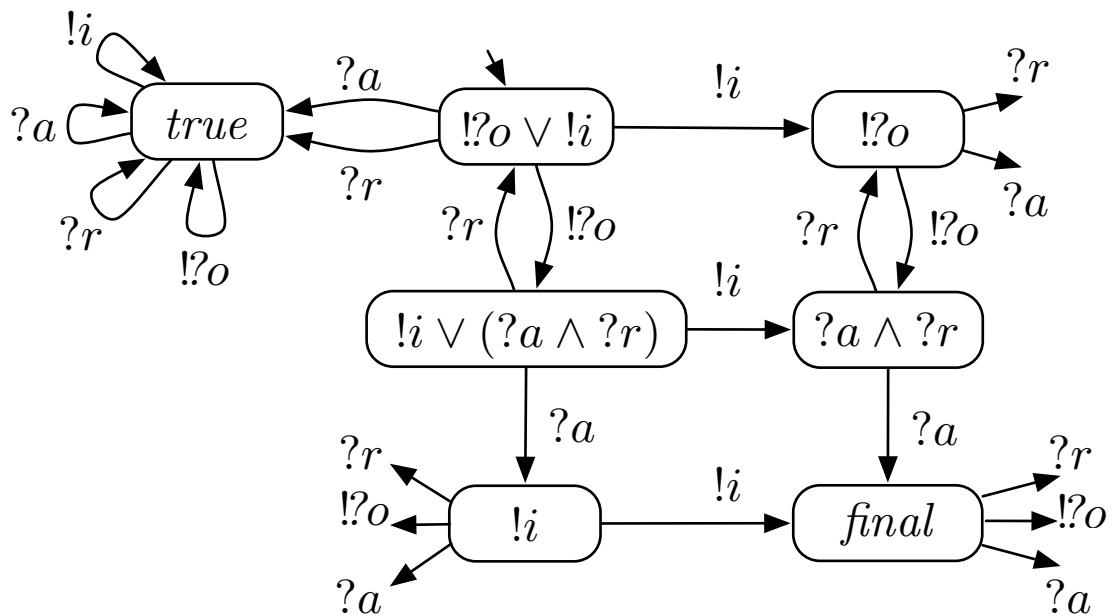
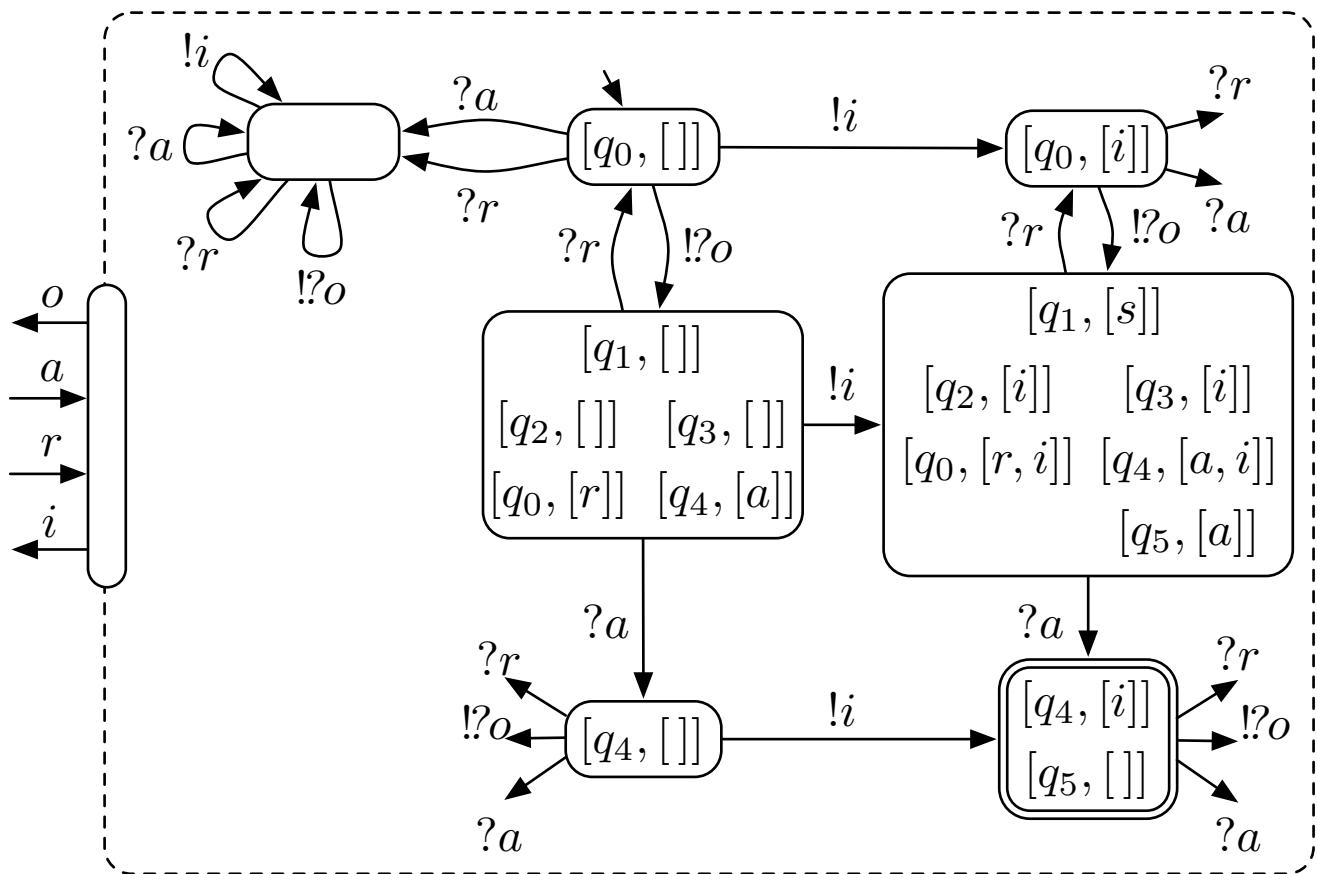
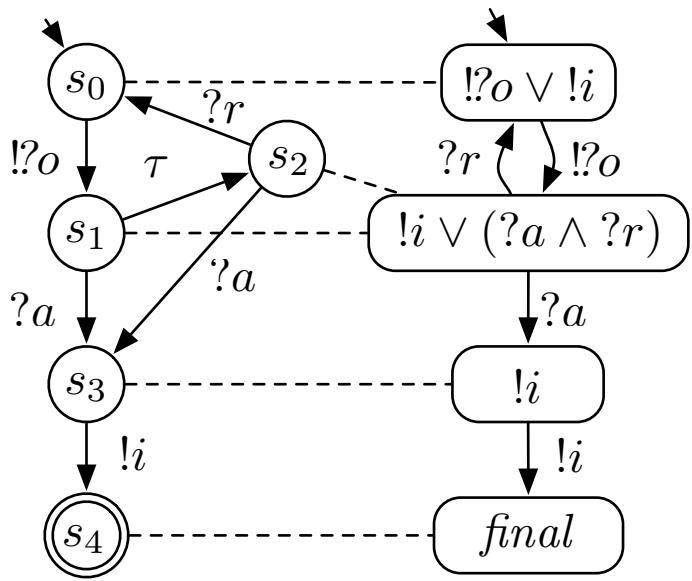


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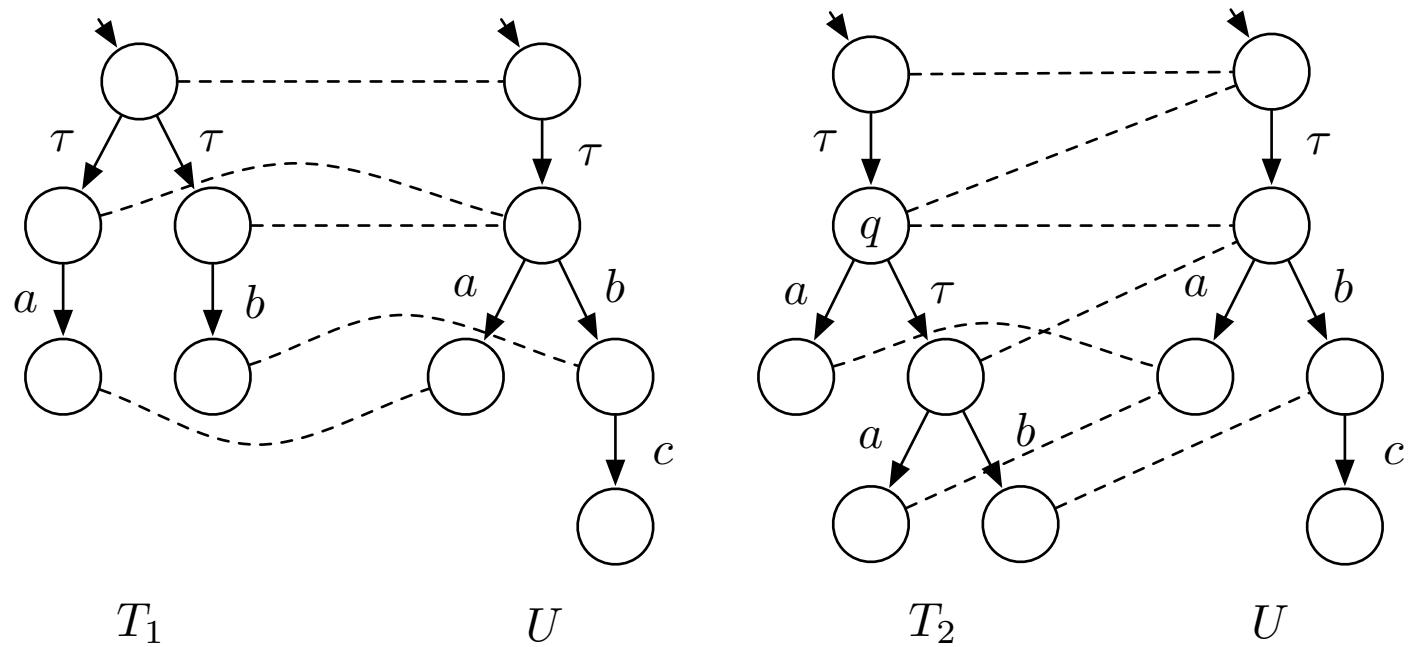
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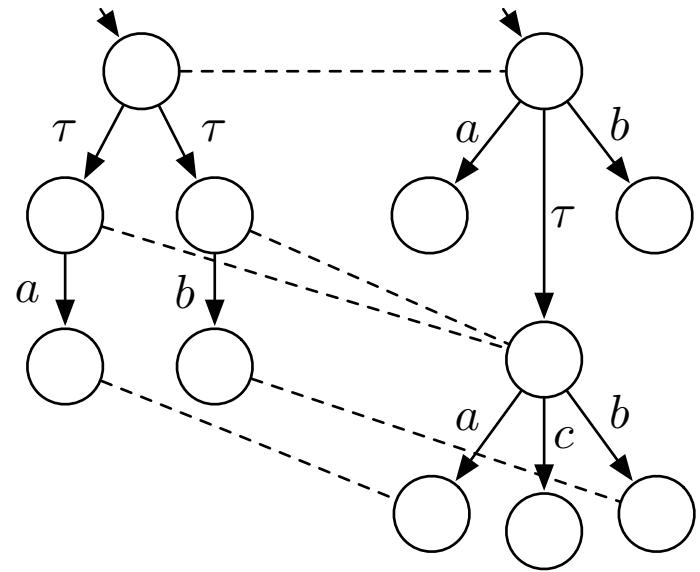
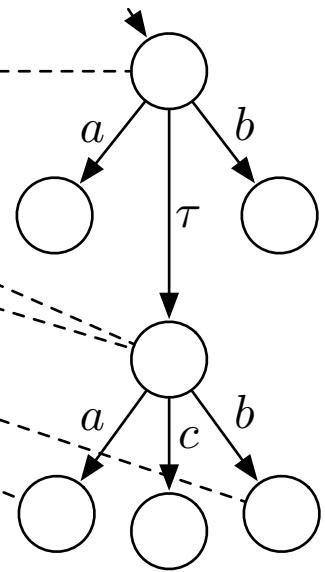
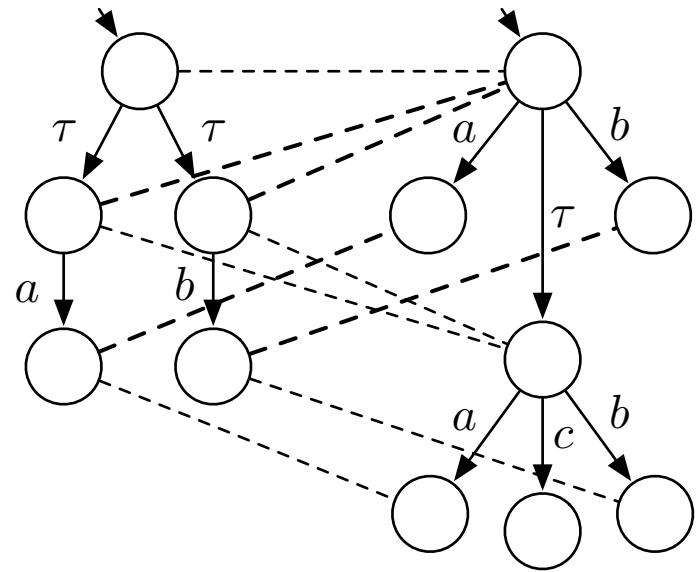


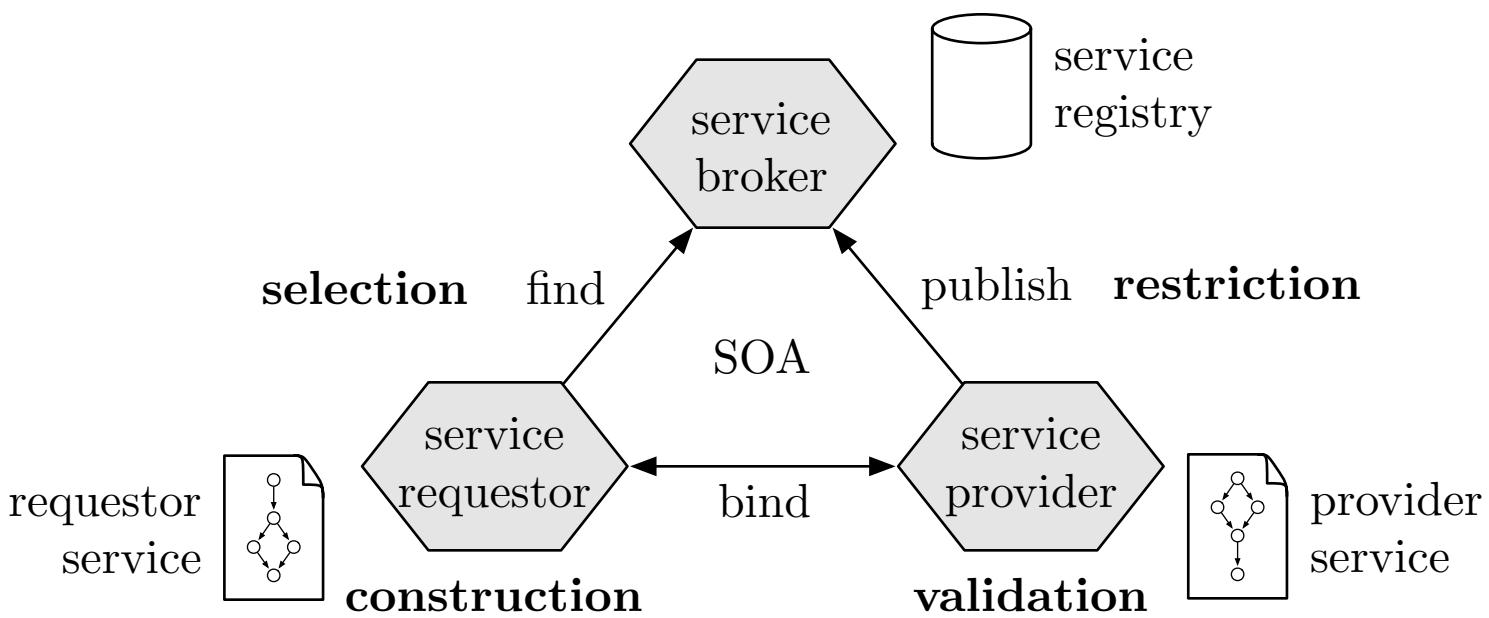
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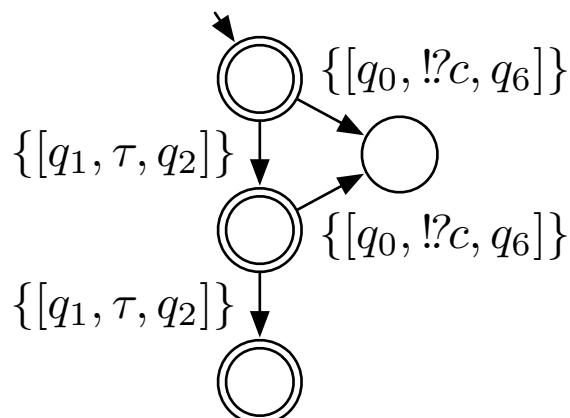
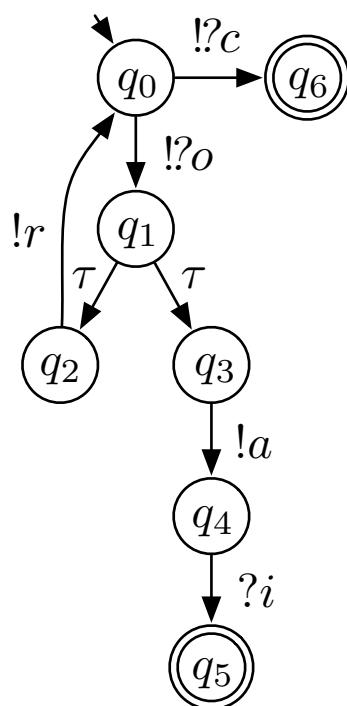


running\_matching

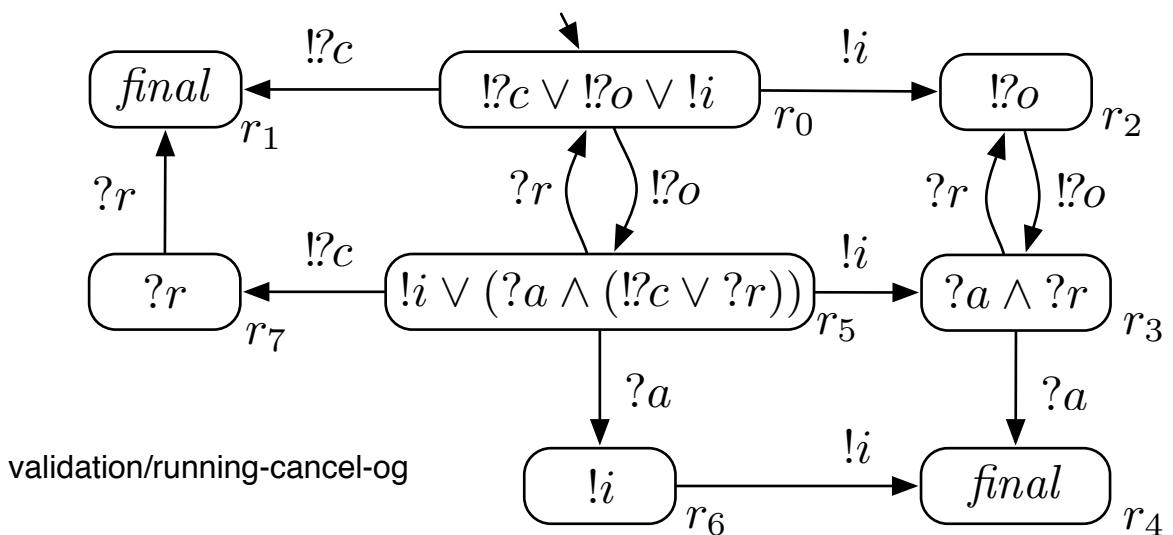
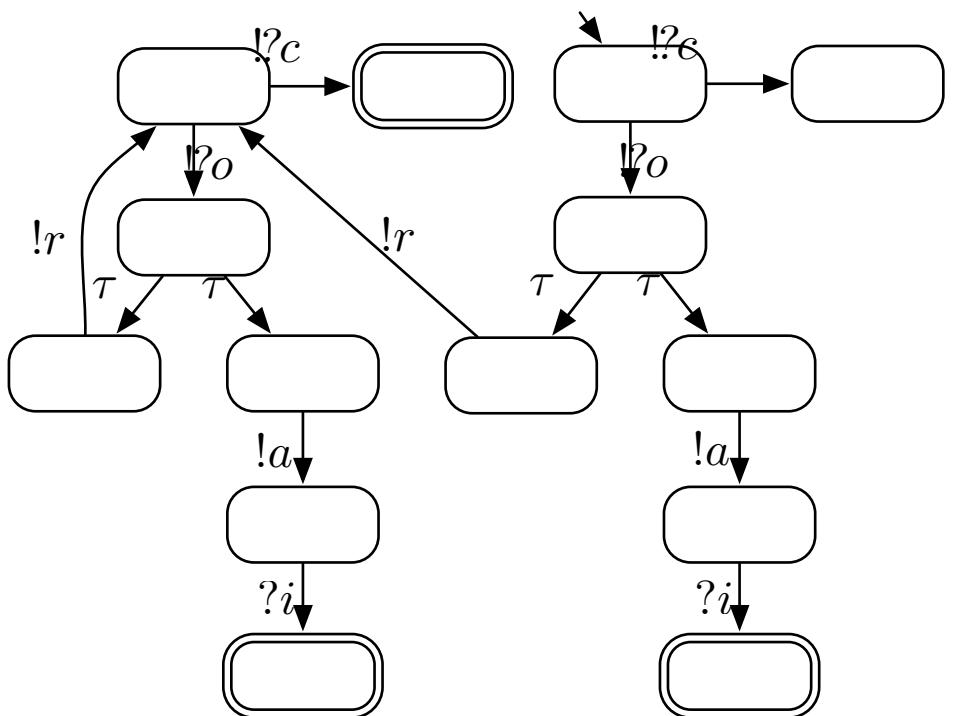
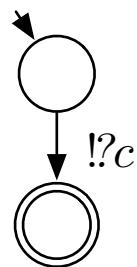


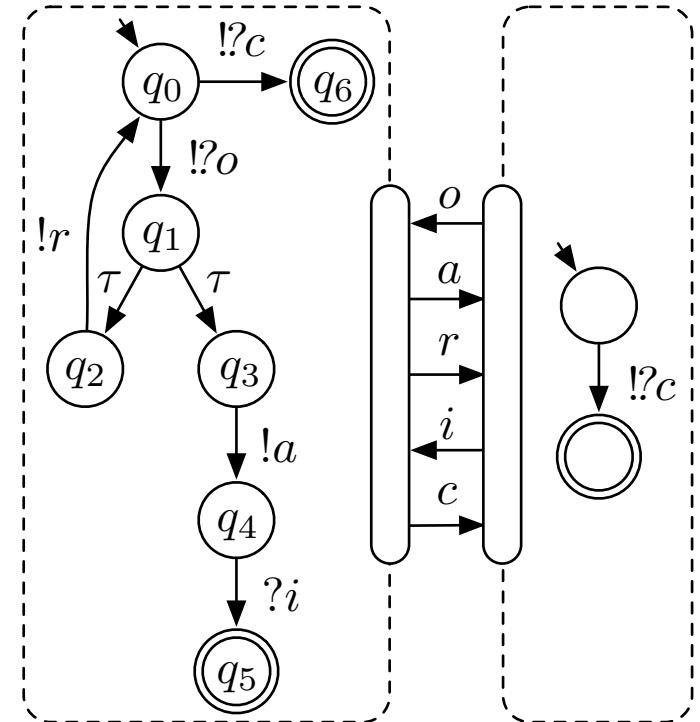

 $T$ 

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 $U$





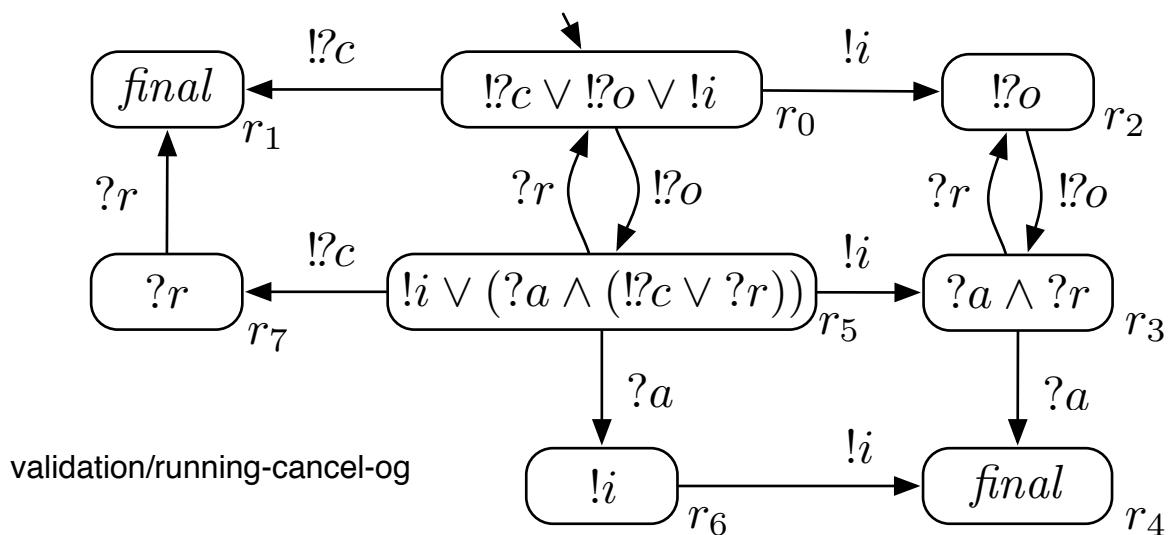
validation/running-cancel

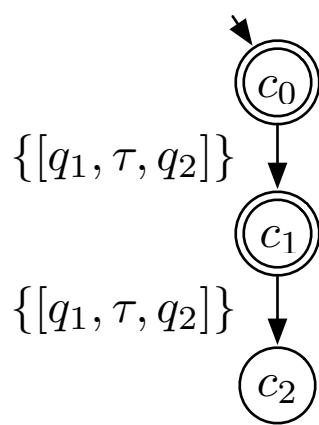
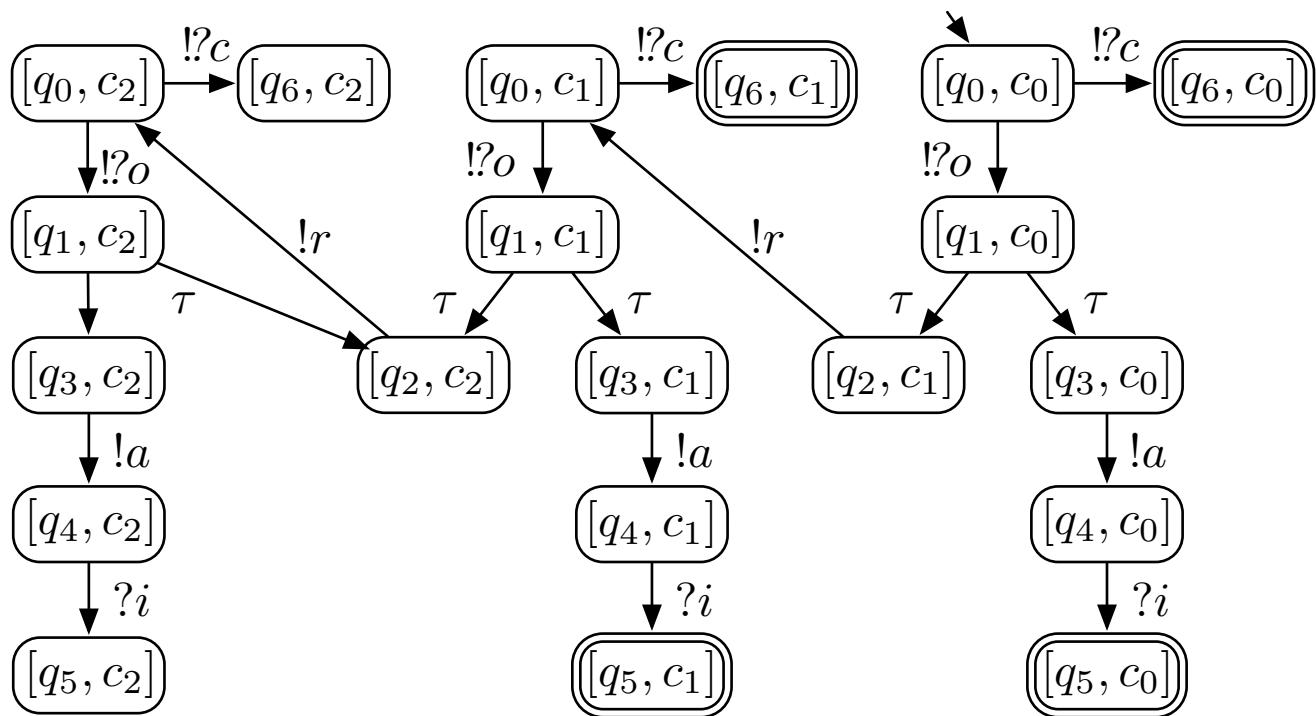


