Exercises 3 : Interaction and Concurrency

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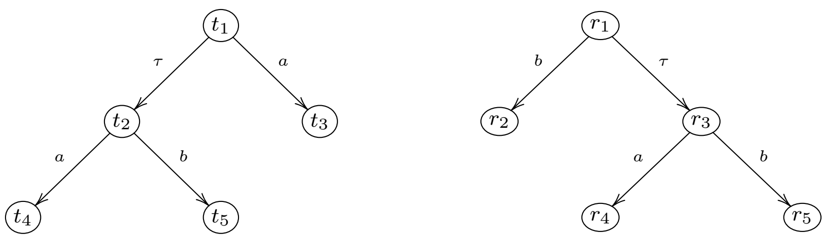
Exercise I.1

Prove that states t_1 and r_1 in the transition systems below are branching bisimilar.



Exercise I.2

Suppose the following clause was added to the definition of branching bisimulation:

For all $\langle p, q \rangle \in R$,

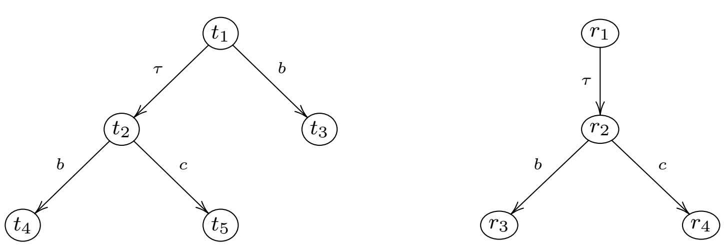
- There is an infinite sequence $p \xrightarrow{\tau}_1 \xrightarrow{\tau}_1 \xrightarrow{\tau}_1 \cdots$ iif there is an infinite sequence $q \xrightarrow{\tau}_2 \xrightarrow{\tau}_2 \xrightarrow{\tau}_2 \cdots$

Compare the resulting relation with branching bisimilarity and discuss wether it can be of use in distinguishing divergent from non divergent states.

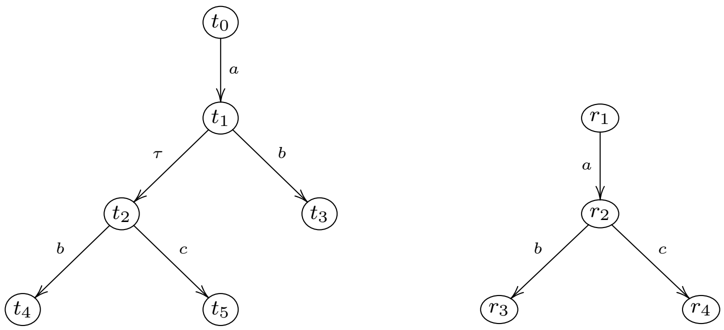
Exercise I.3

In the following cases, discuss whether states t_0 and r_0 are branching, rooted branching, weak or rooted weak bisimilar. Justify.

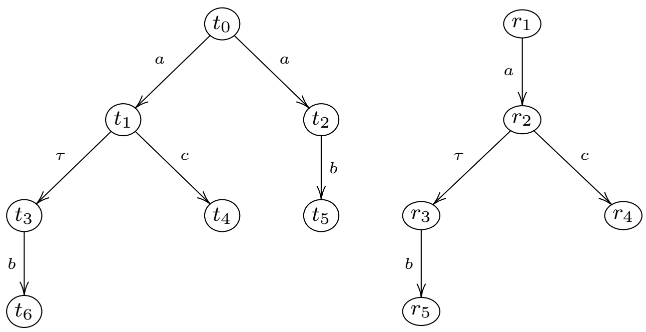
1.



2.



3.



In all diagrams identify the inert τ-transitions.

Exercise I.4

Show that a branching bisimulation is a weak bisimulation relation.
