

a ranked alphabet

arity 2



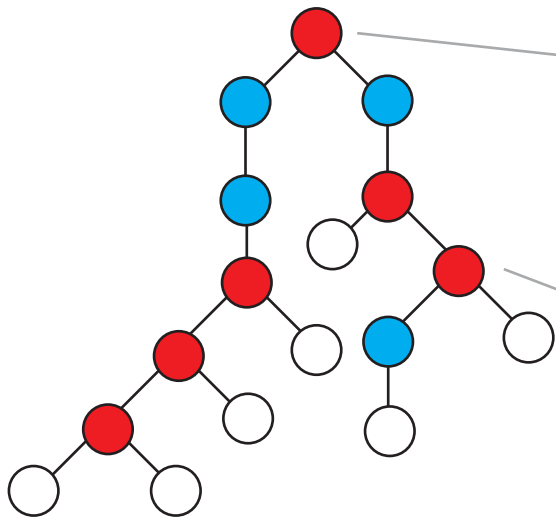
arity 1



arity 0



a tree



this node has a label of arity 2,
and therefore it has 2 children

this node is child 2
(children are ordered)



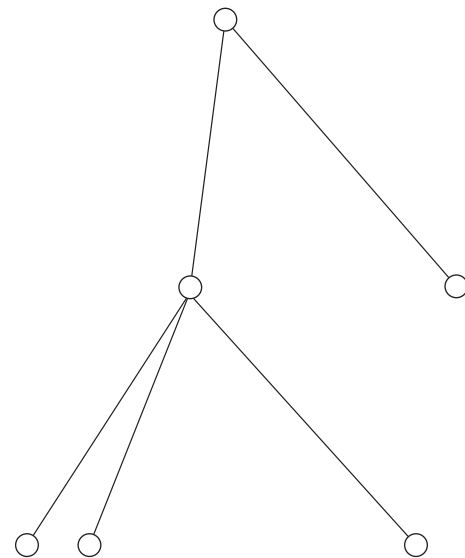
A tree t over $\Sigma^{[2]}$



$\text{unfold}_1(t)$

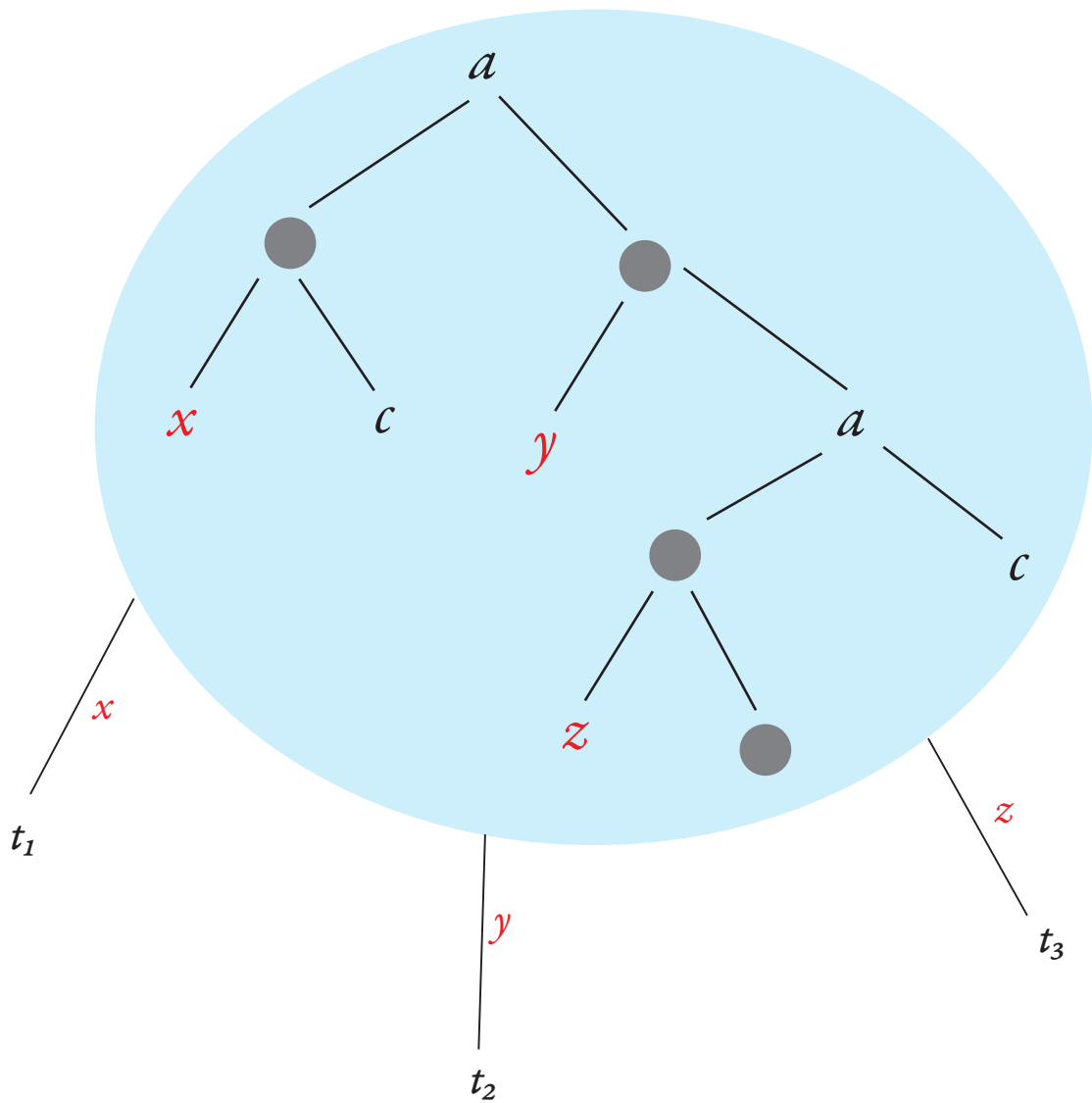


$\text{unfold}_2(t)$