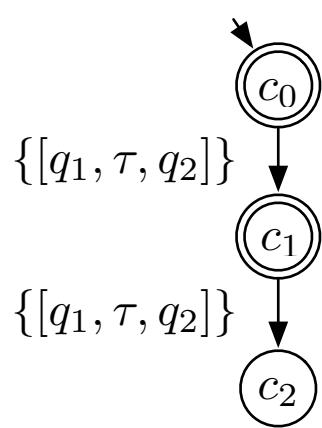
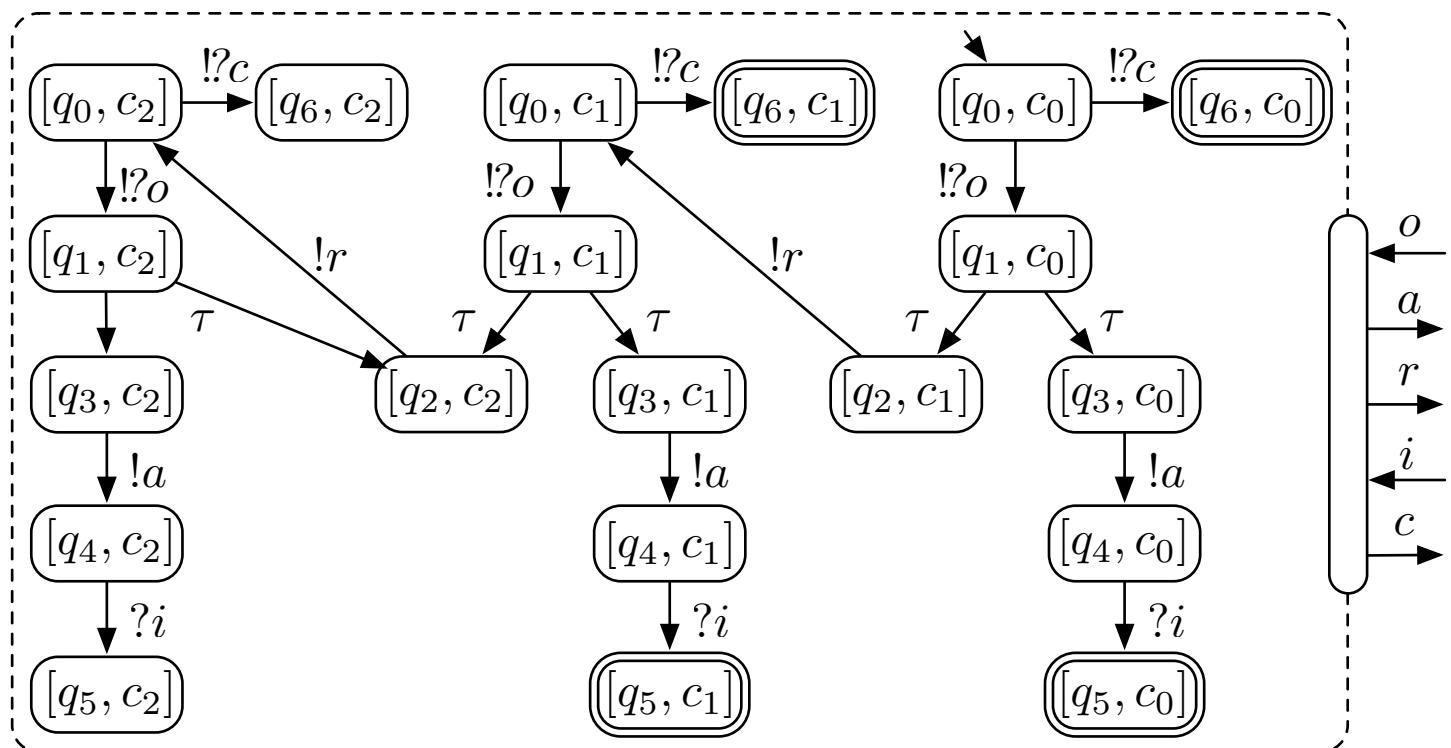


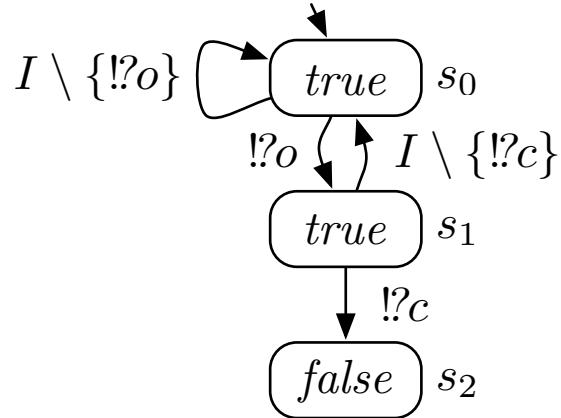
validation/running-cancel

validation/running-bad

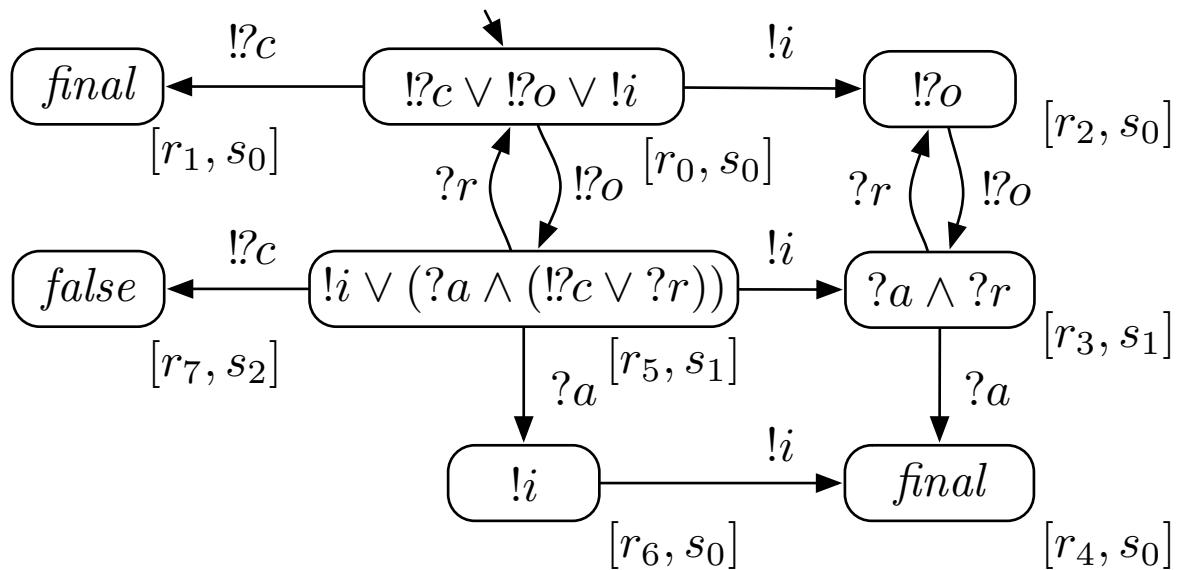




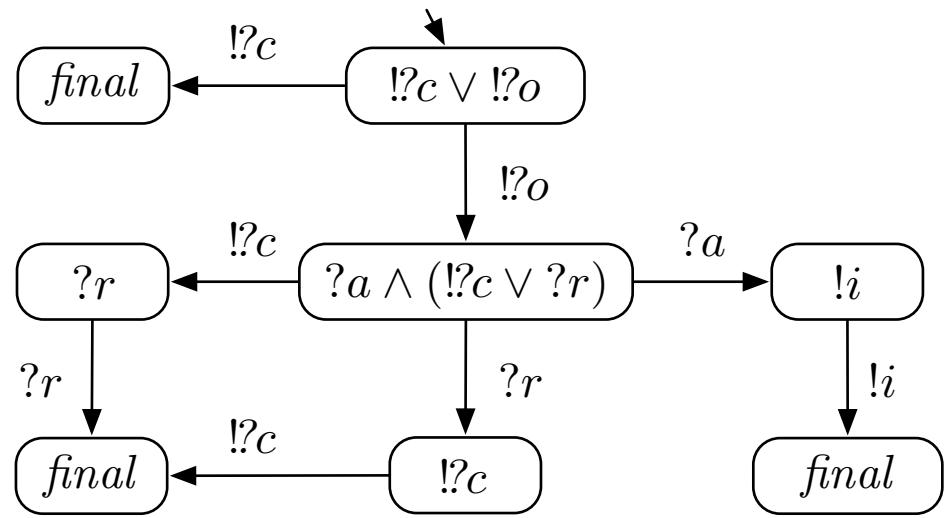




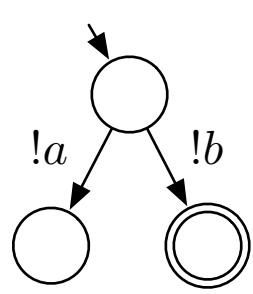
validation/constraint\_5



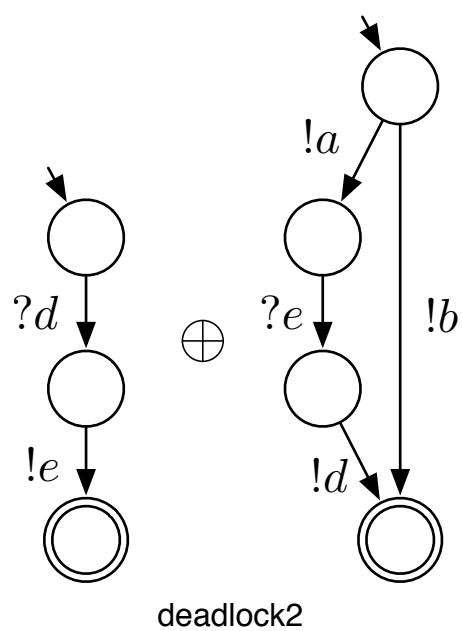
validation/product\_1



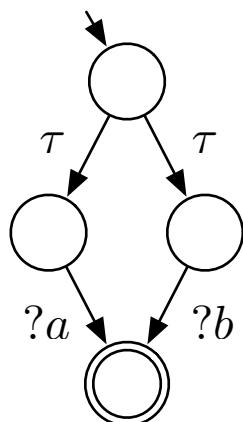
validation/product\_3



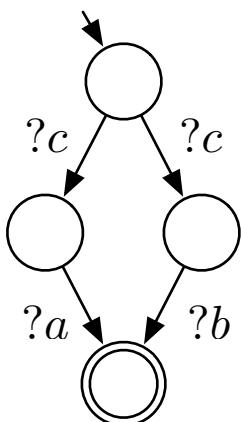
deadlock1



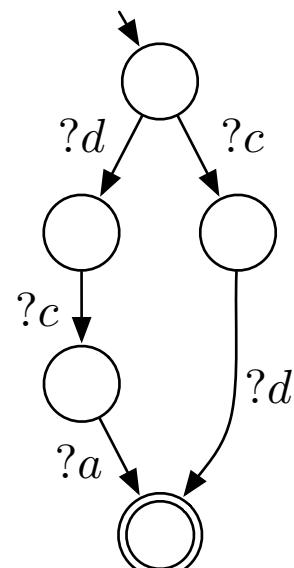
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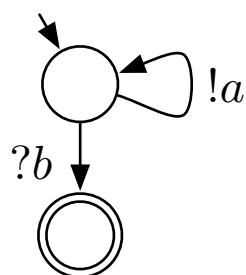
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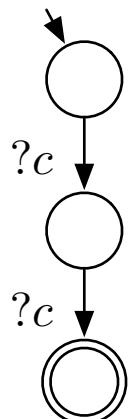
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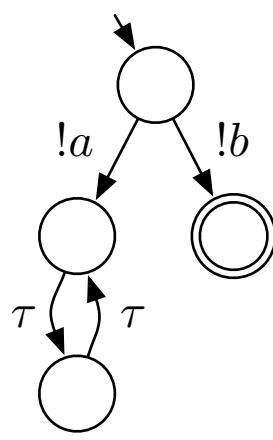
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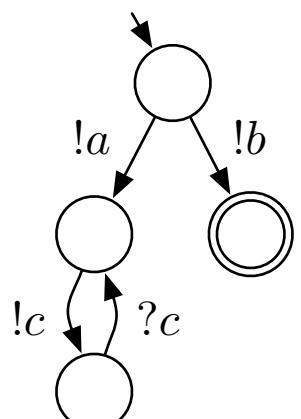
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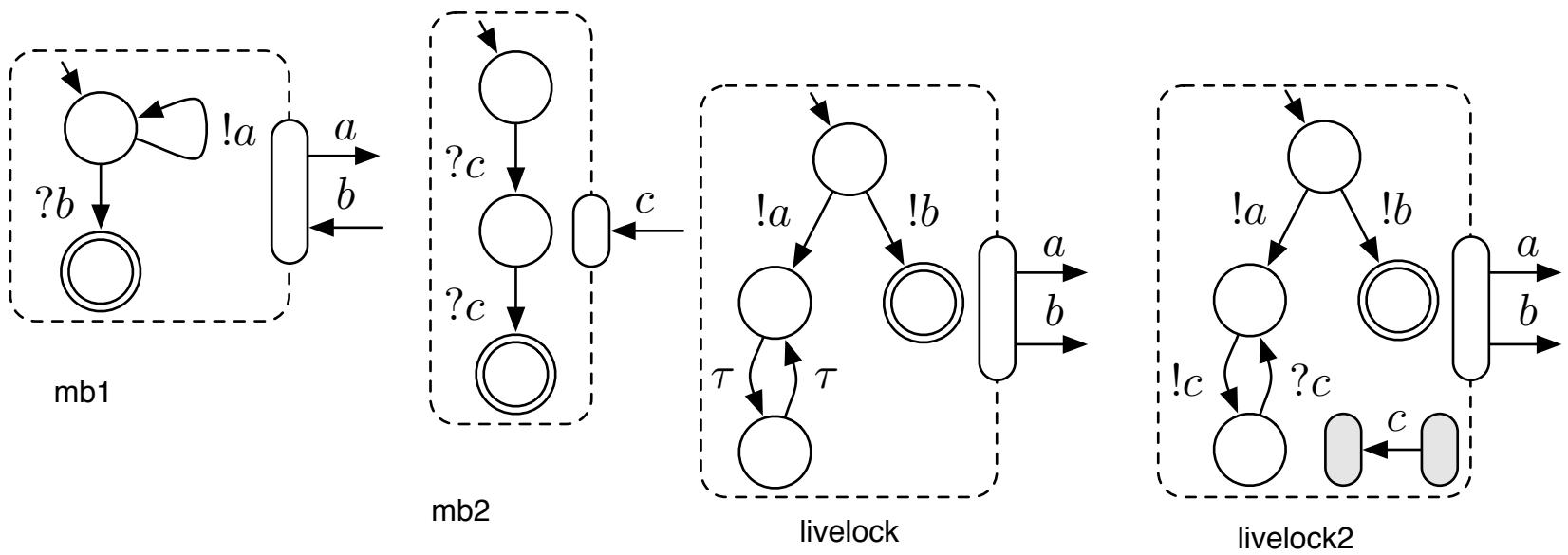
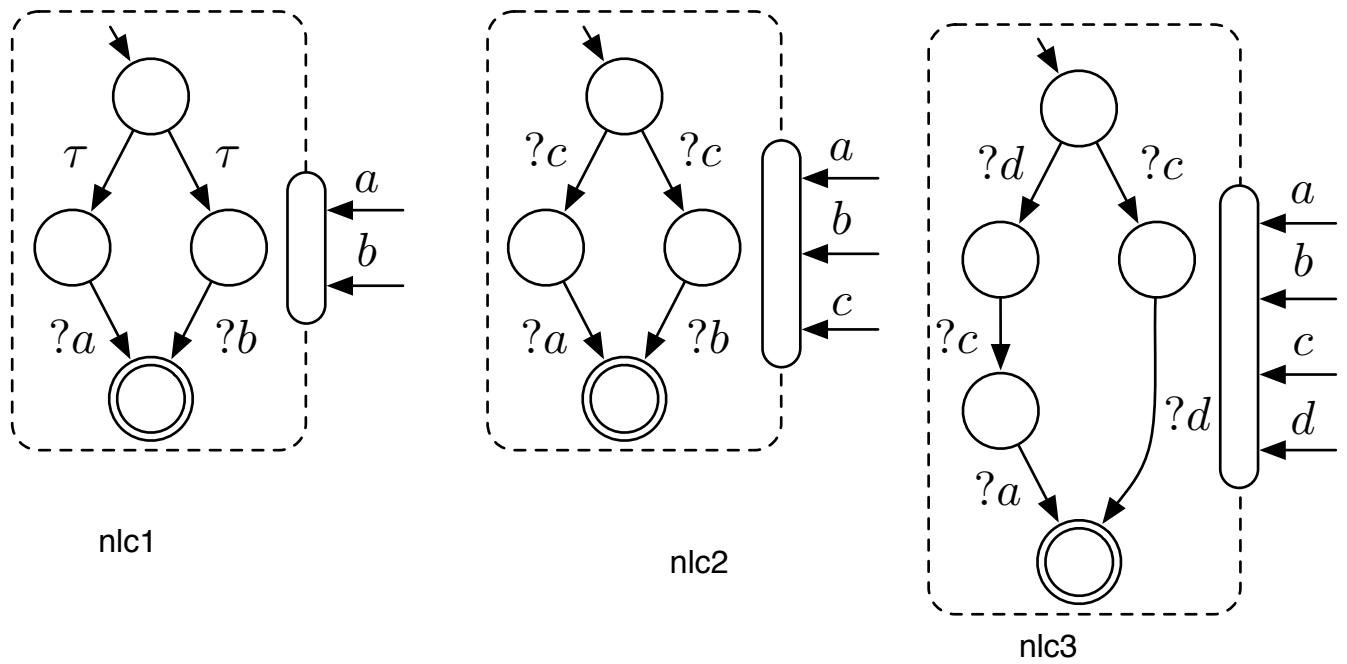
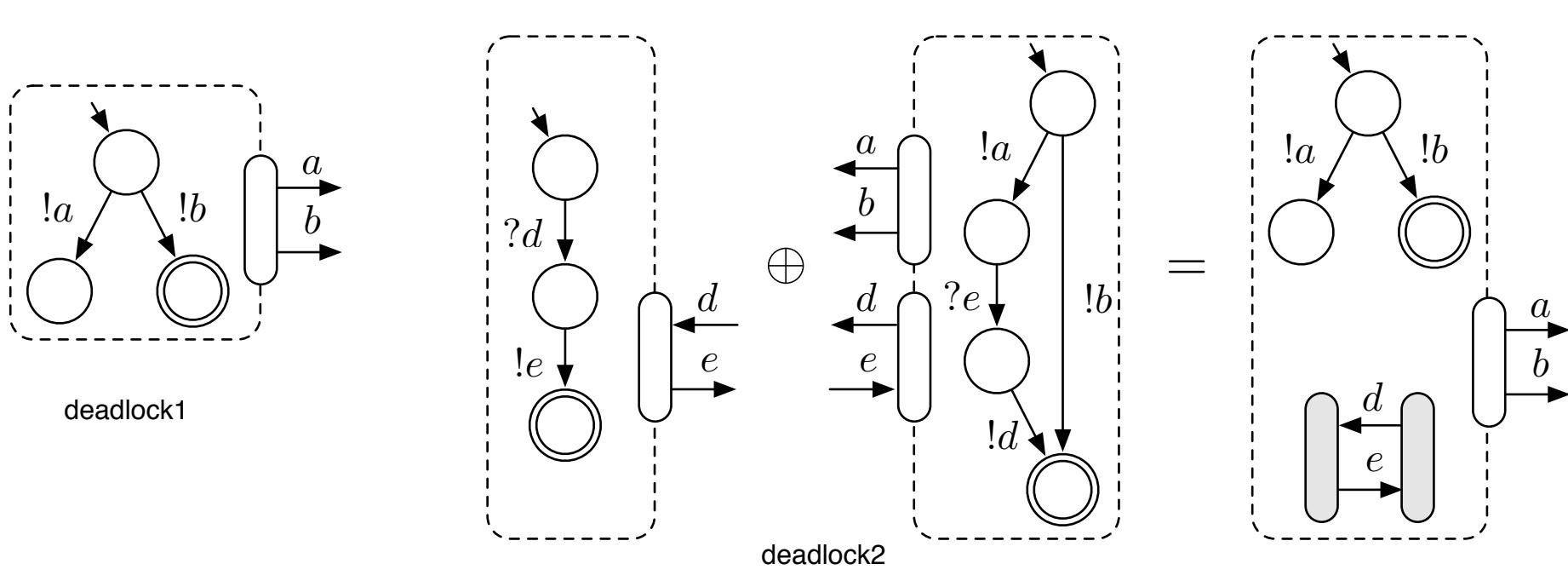
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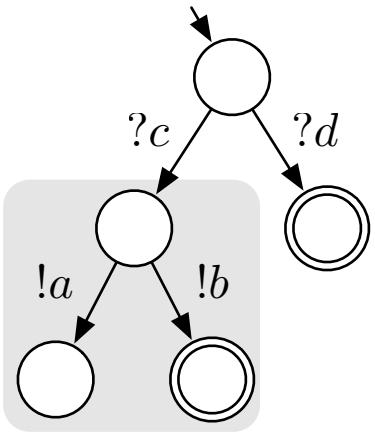


livelock

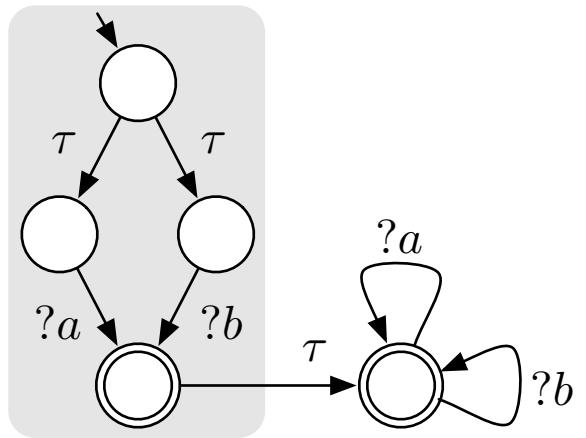


livelock2

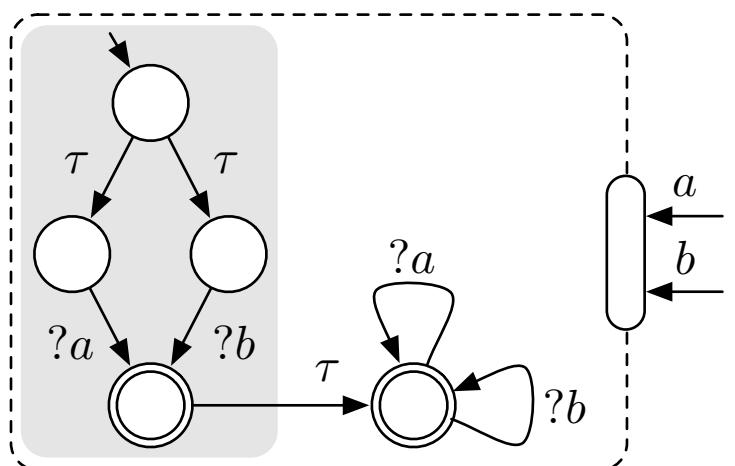
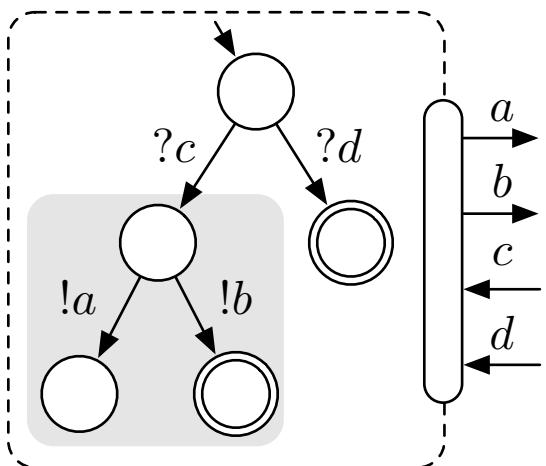


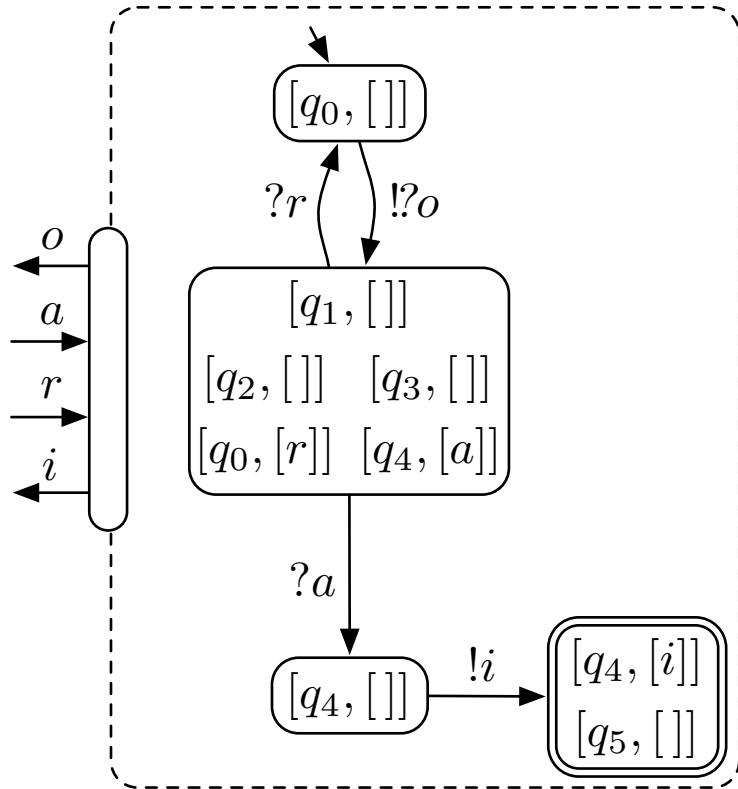


diagnosis/nonlocal1

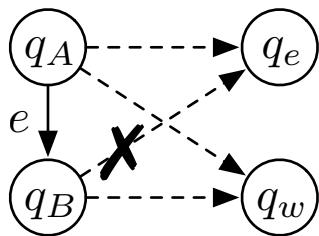
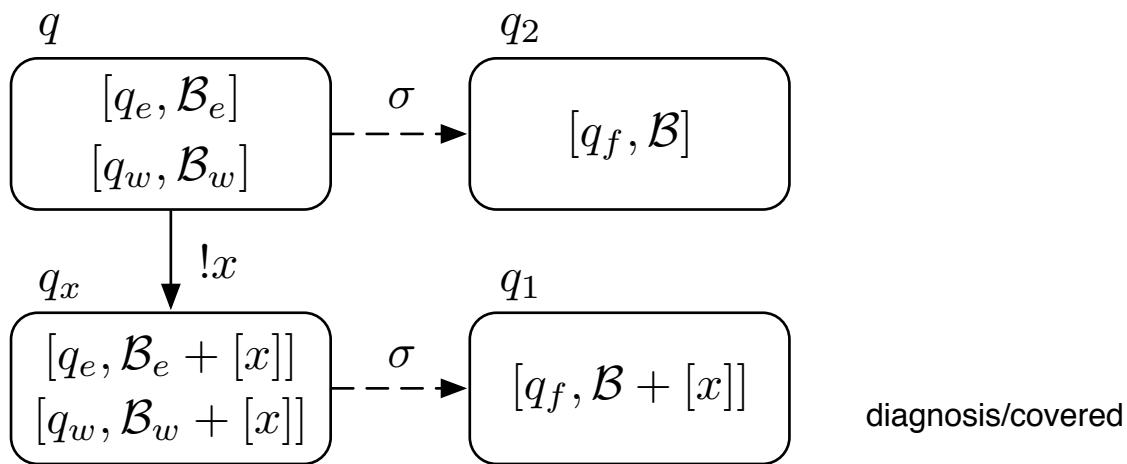


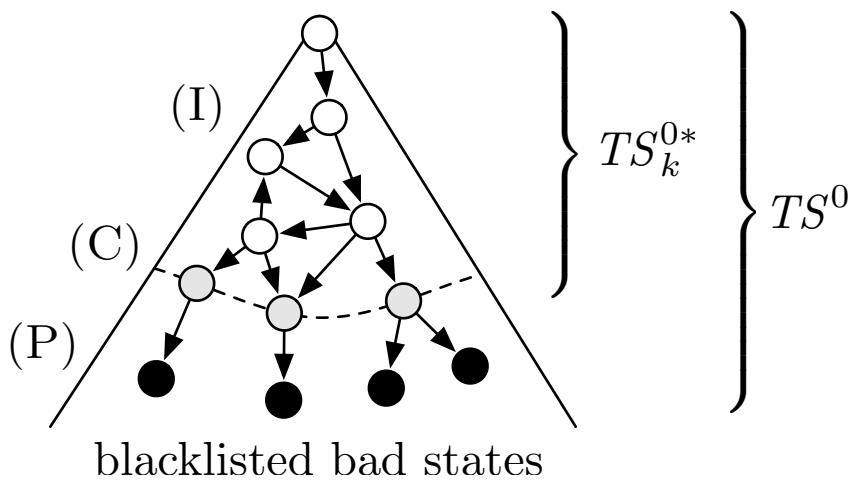
diagnosis/nonlocal2



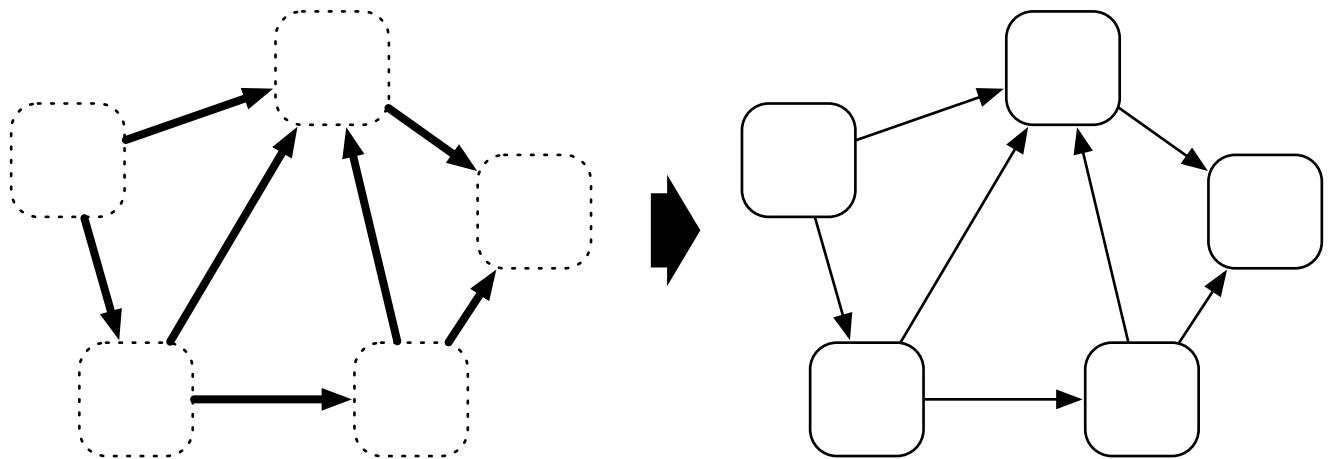
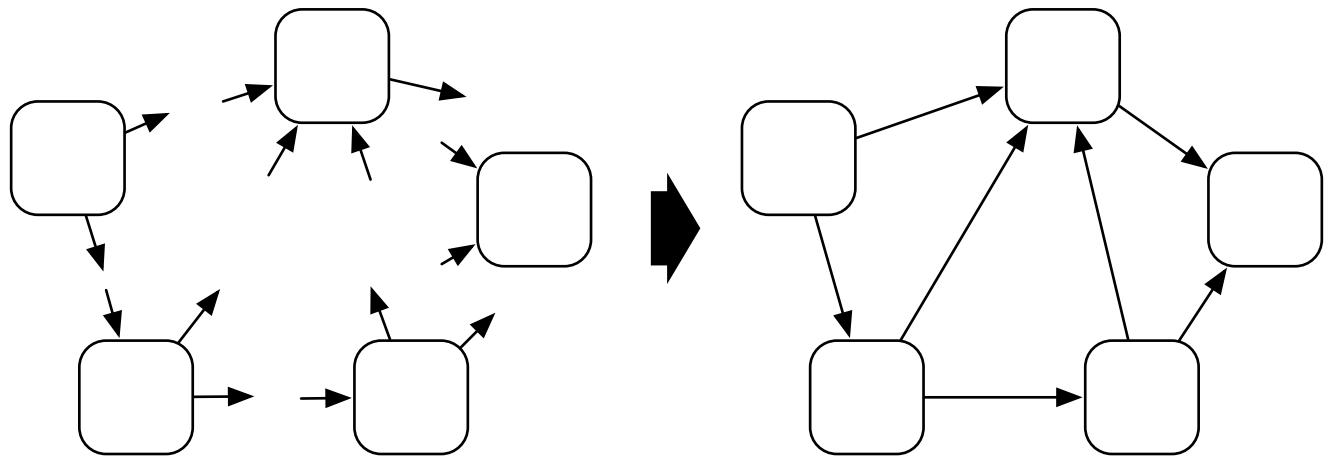
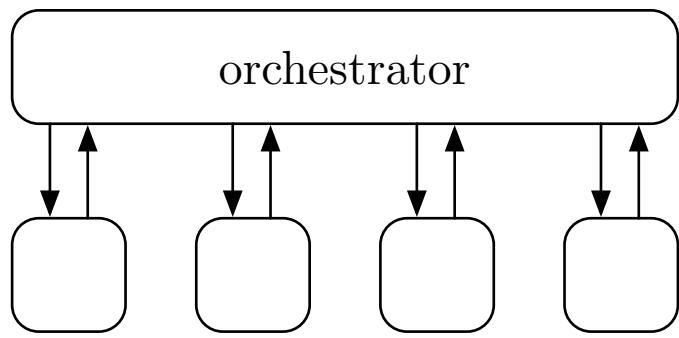


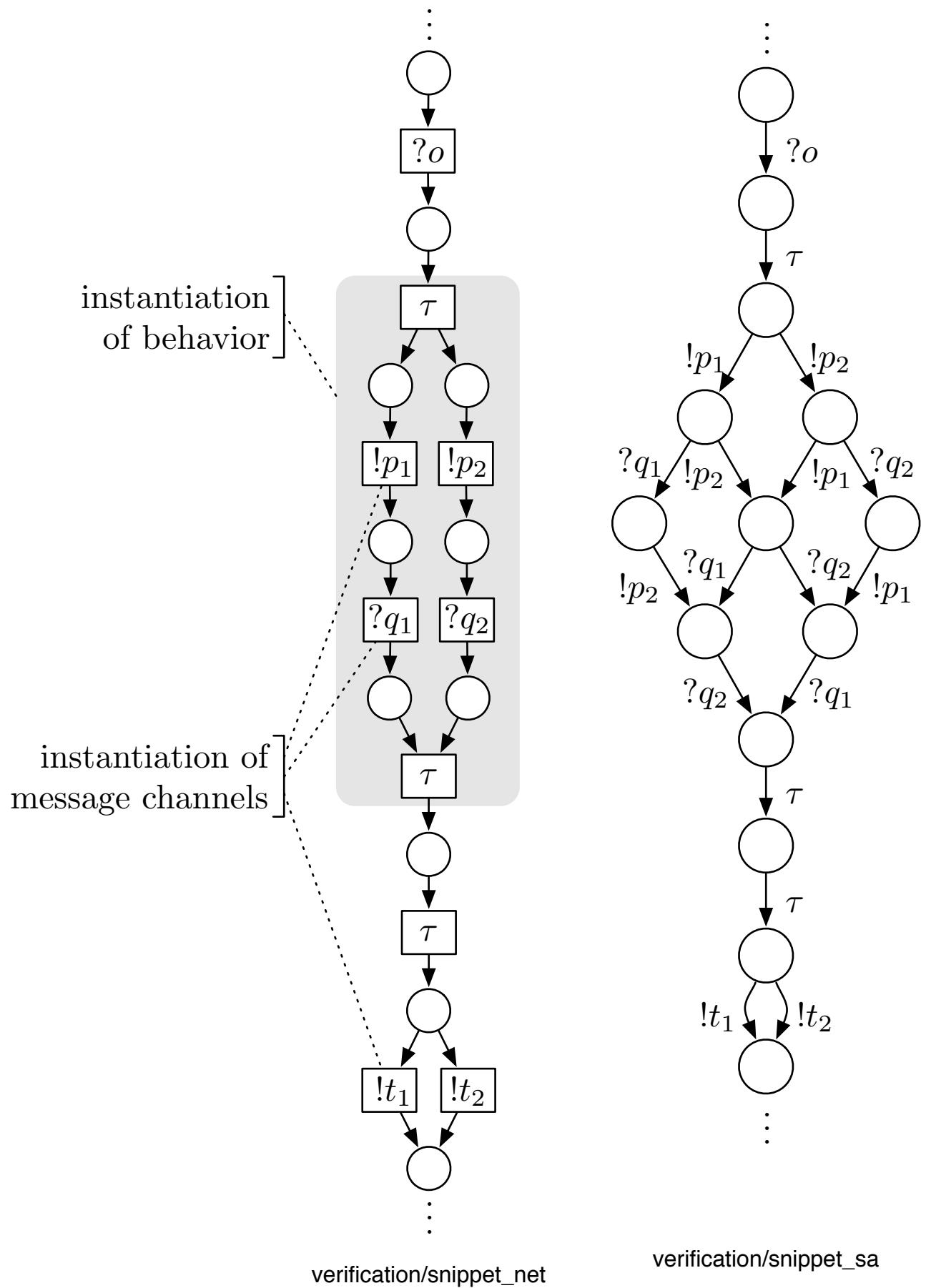
diagnosis/reduced

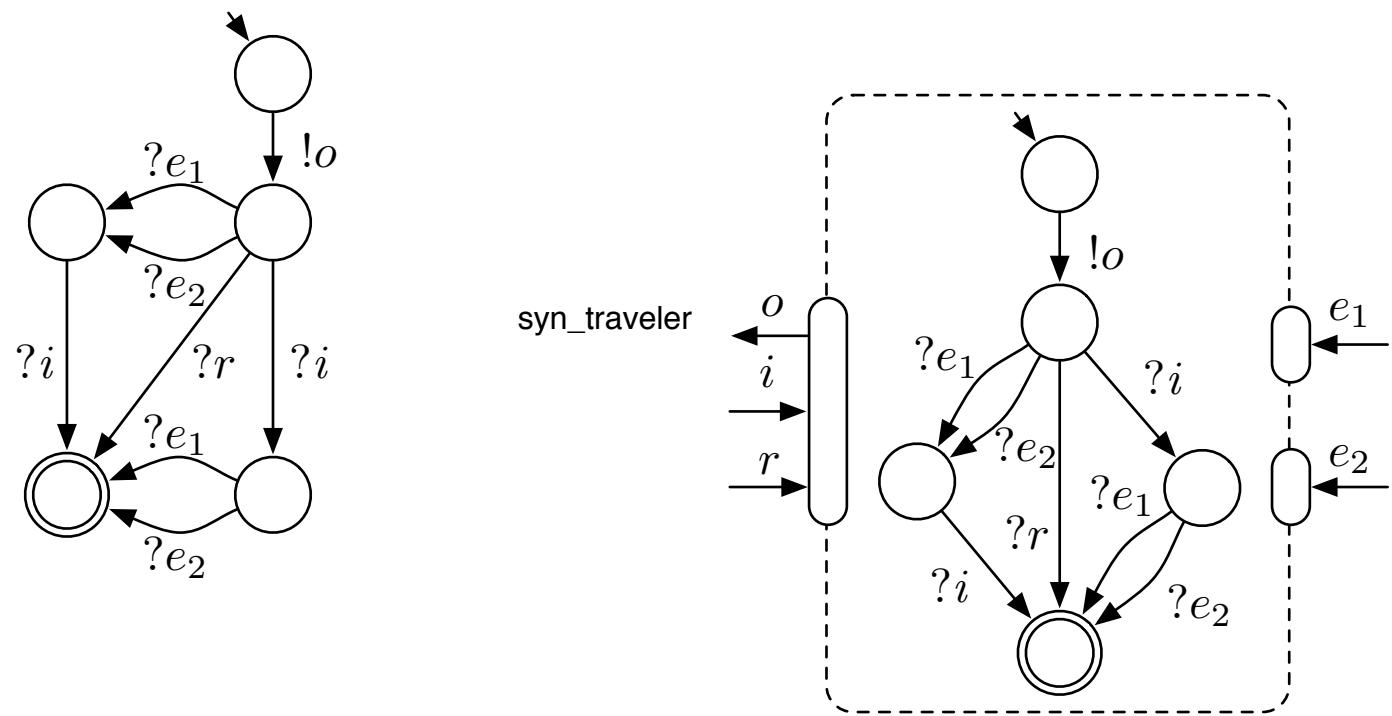
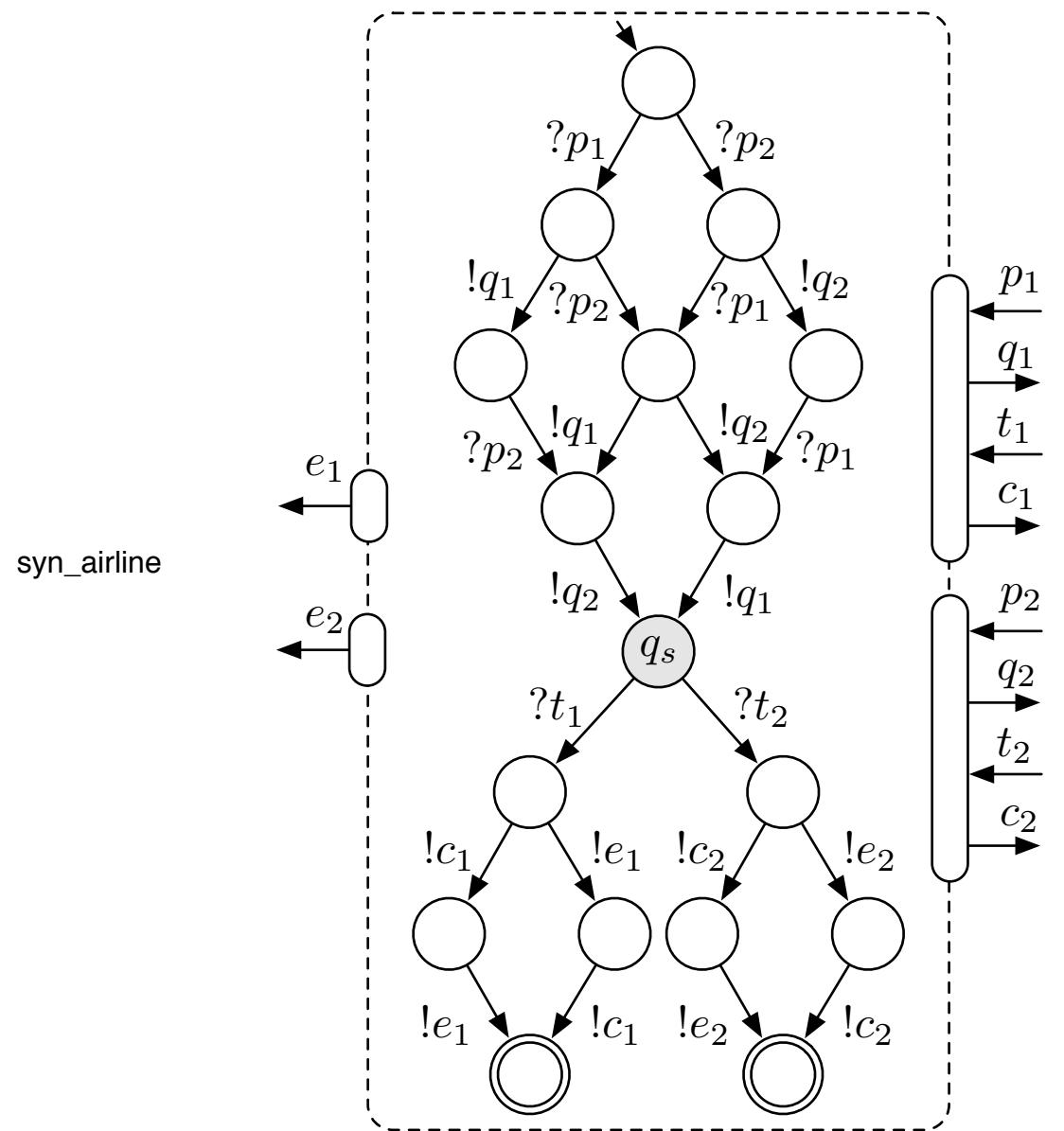




diagnosis/counterexample







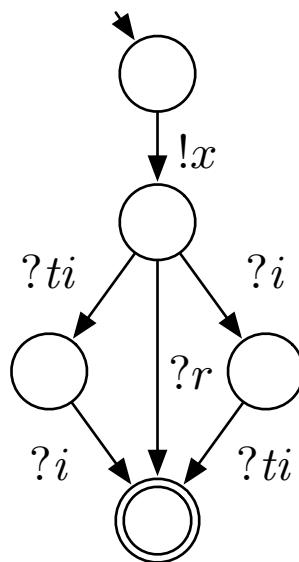
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      <receive wsu:id="ReceiveQuote" />
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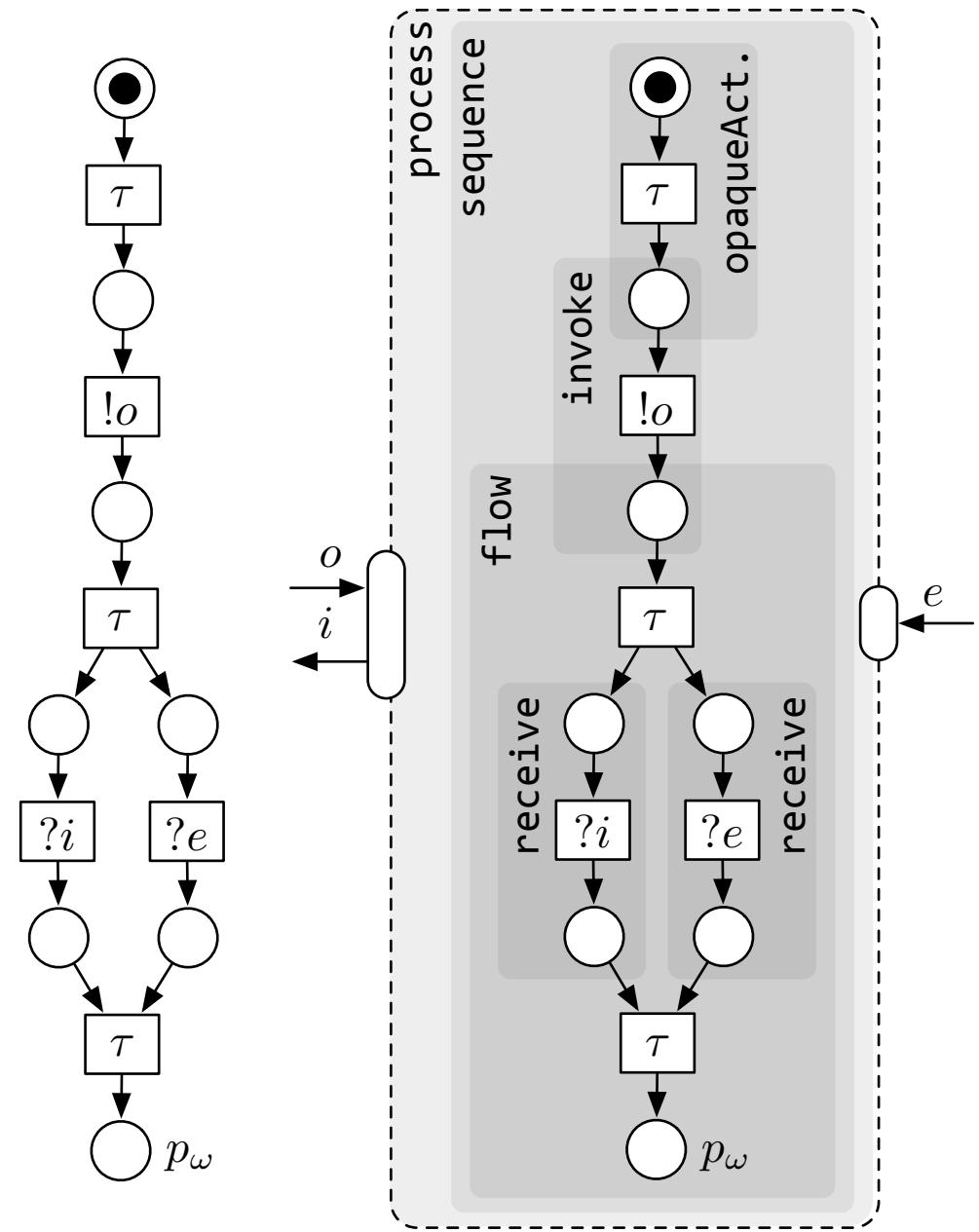
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...