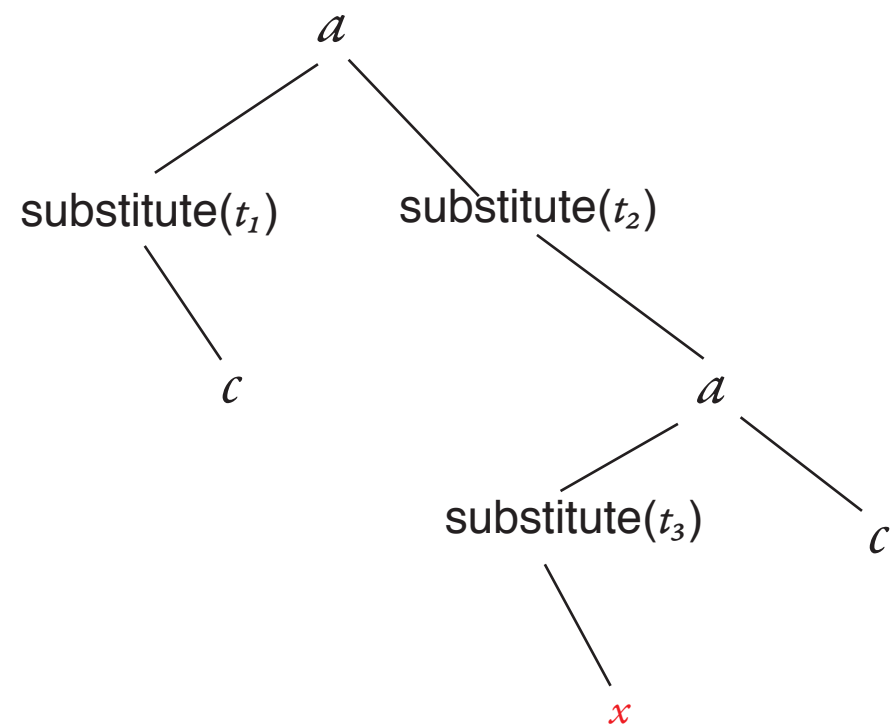




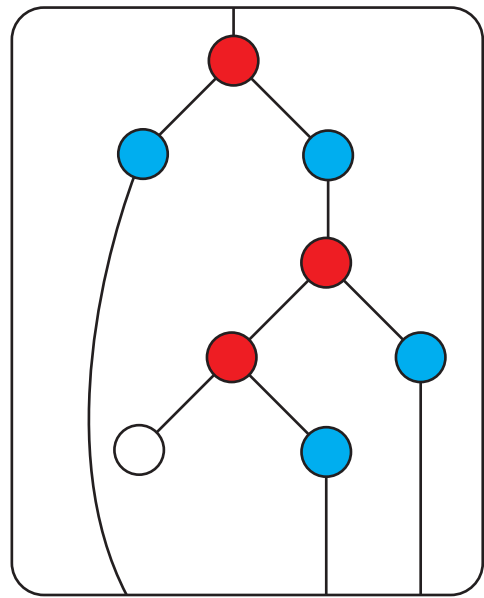
t



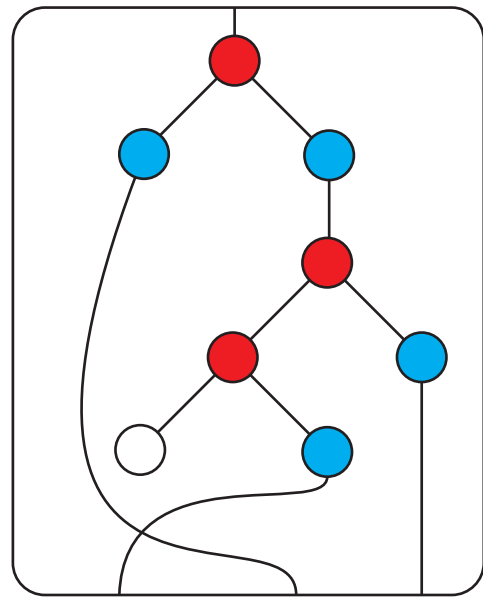
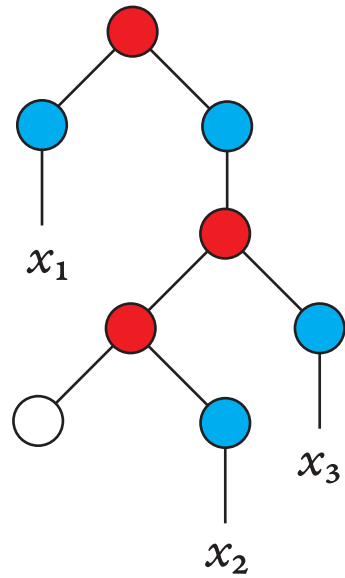
$\text{substitute}(t)$