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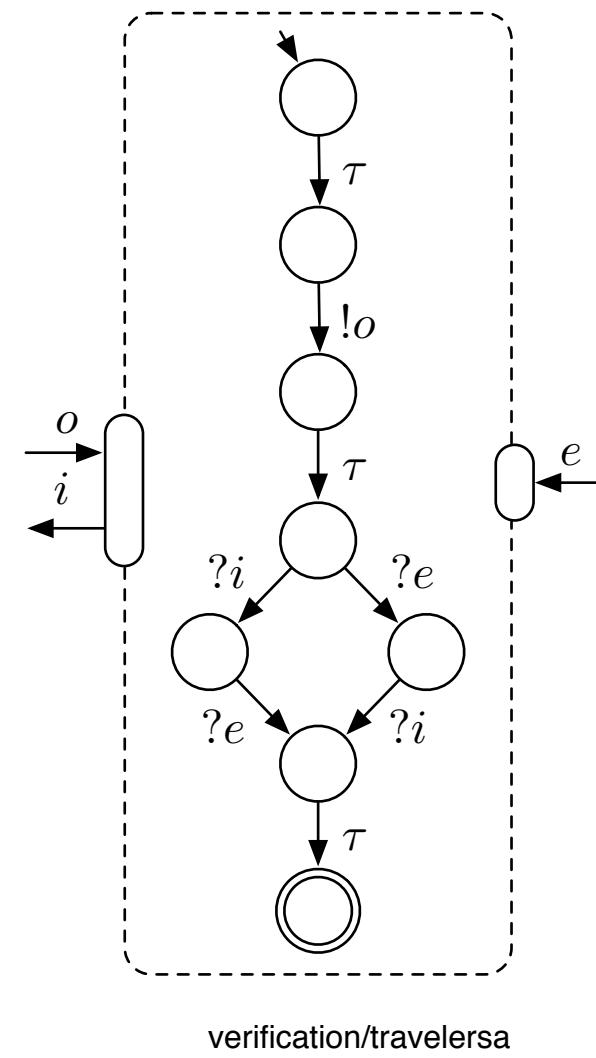
verification/code



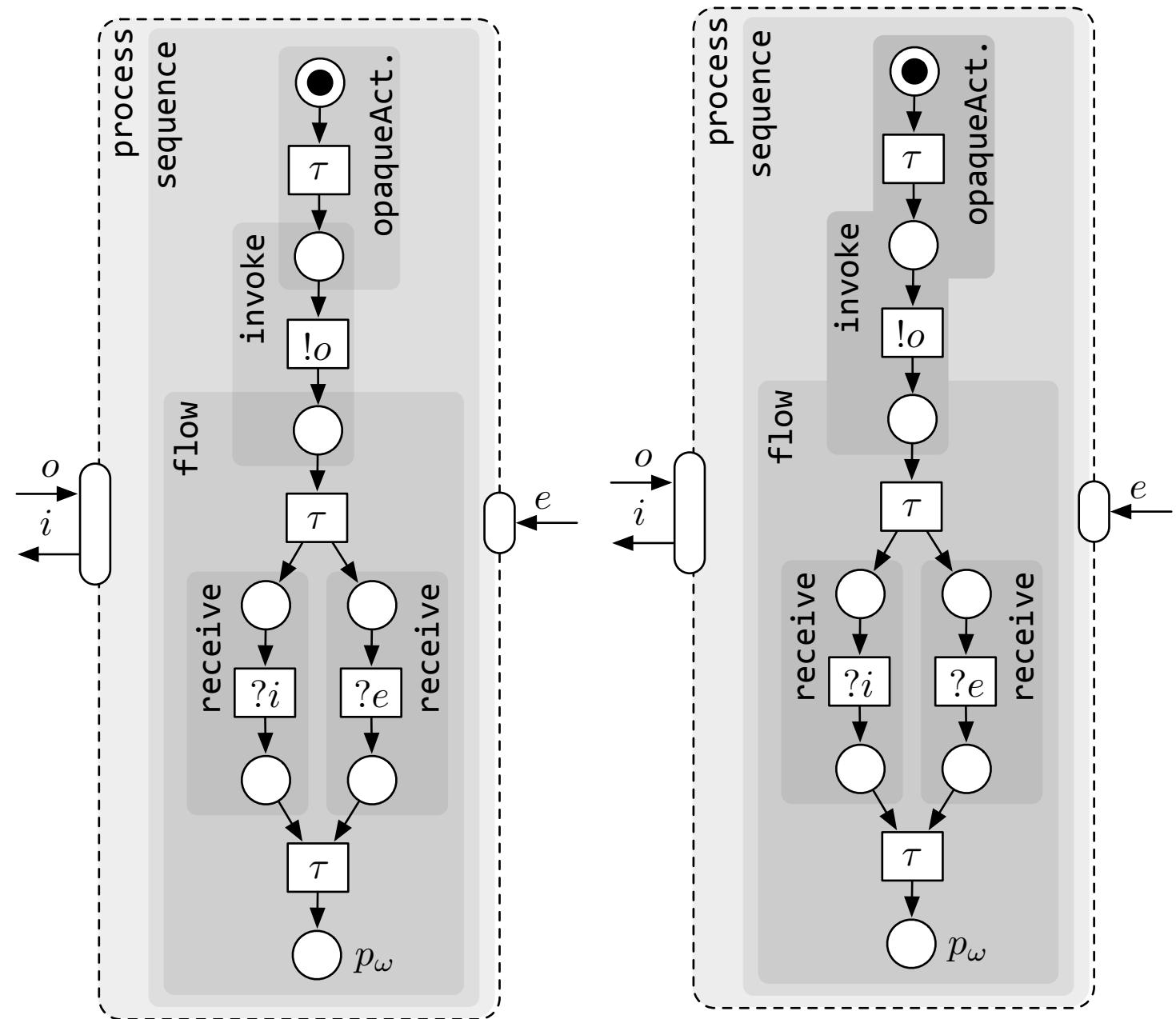
verification/syn\_traveler

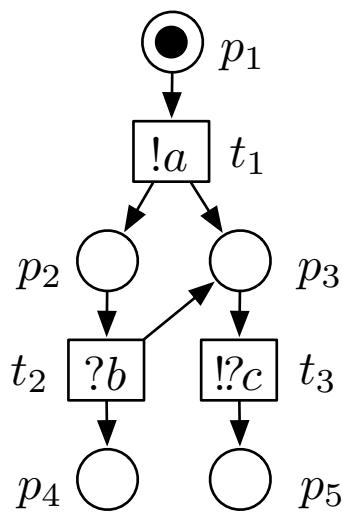


verification/travelerpn

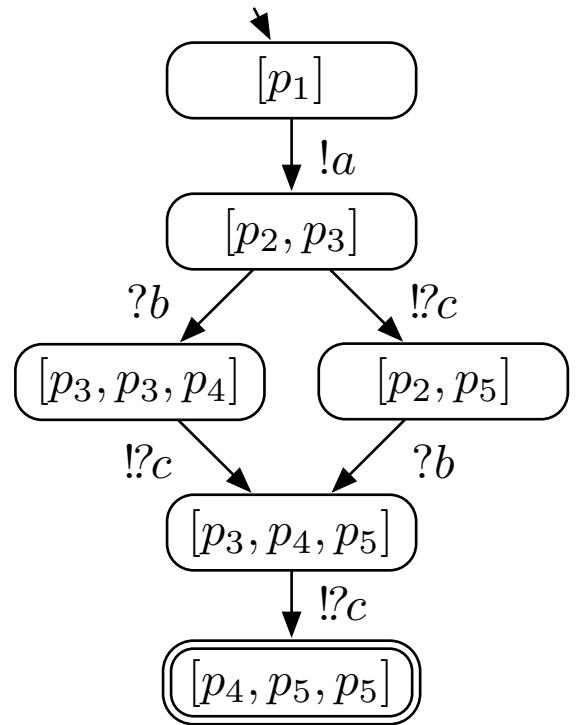


verification/travelersa

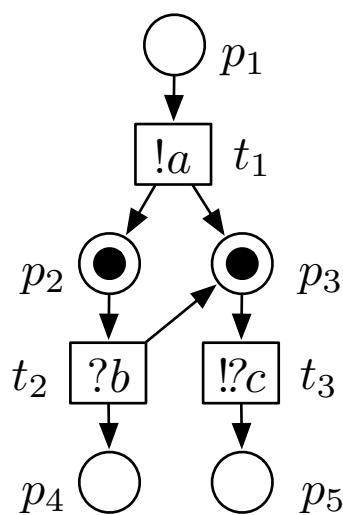




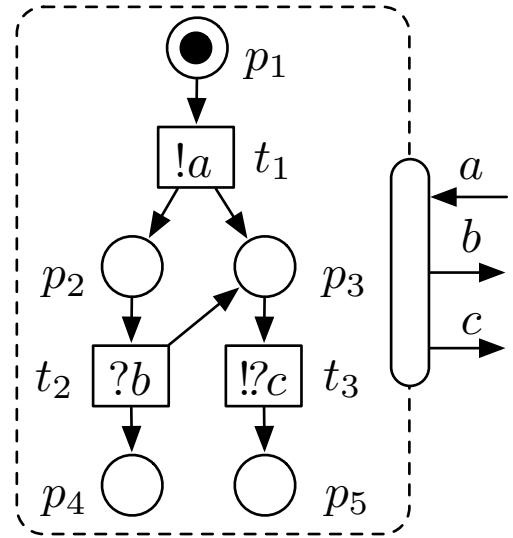
verification/n1



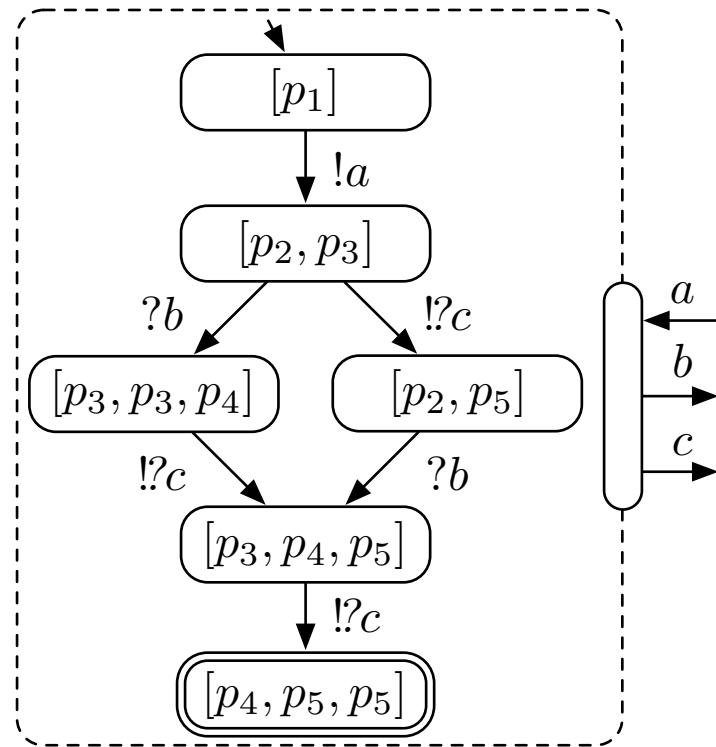
verification/san1



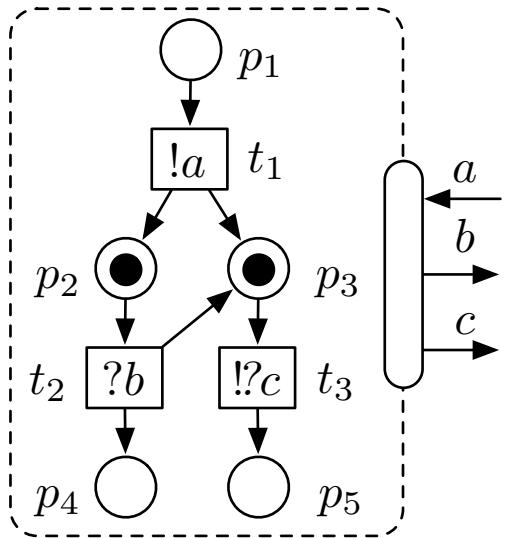
verification/n1-1



verification/n1



verification/san1



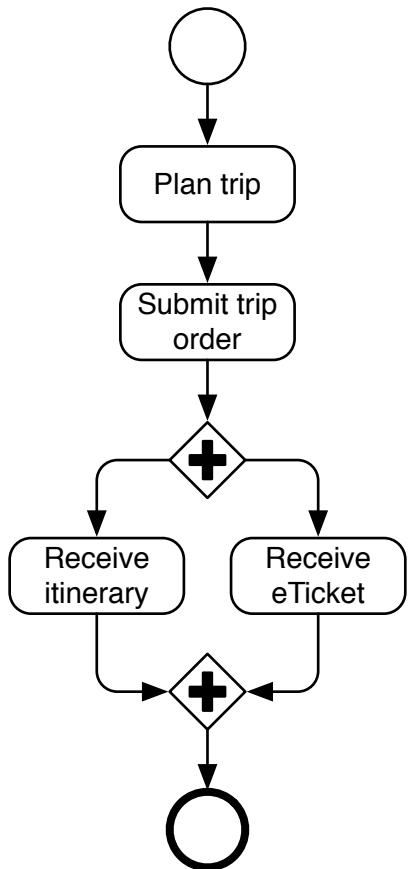
verification/n1-1

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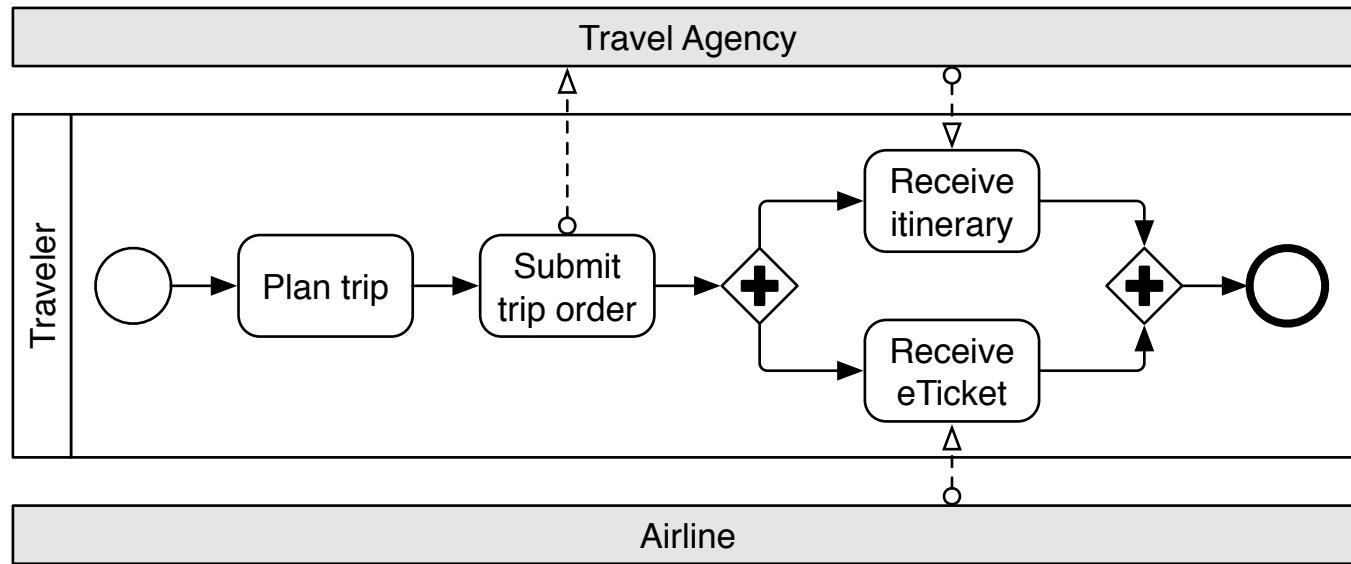
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    <invoke wsu:id="SubmitTripOrder" />
    <flow>
      <receive wsu:id="ReceiveItinerary" />
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  </sequence>
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verification/traveler\_bpel



verification/traveler\_bpmn





standard / multi instance activity → o-▷ control / message flow

||



start / end event



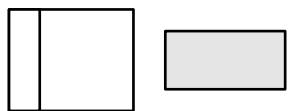
XOR / AND / event-based gateway



intermediate / end message receive event



timeout event



expanded/collapsed pool

→ o-▷ control/message flow



standard/multi instance activity



o-▷ message sending activity

||



start/end event



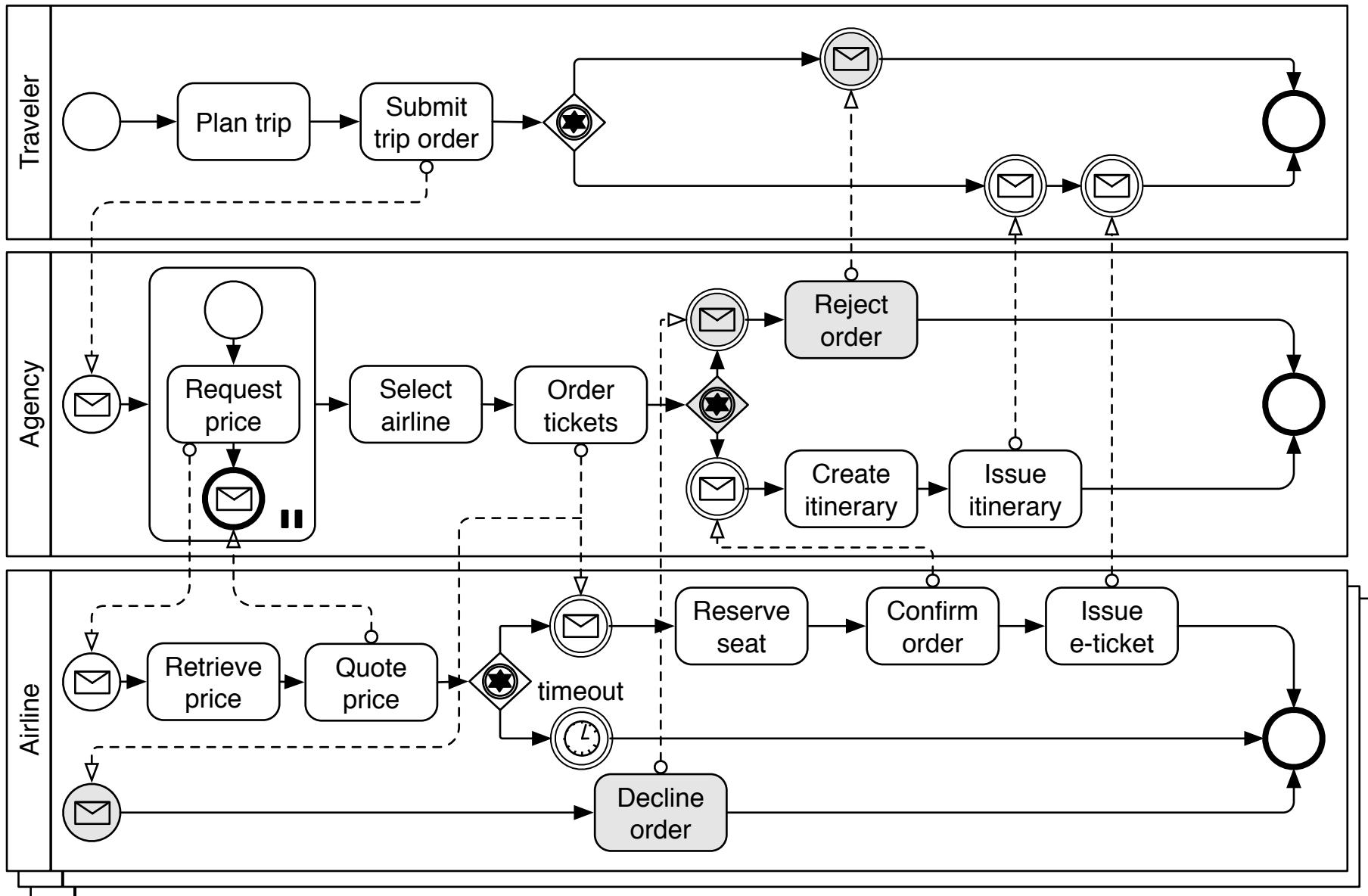
XOR/AND/event-based gateway



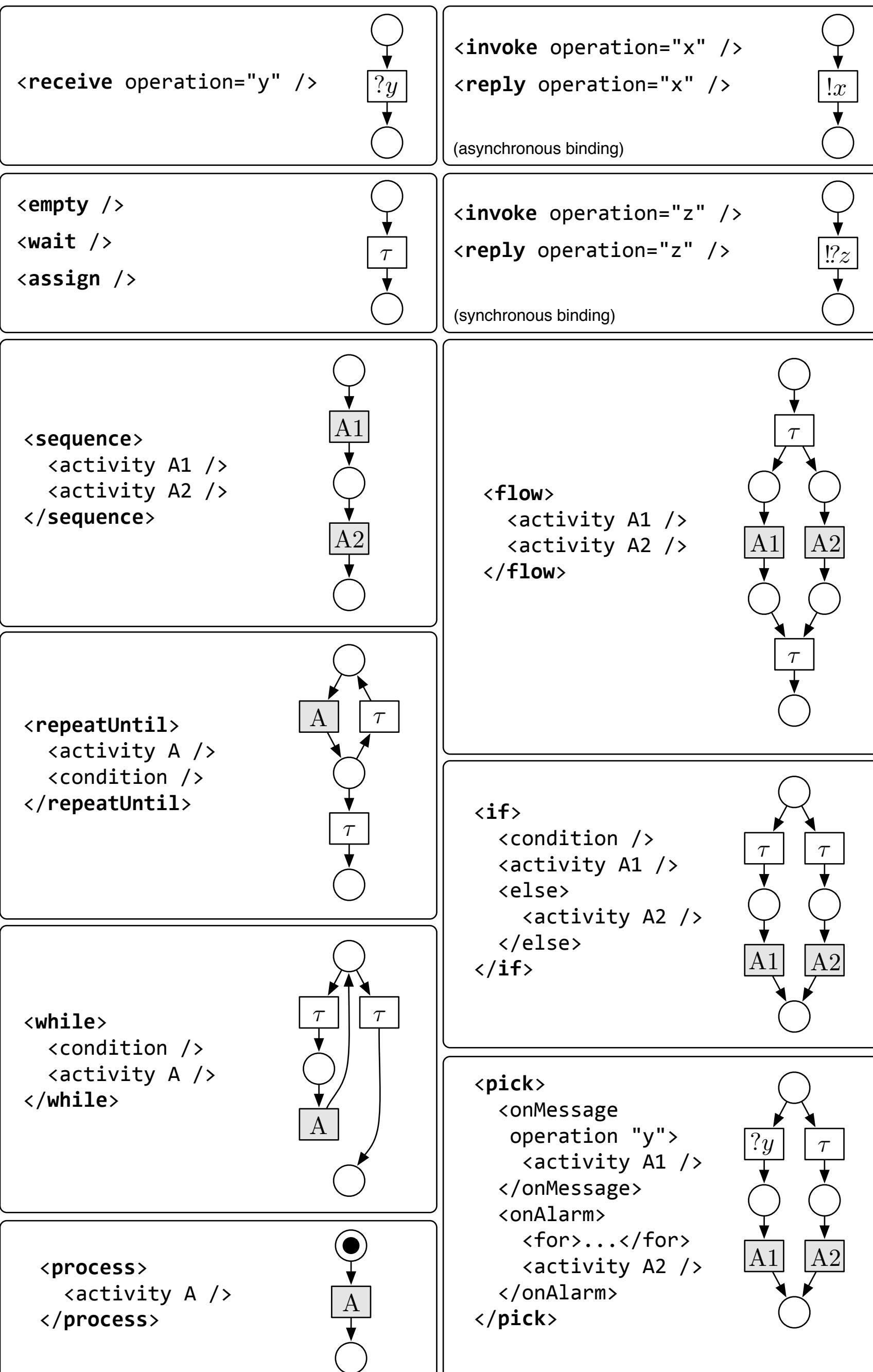
start/intermediate/end message receive event

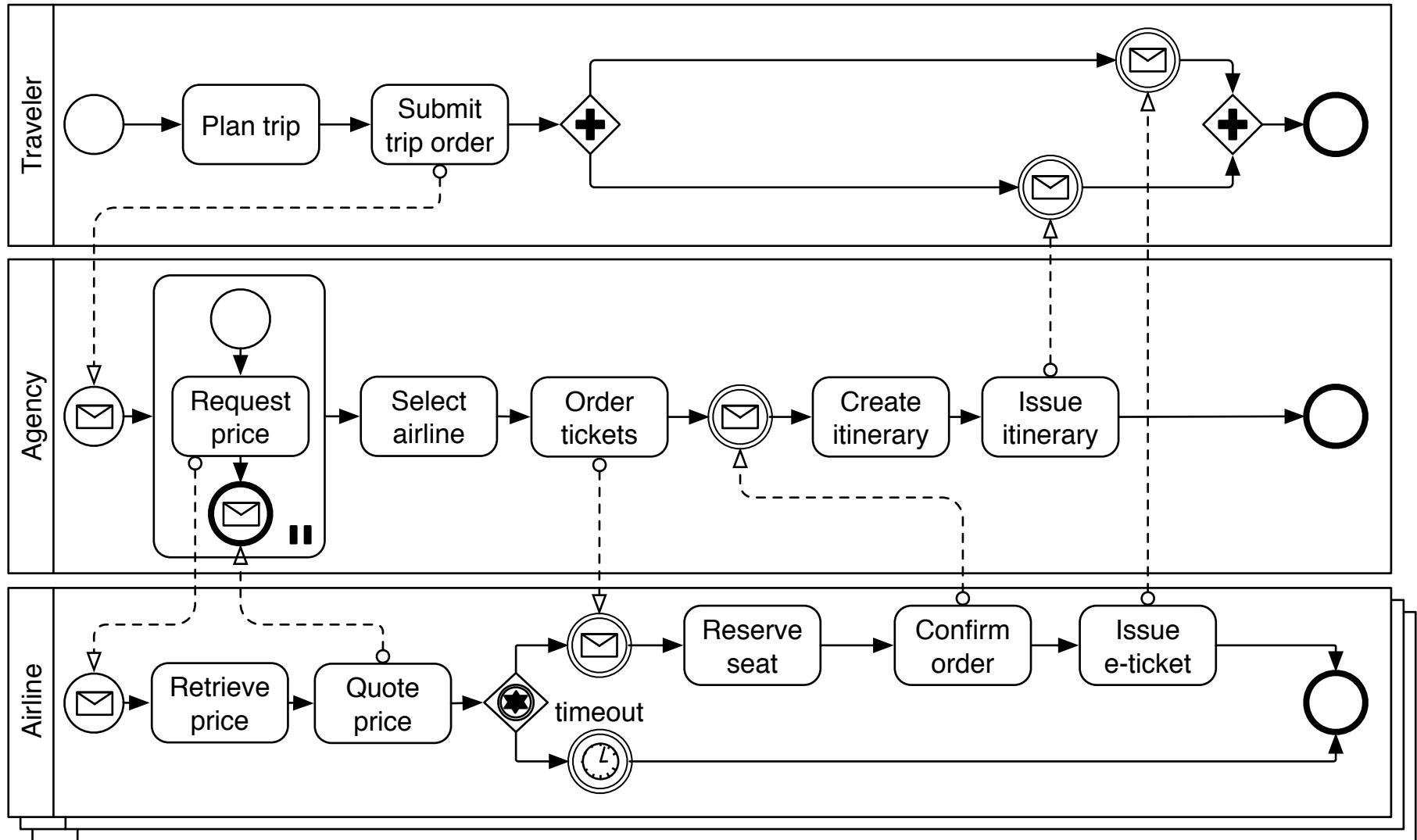


timeout event

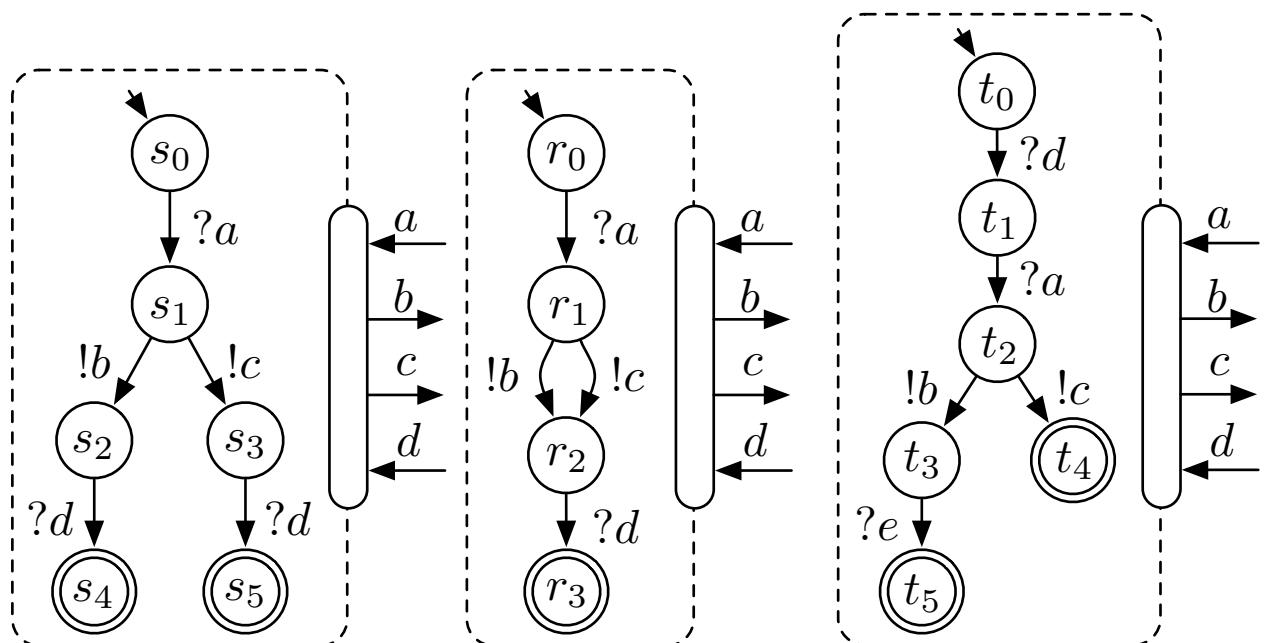


verification/choreo-fix





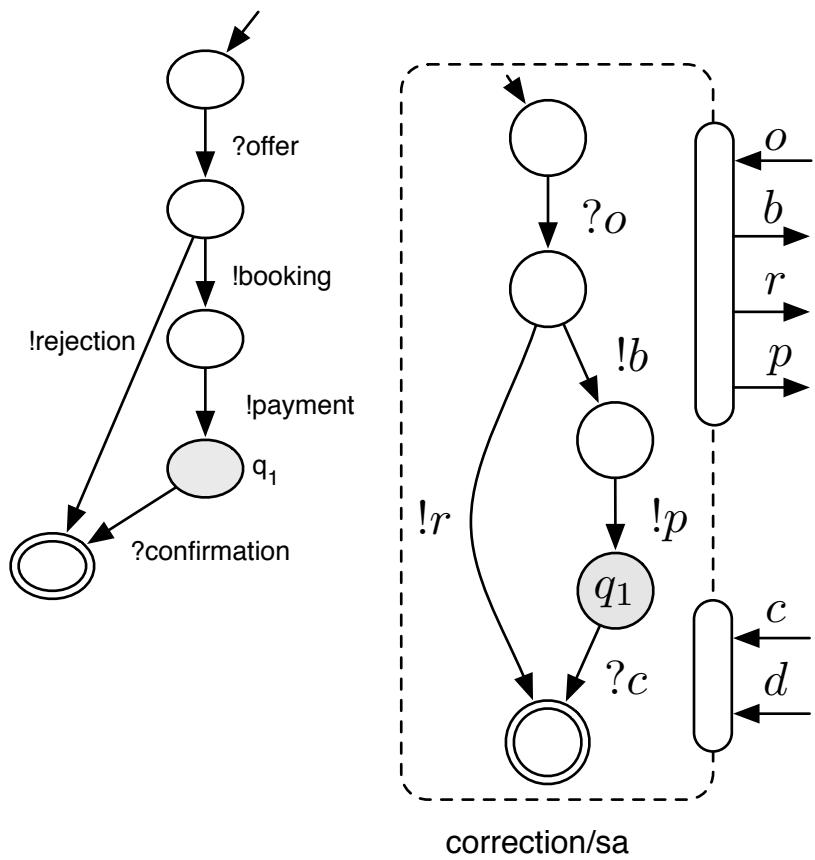
verfication/choreo



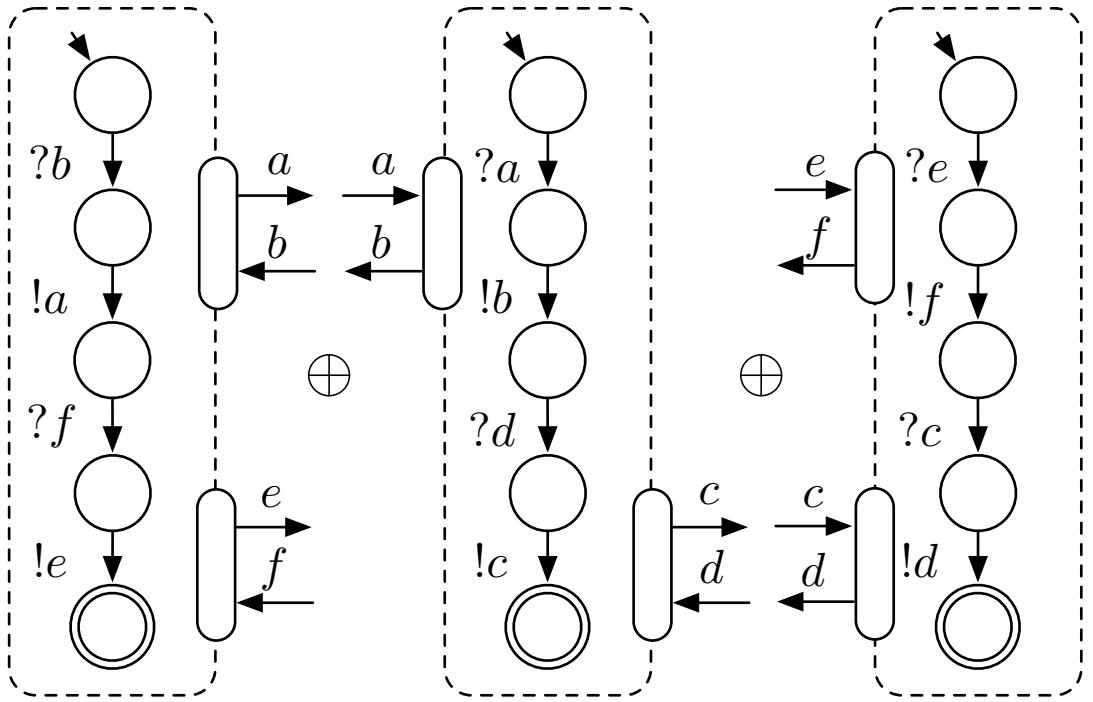
correction/a1

correction/a2

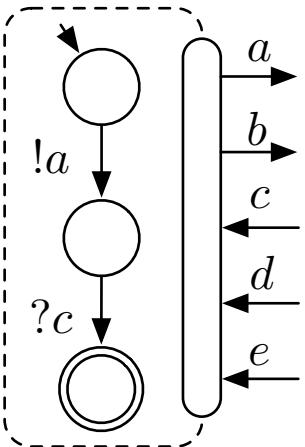
correction/a3



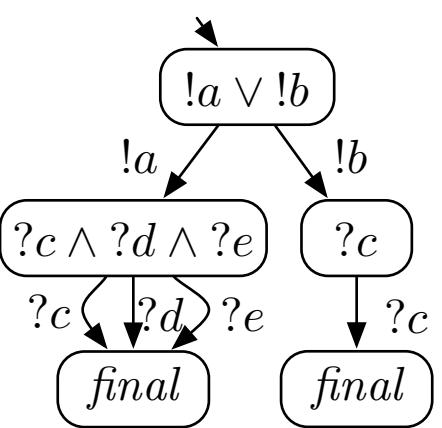
correction/sa



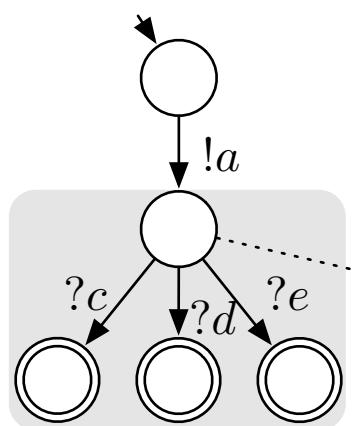
correction/counter



correction/sim1



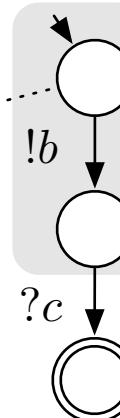
correction/sim2



correction/sim3

change label !a to !b ]

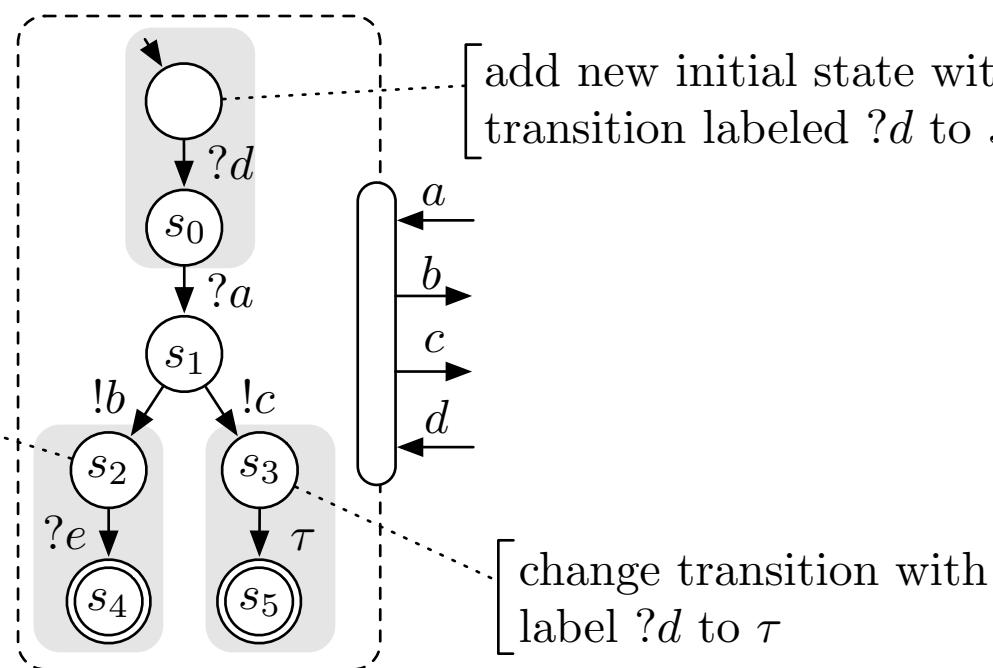
[ insert transition with label ?d to new state  
insert transition with label ?e to new state



correction/sim4

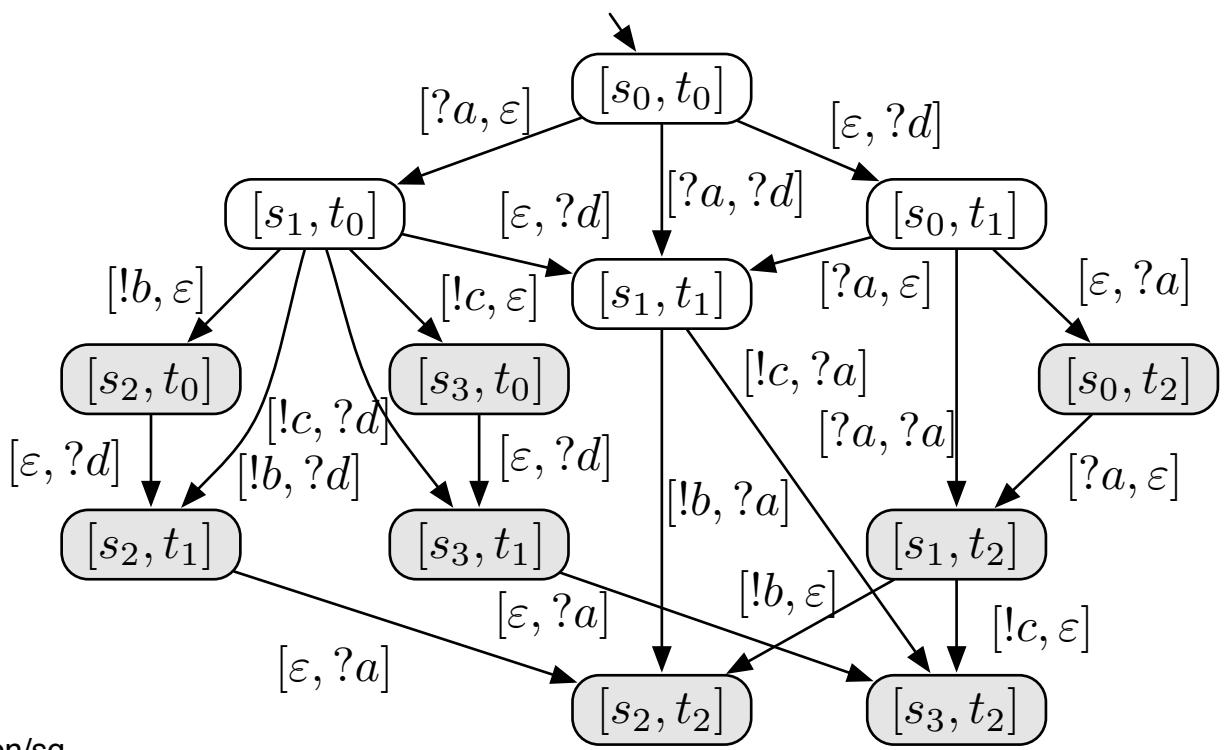
change transition with  
label ?d to ?e ]

[ add new initial state with  
transition labeled ?d to  $s_0$

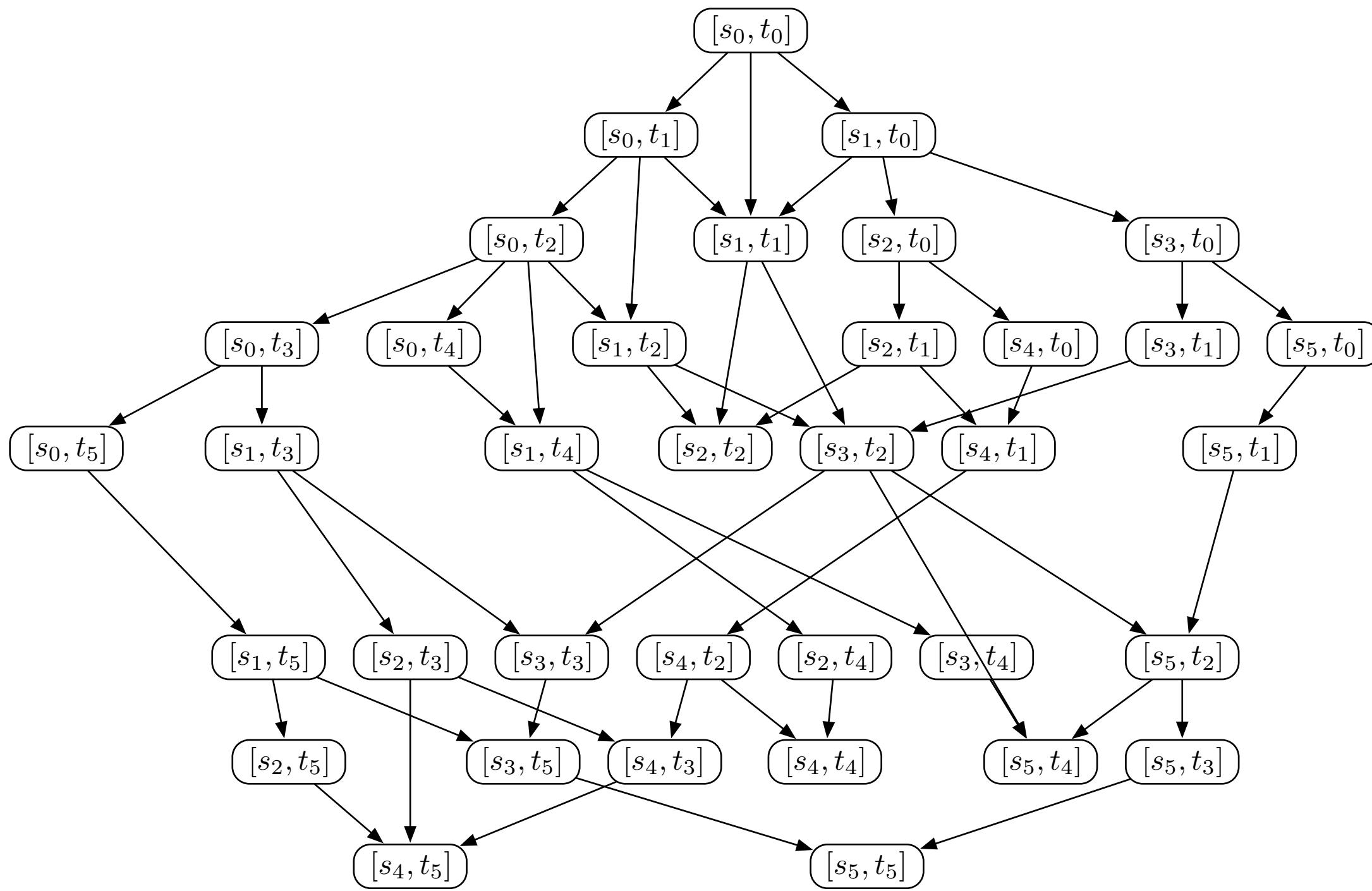


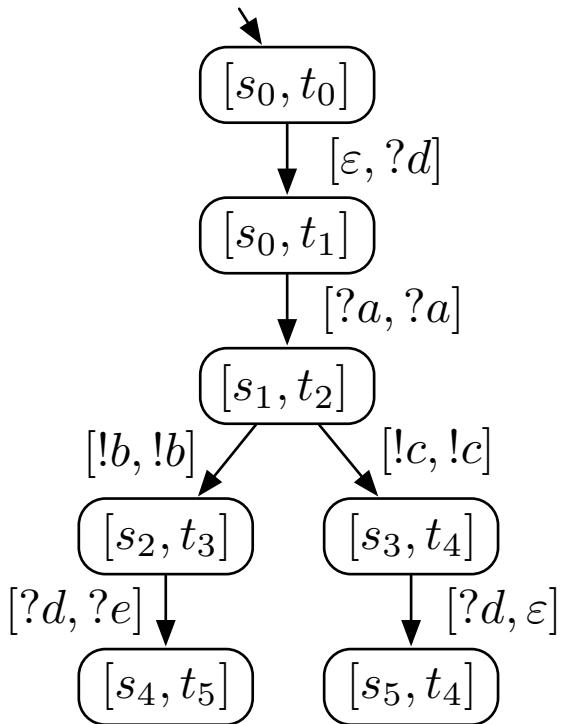
[ change transition with  
label ?d to  $\tau$

correction/fix

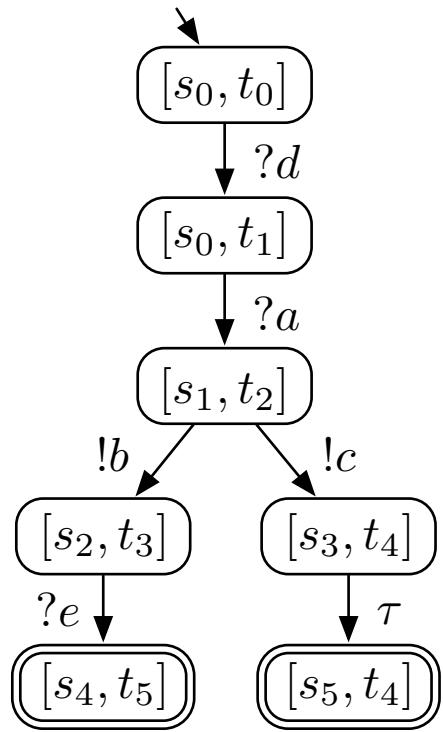


correction/sg

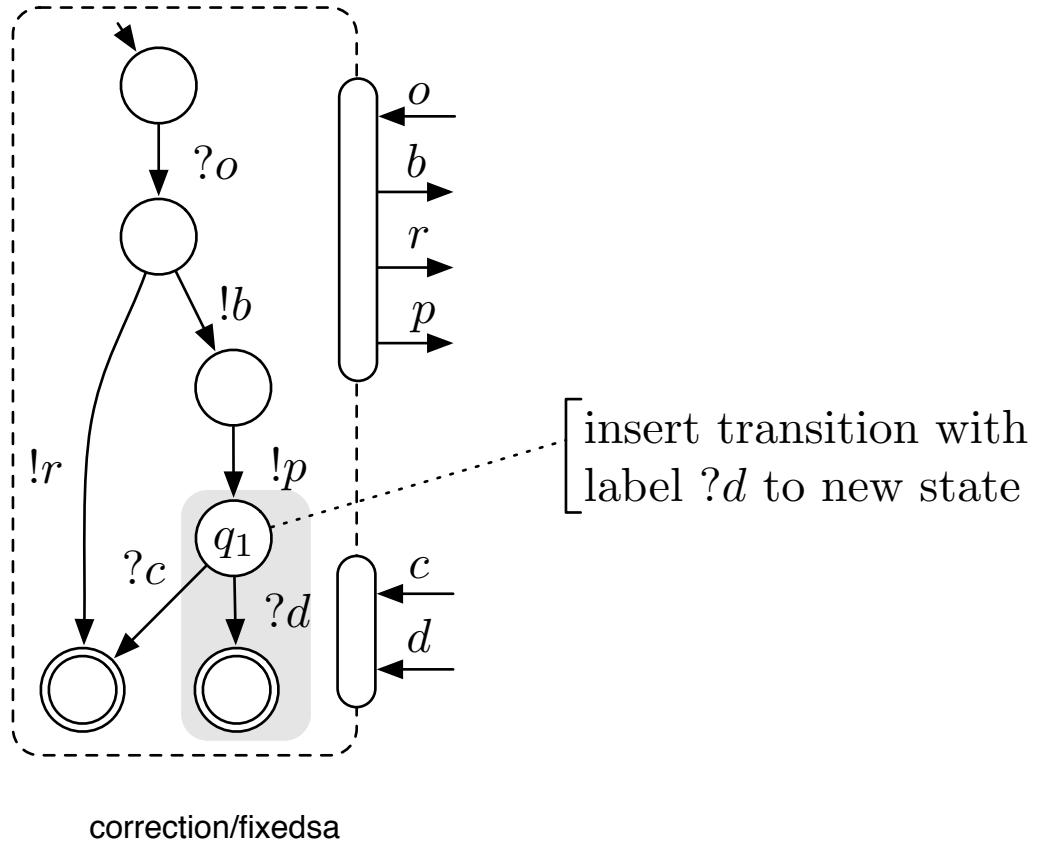


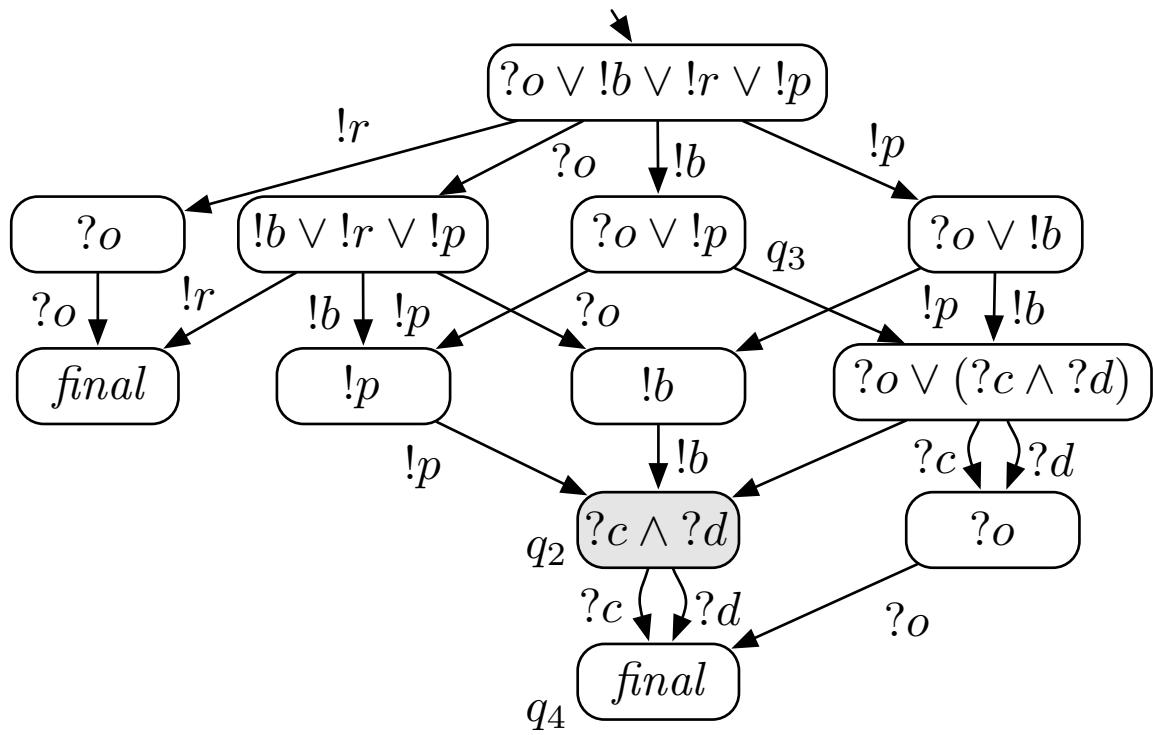


correction/sync

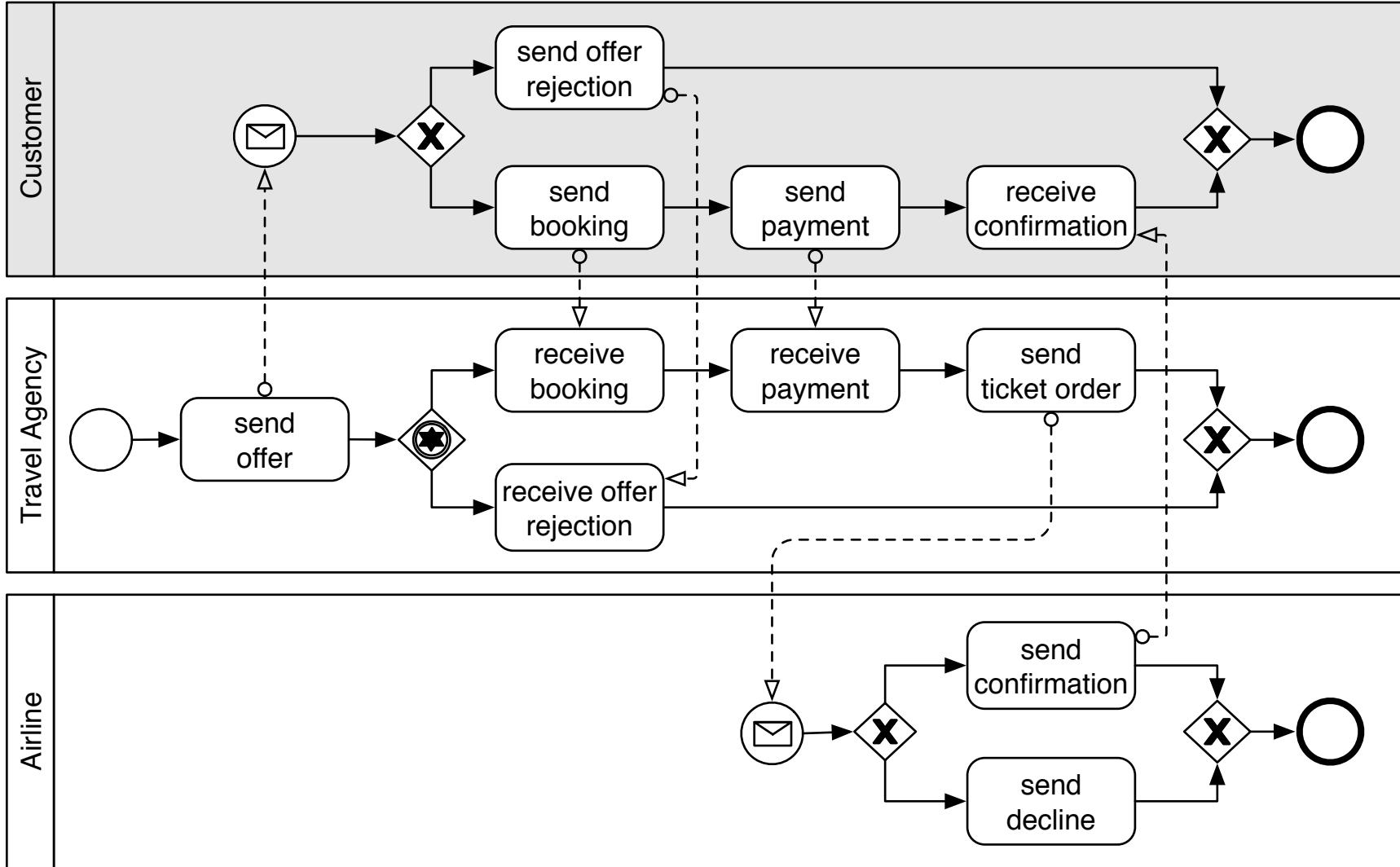


correction/rsync

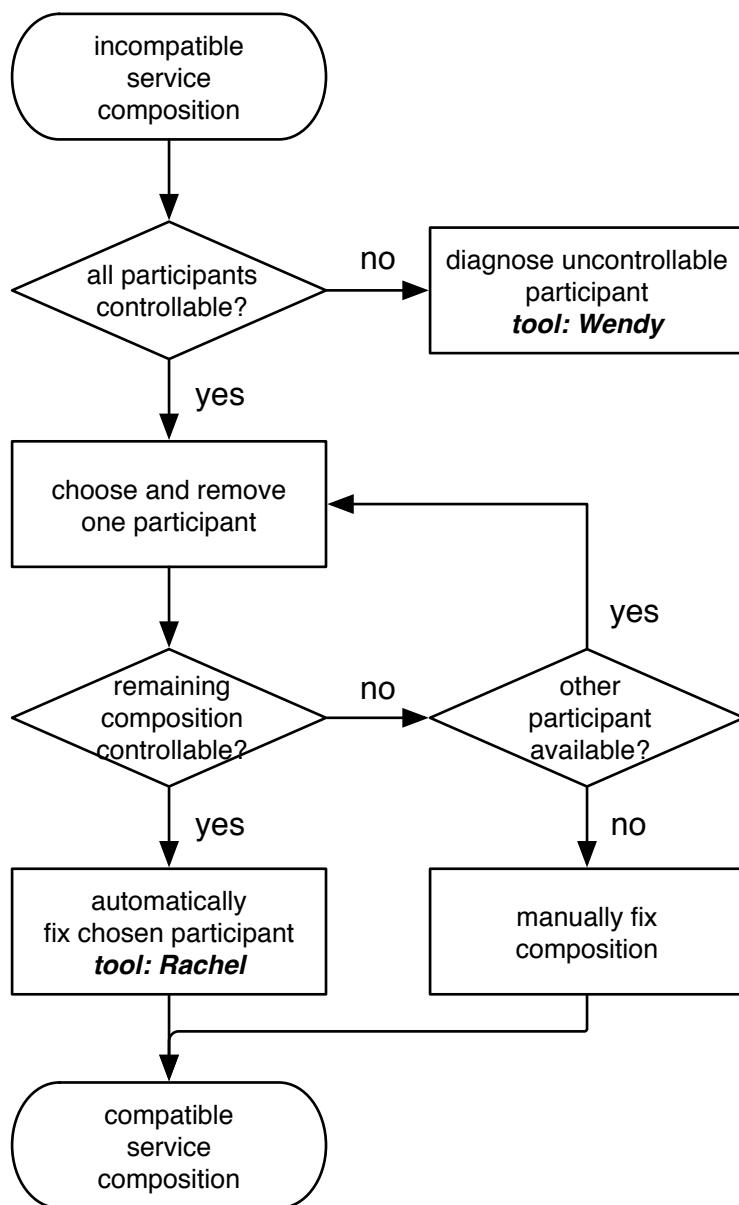
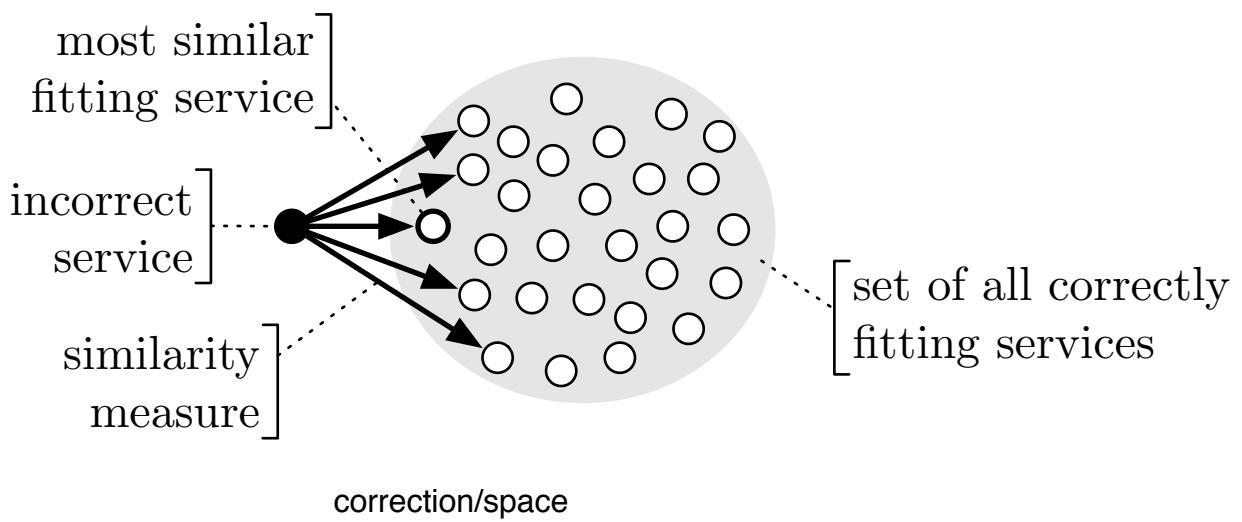


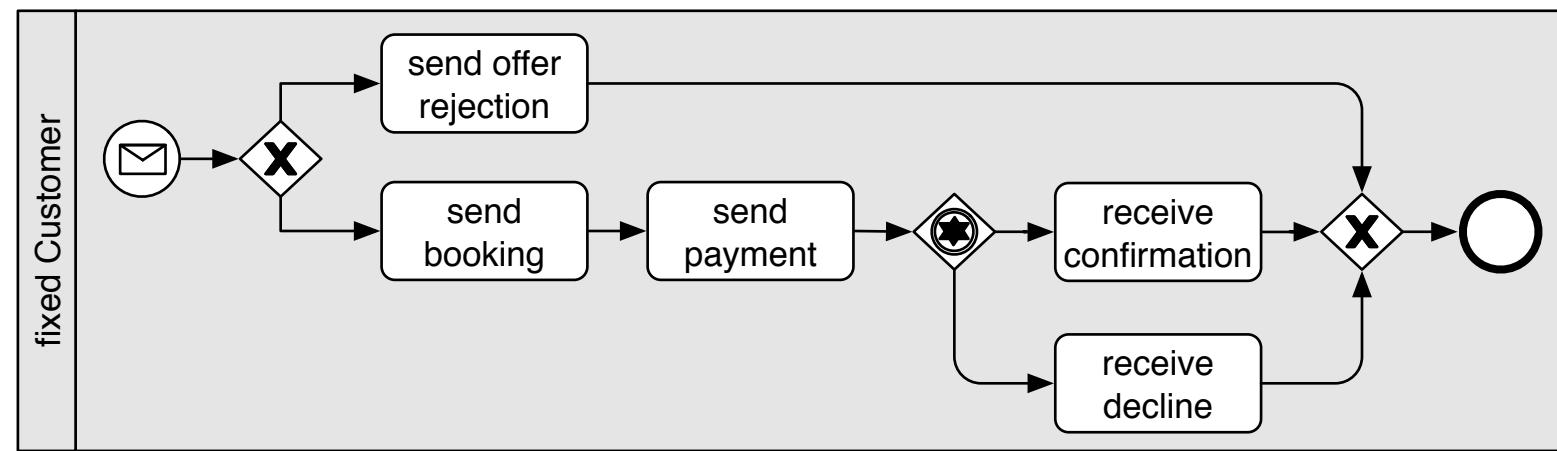


correction/og

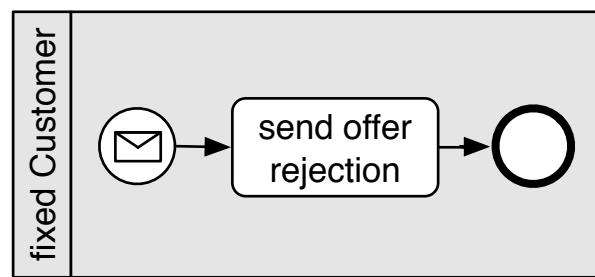


correction/chor

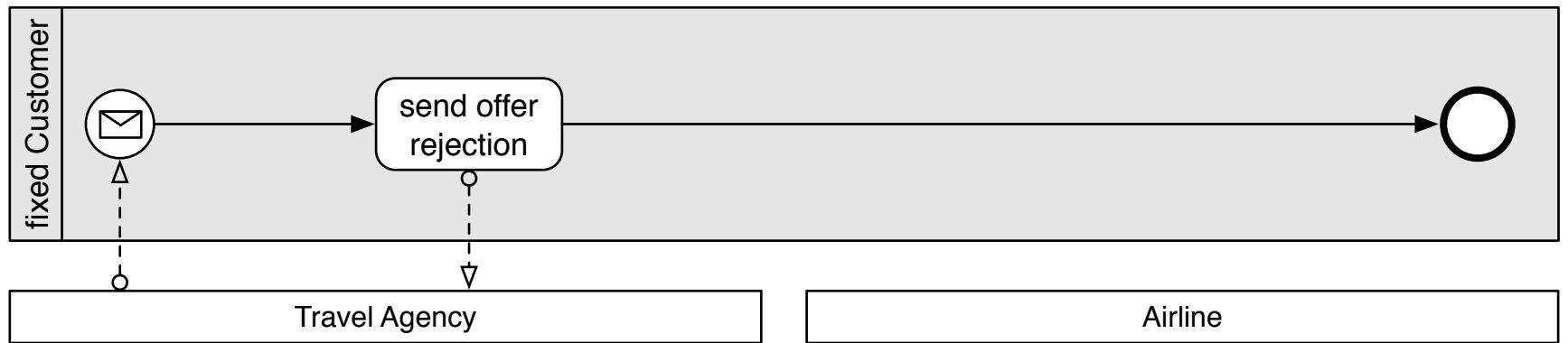
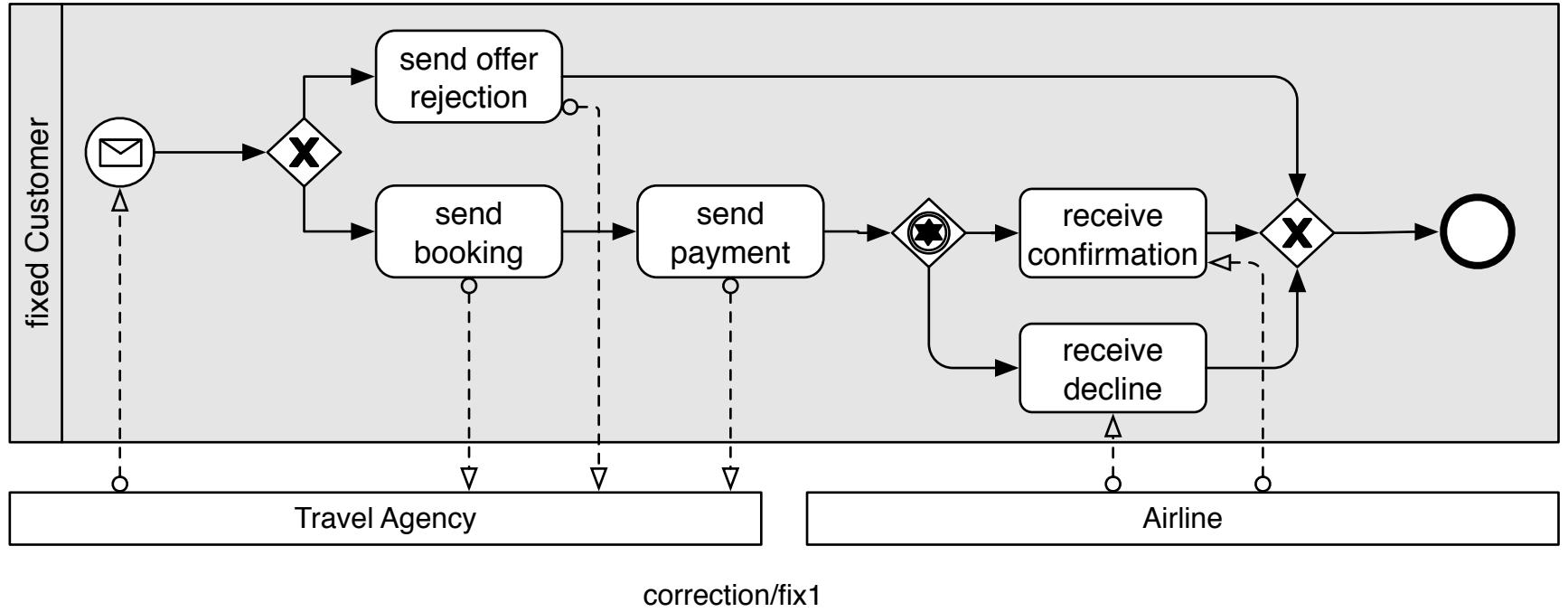


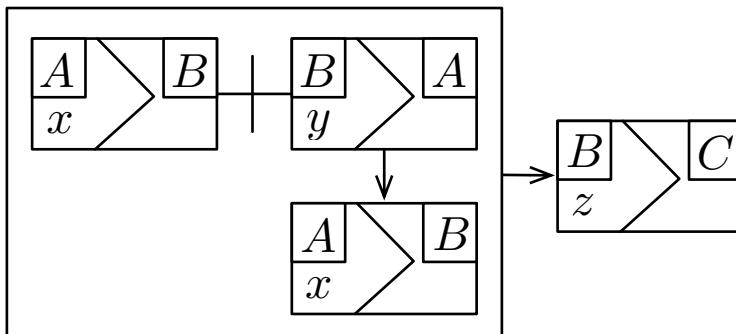
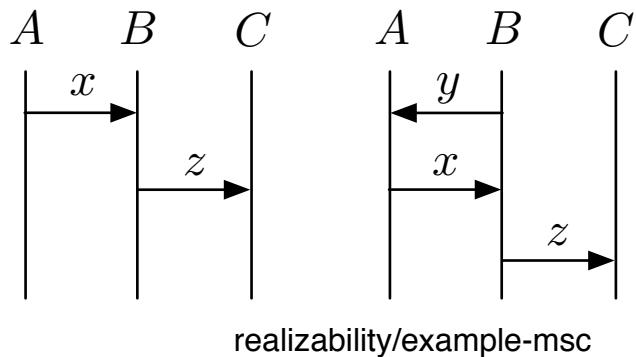
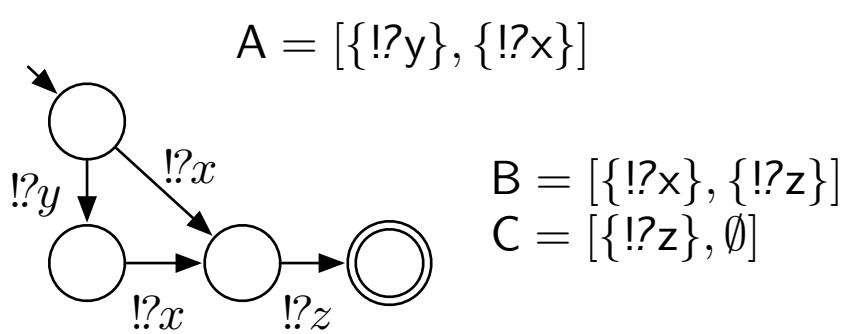


correction/fix1

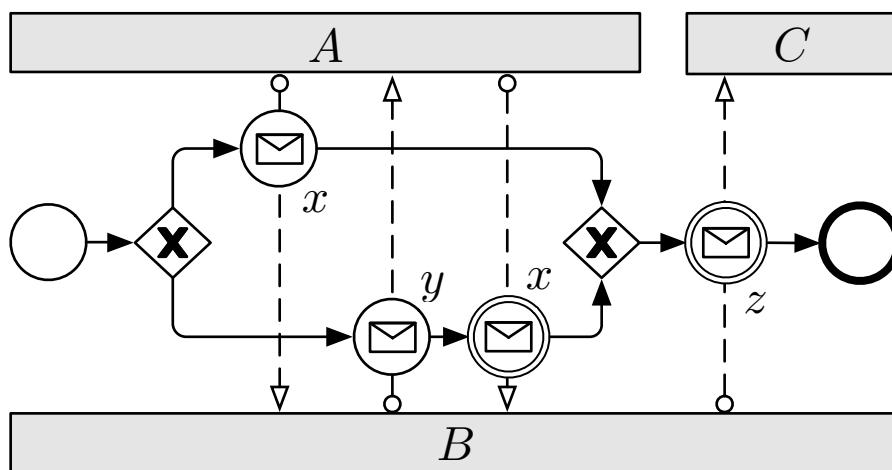
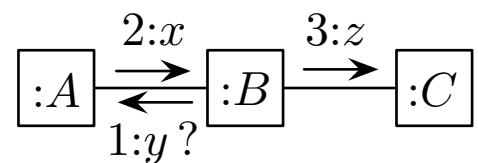


correction/fix2



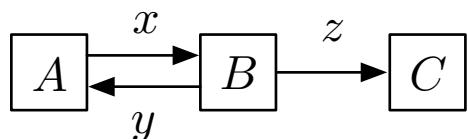


realizability/example-letsdance

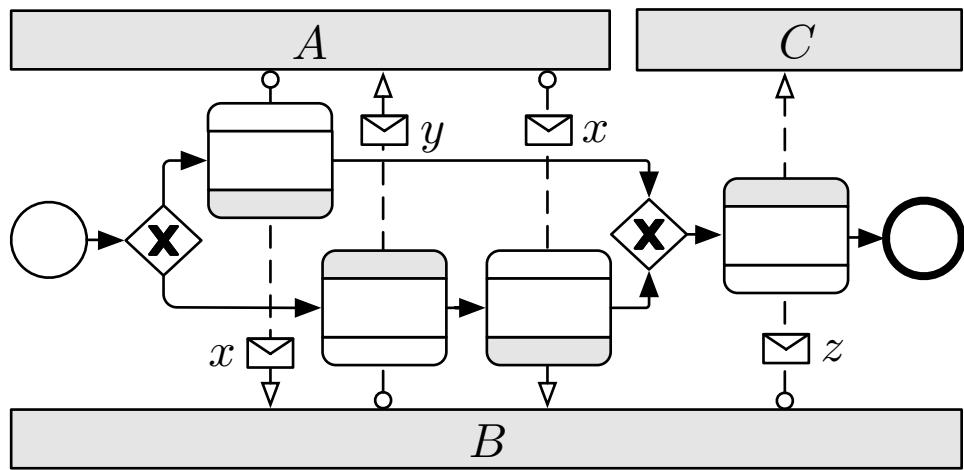


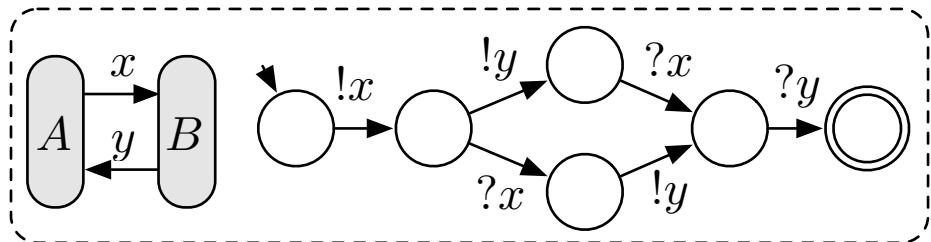
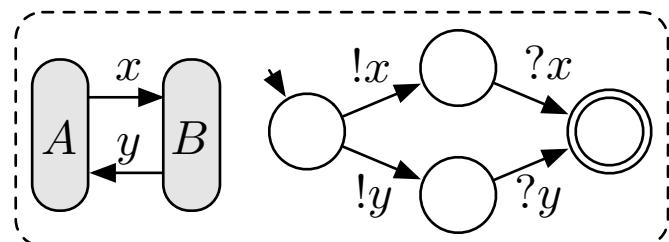
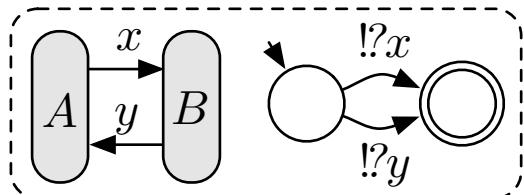
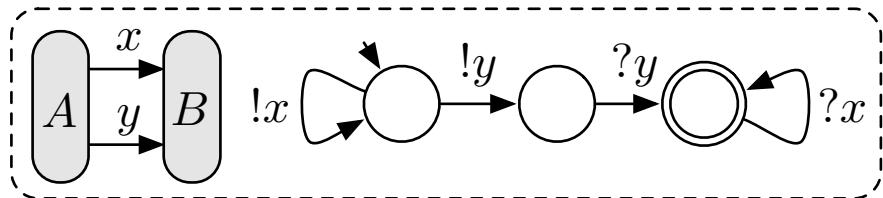
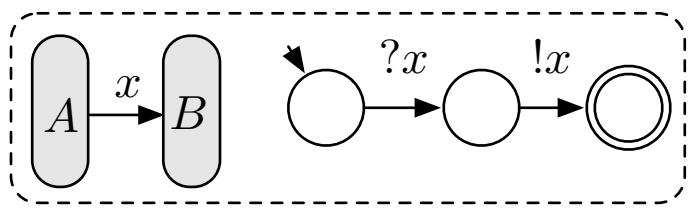
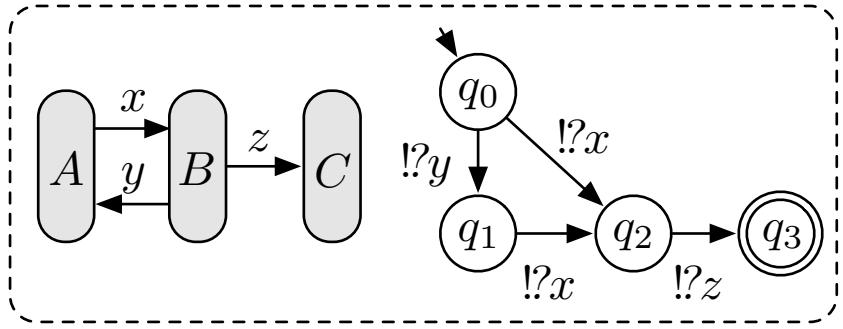
realizability/example-collab

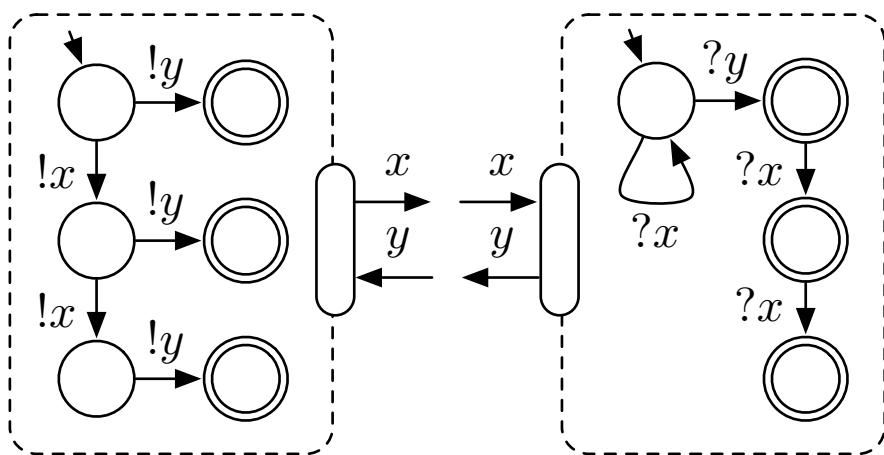
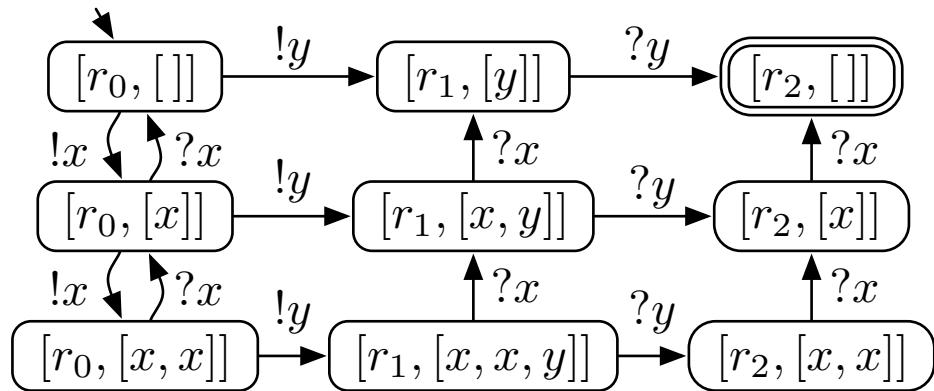
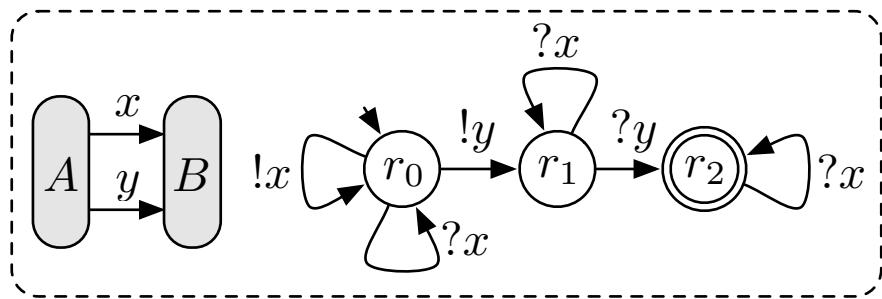
realizability/example-ipmn

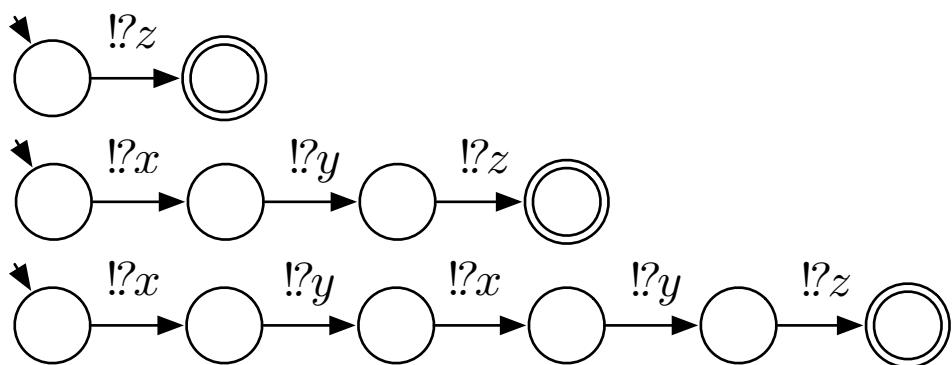
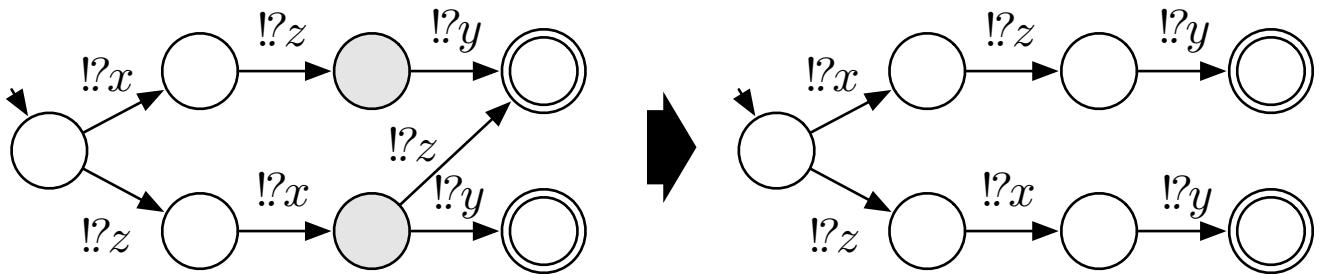
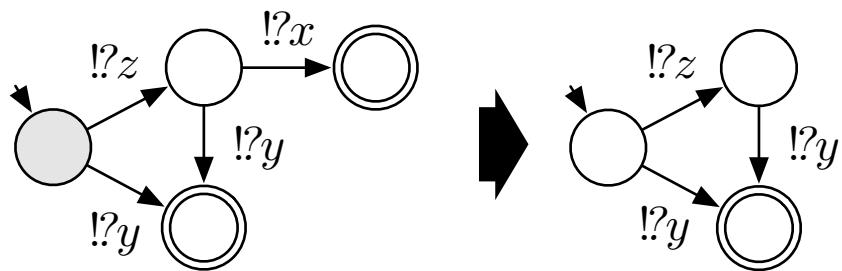
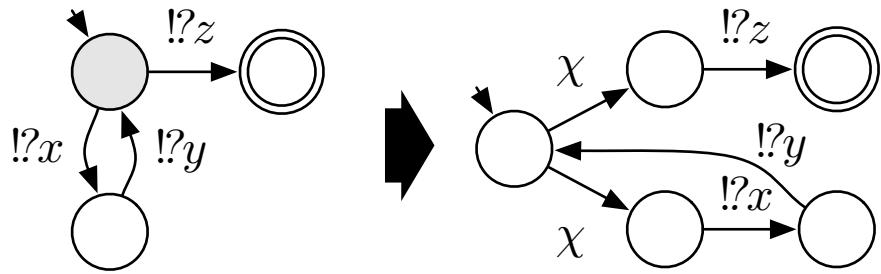
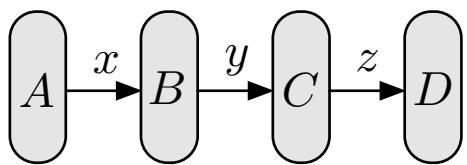


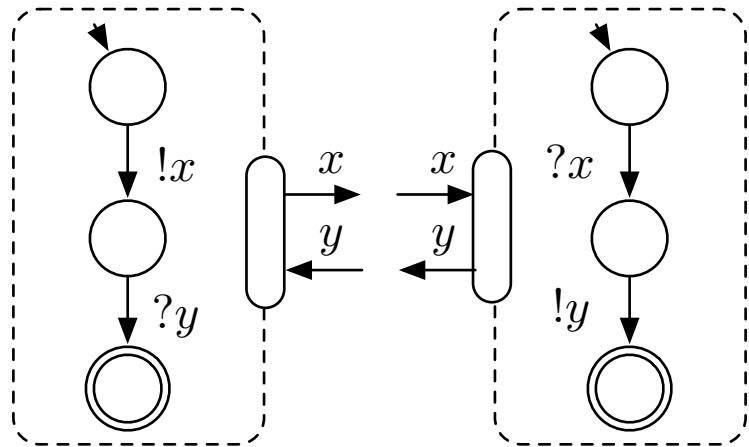
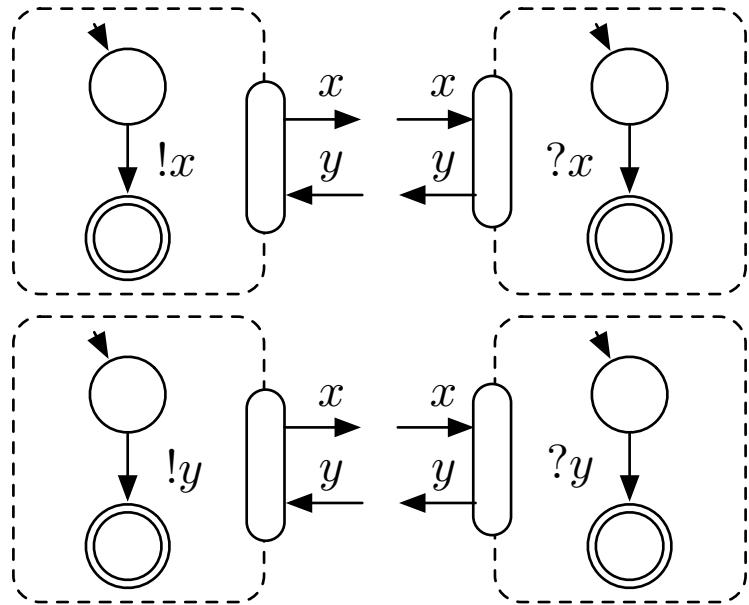
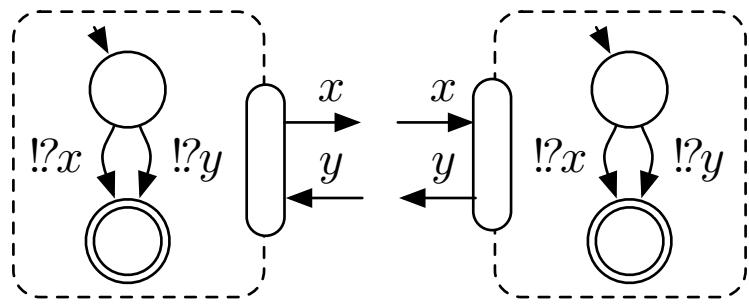
realizability/collaboration1

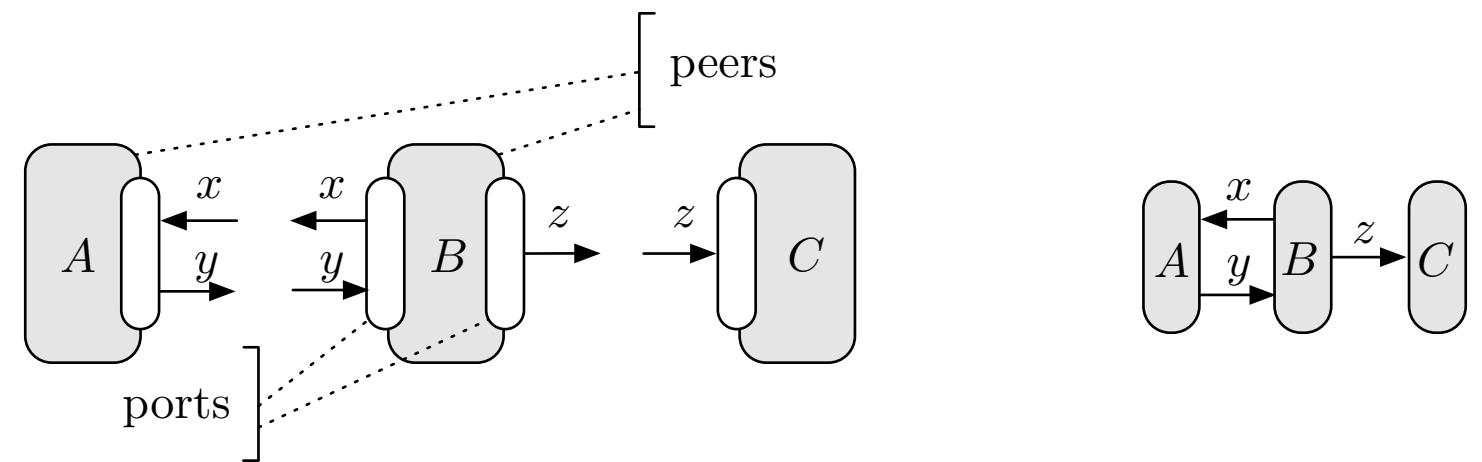
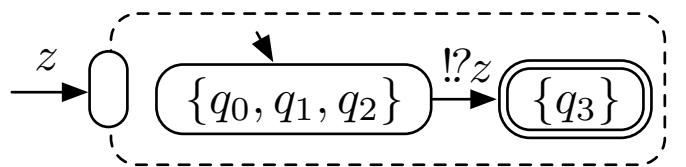
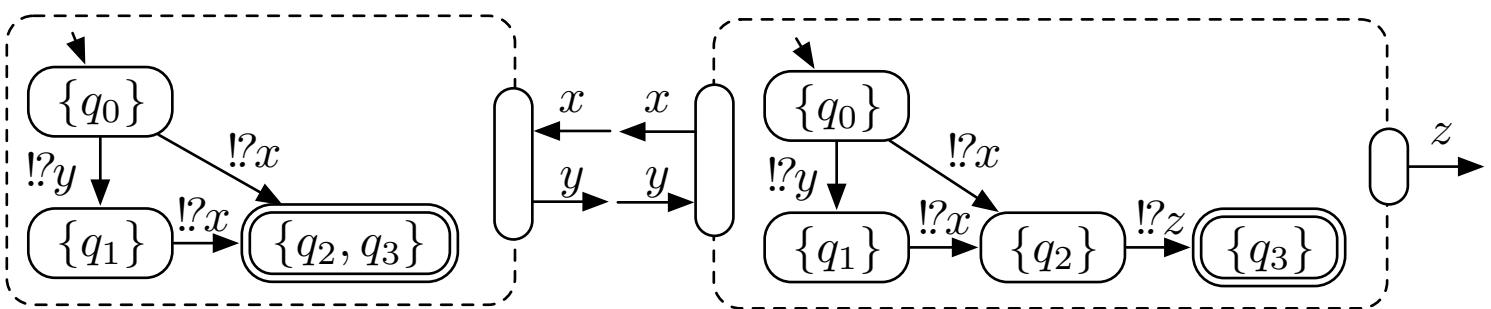
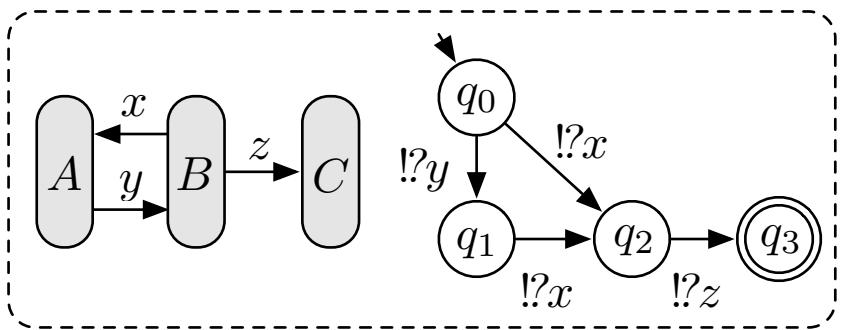


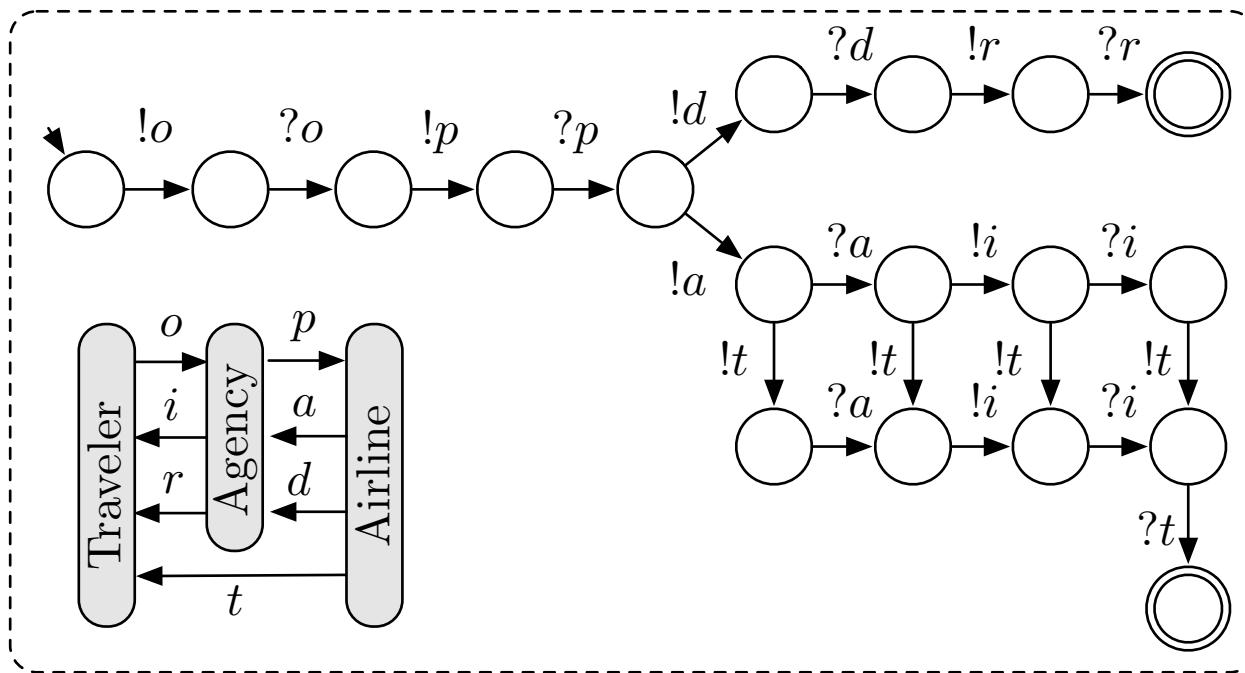
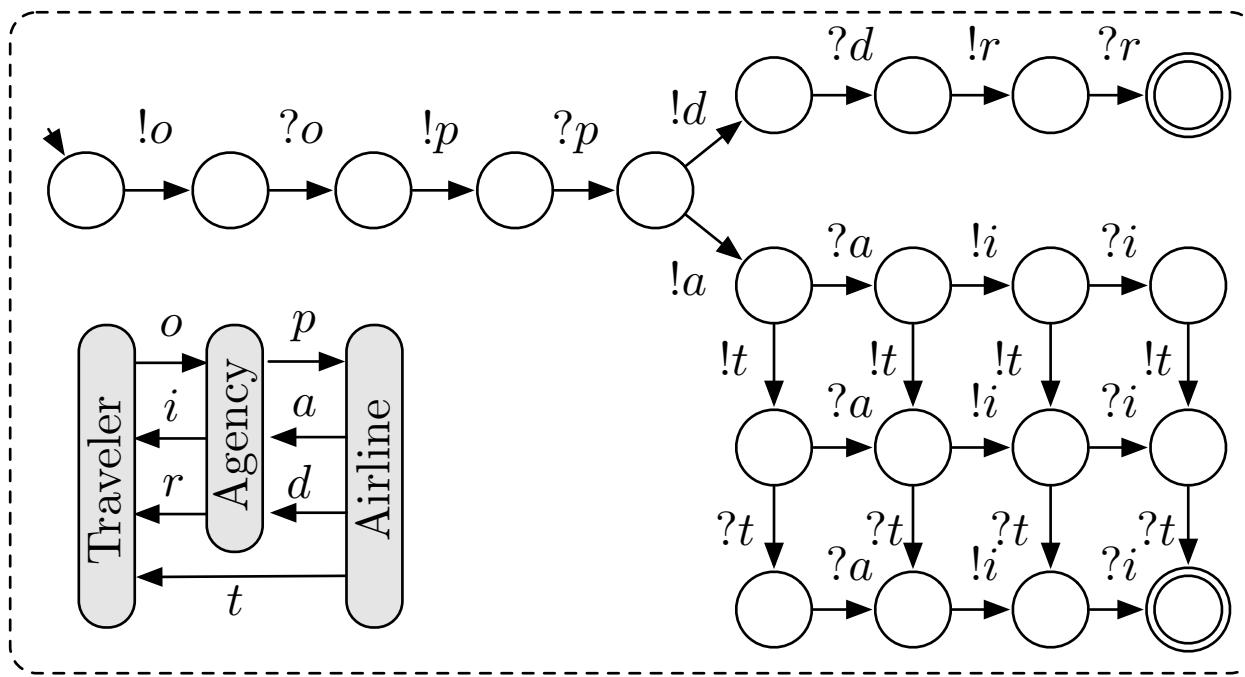


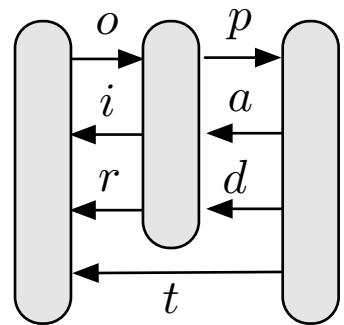
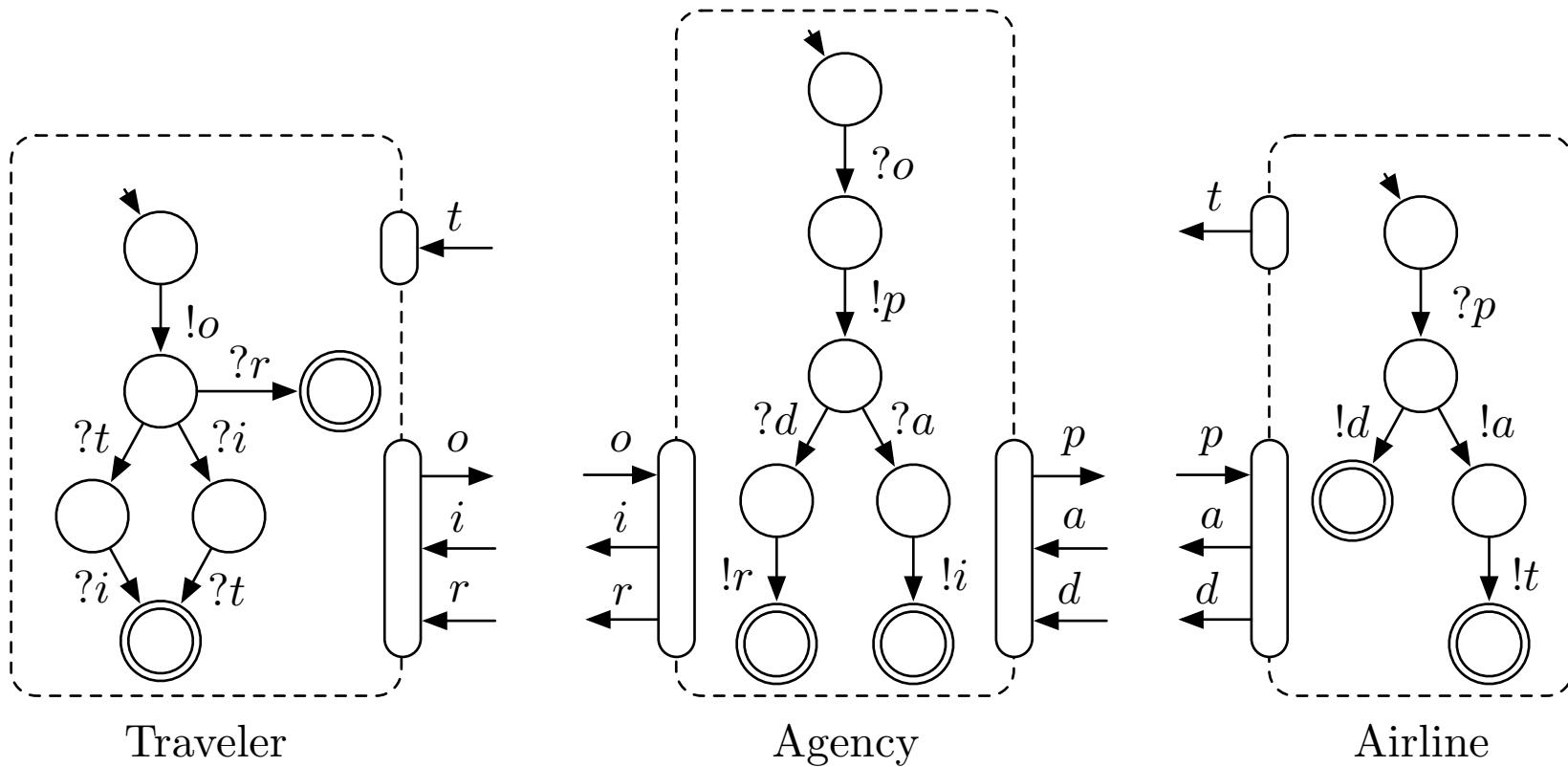


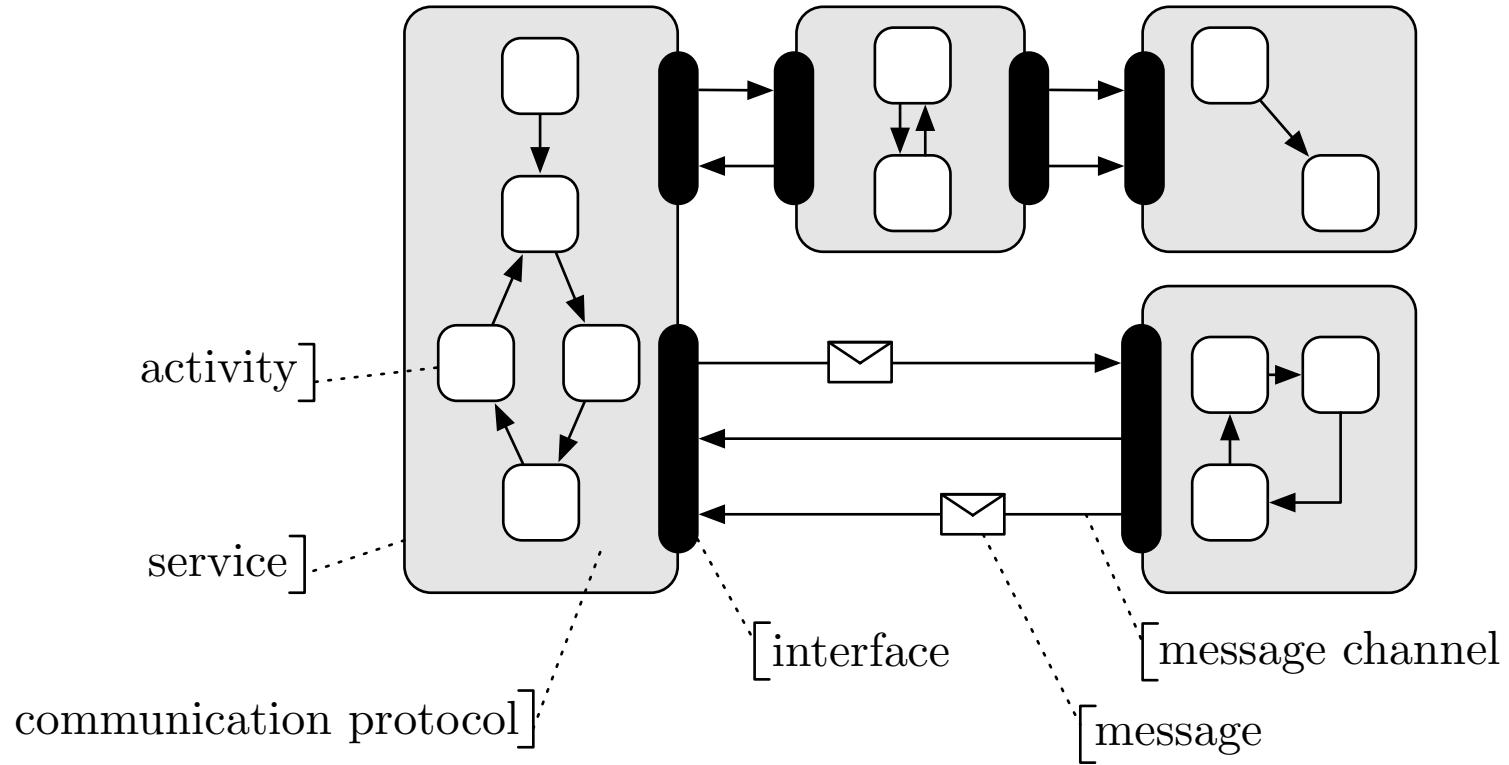




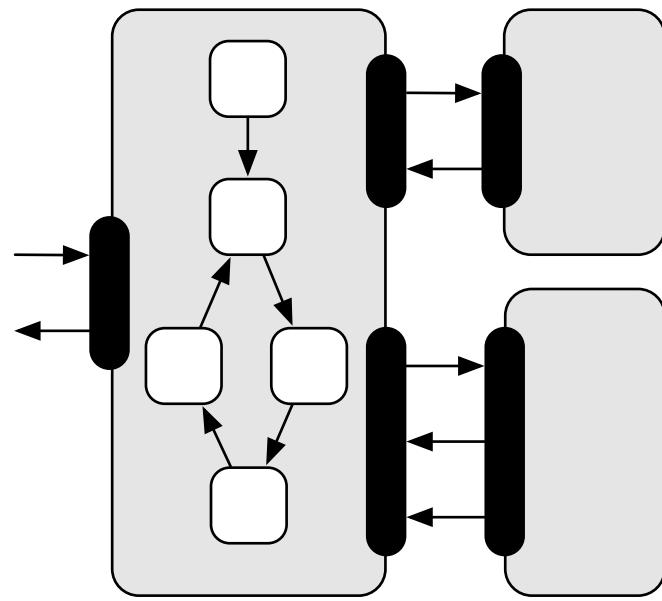


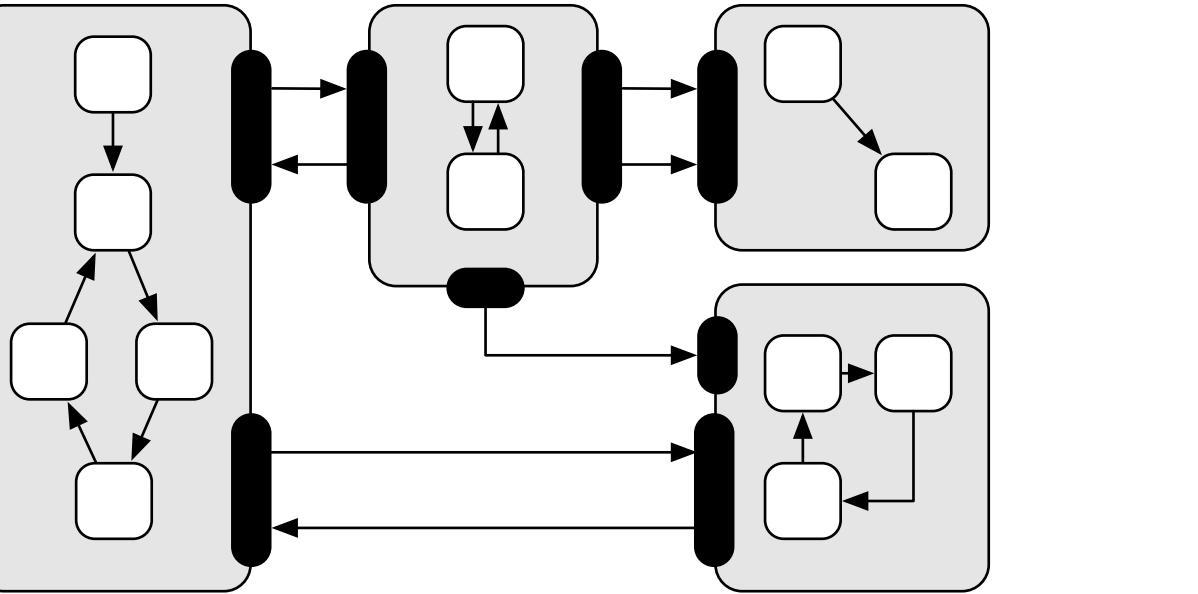
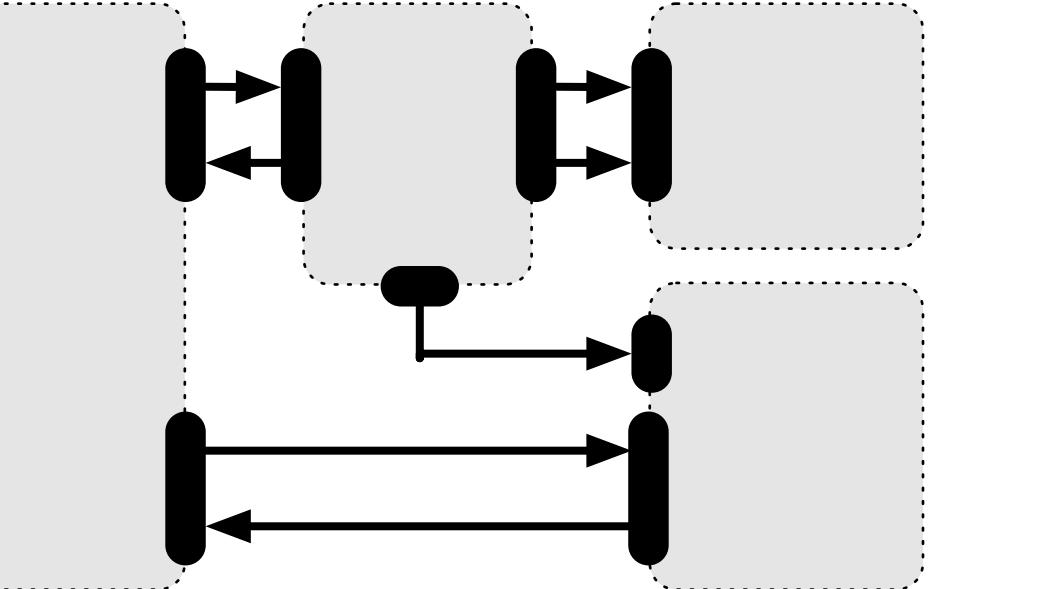
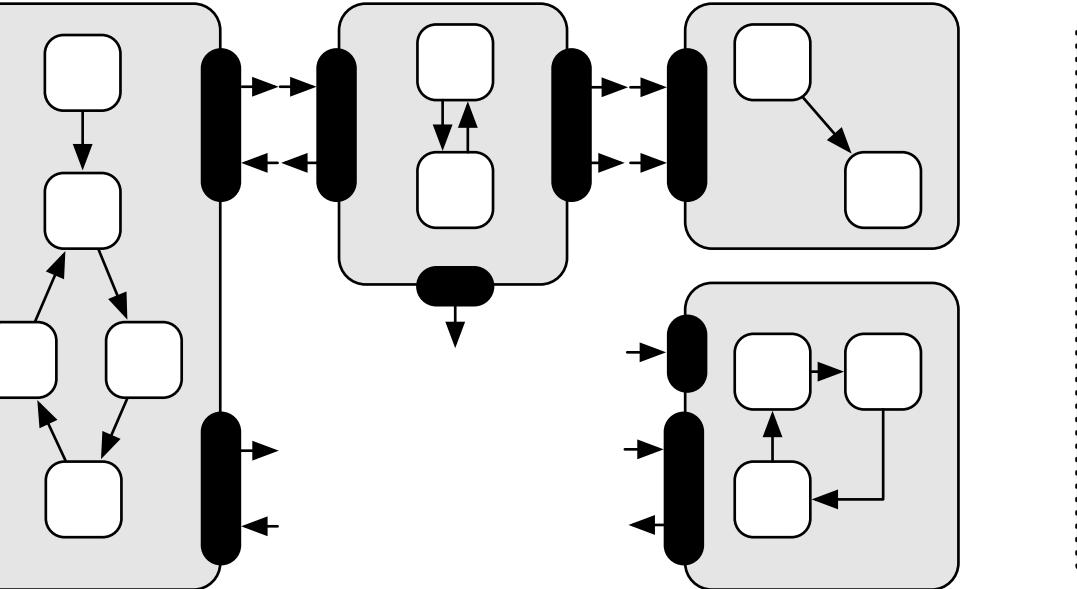


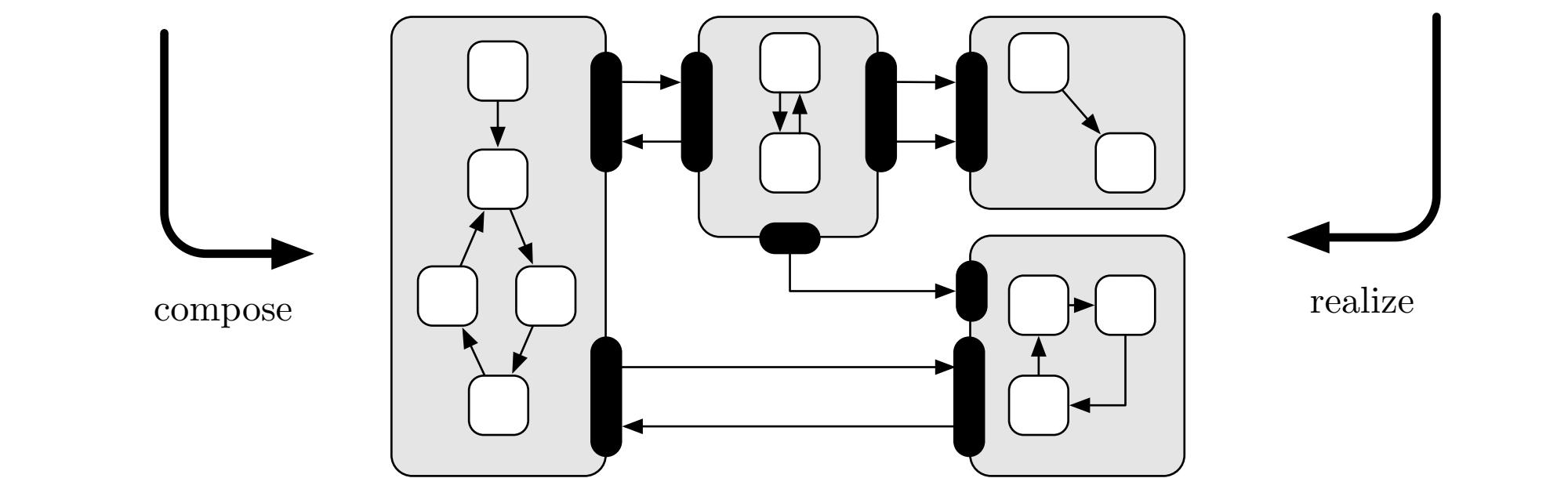
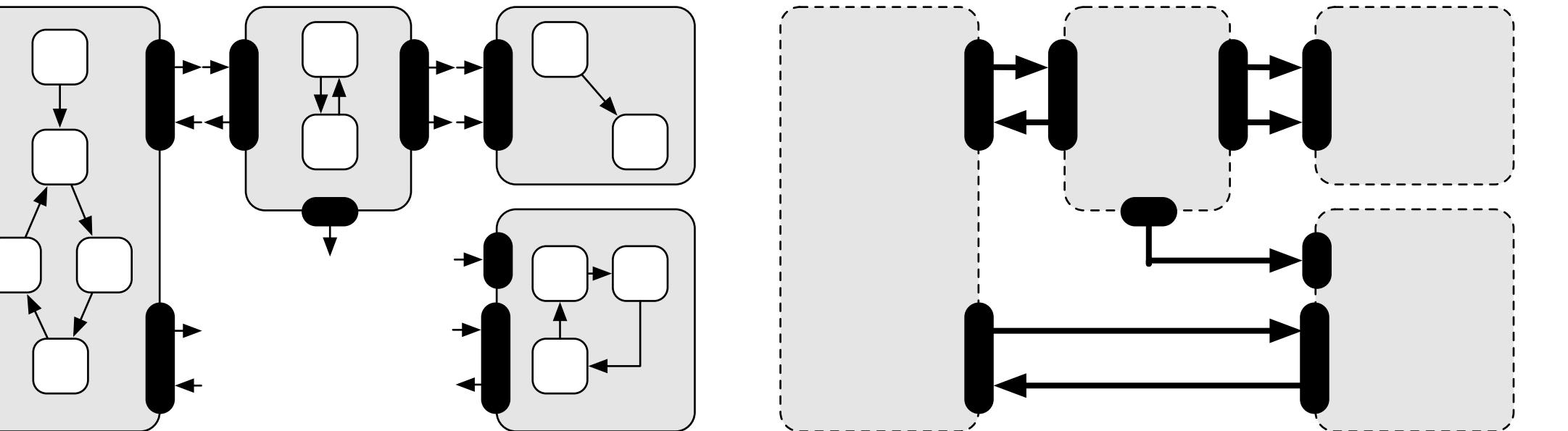


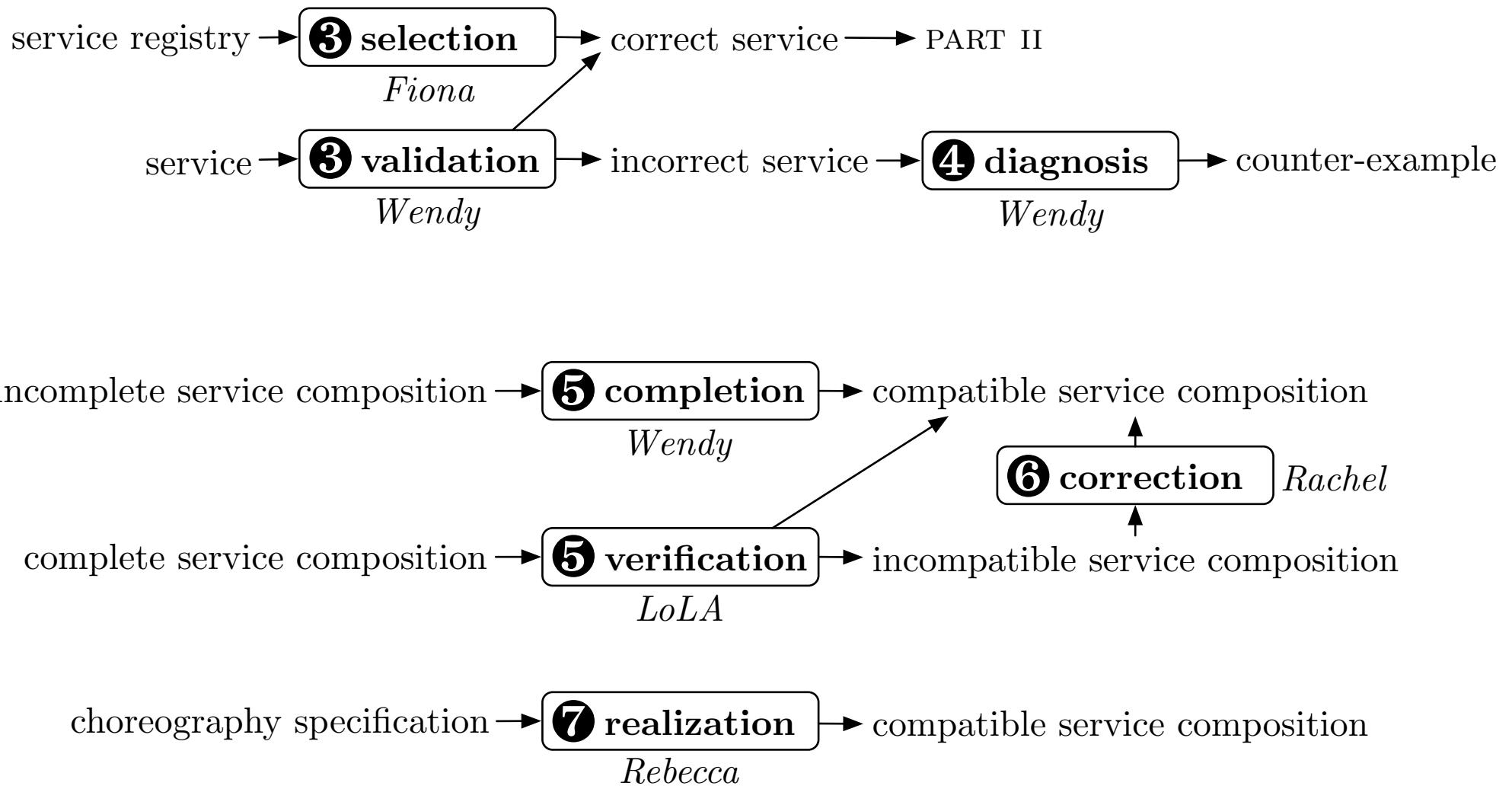


## orchestrator

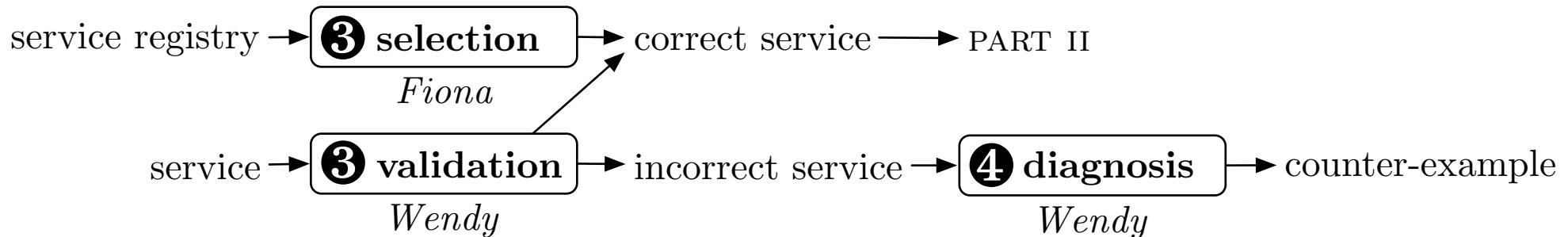




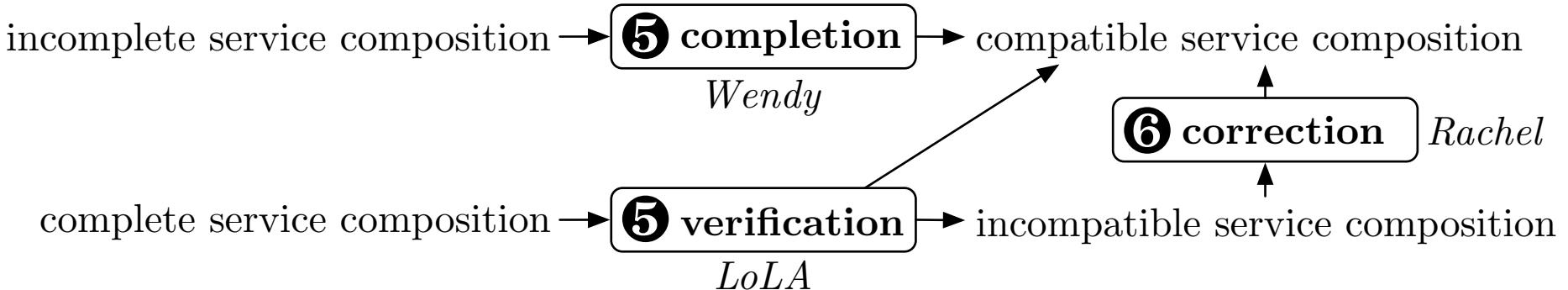




## PART I CORRECTNESS OF SERVICES



## PART II CORRECTNESS OF SERVICE COMPOSITIONS



## PART III CORRECTNESS OF SERVICE CHOREOGRAPHIES



## TOOL SUPPORT

### CORRECTNESS BY CONSTRUCTION

construction (Chap. 3)

selection (Chap. 3)

correction (Chap. 6)

restriction (Chap. 3)

realization (Chap. 7)

completion (Chap. 5)

Rachel

Wendy

Rebecca

### CORRECTNESS BY VERIFICATION

diagnosis (Chap. 6)

verification (Chap. 5)

validation (Chap. 3)

LoLA

Wendy

### FORMALIZATION

compatibility (Chap. 2)

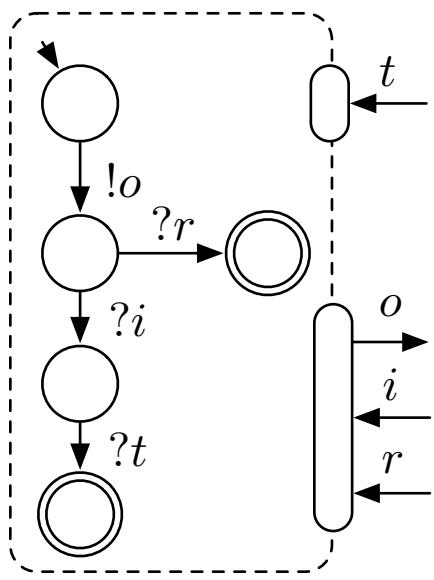
service automata (Chap. 2)

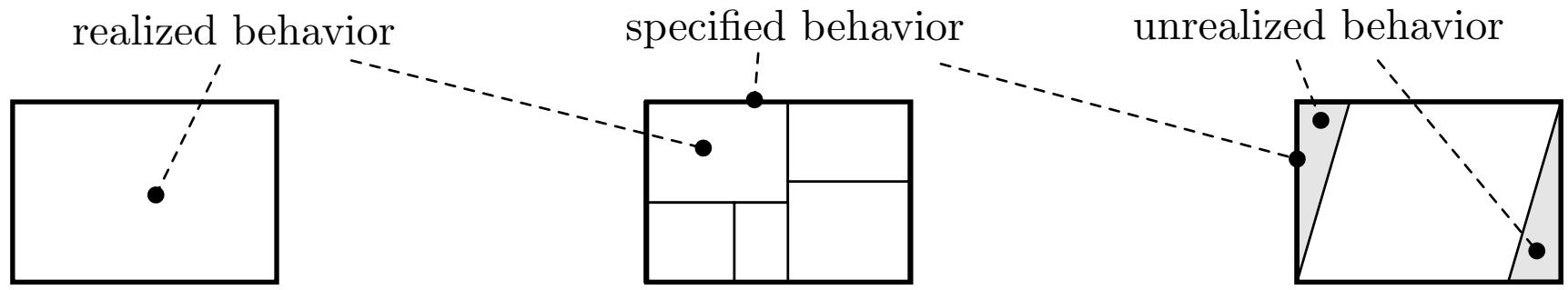
operating guidelines (Chap. 2)

realizability (Chap. 7)

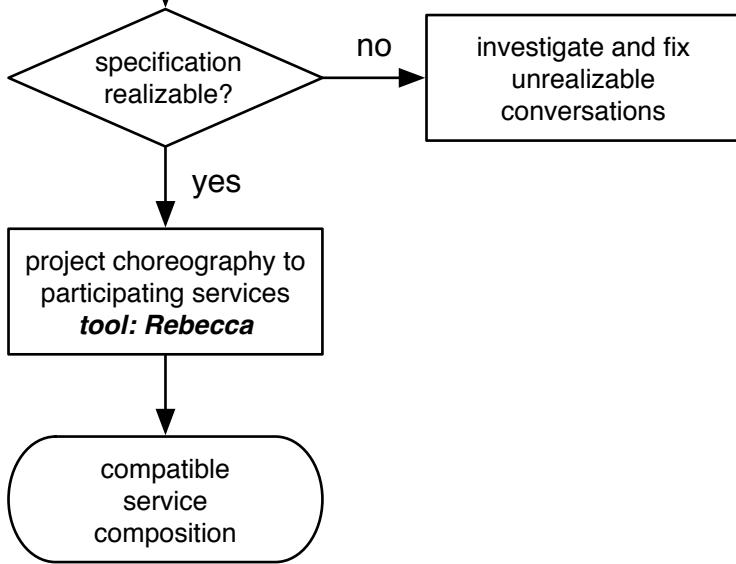
controllability (Chap. 2)

BPEL2oWFN





choreography specification



incomplete service composition