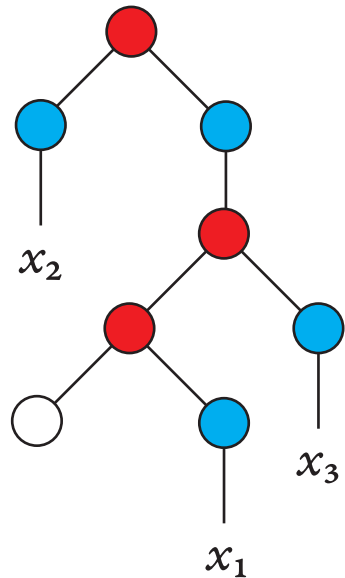


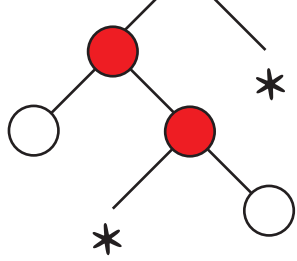


=

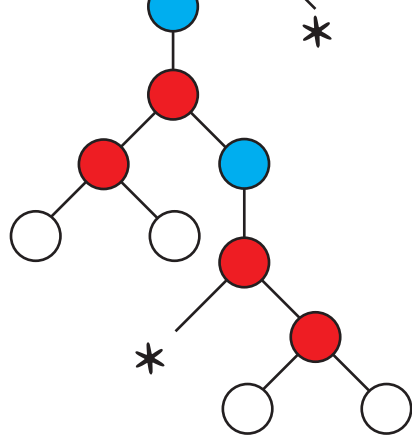


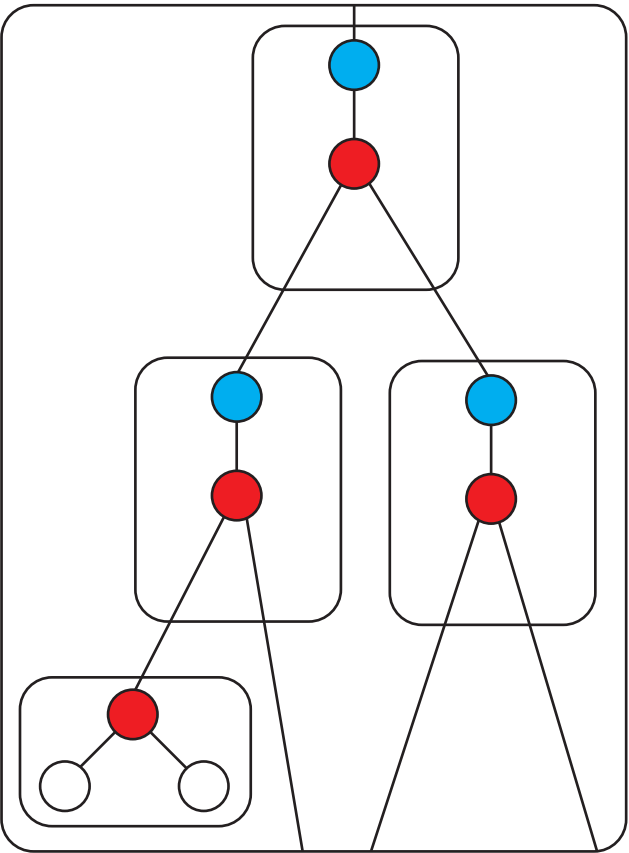
=



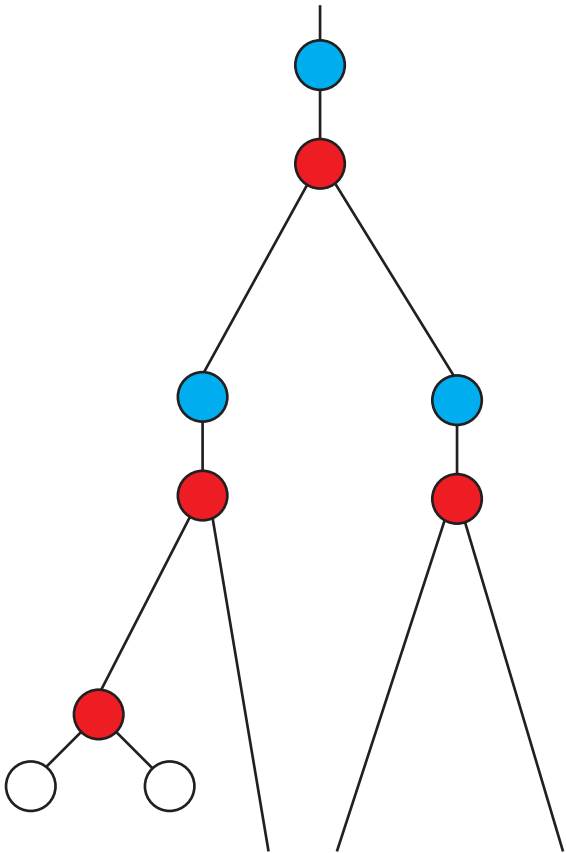


$\mathsf{T}f$
 \mapsto





\mapsto





a term



ancestor equivalence

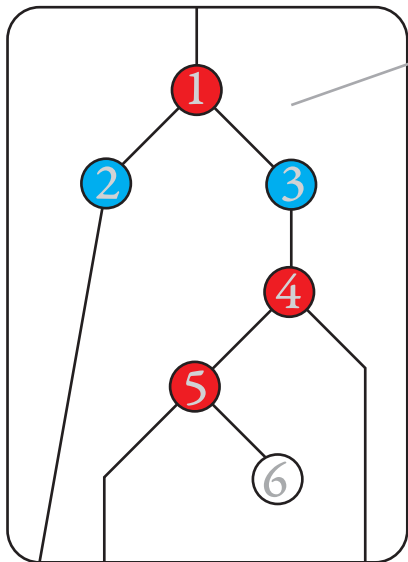


descendant equivalence





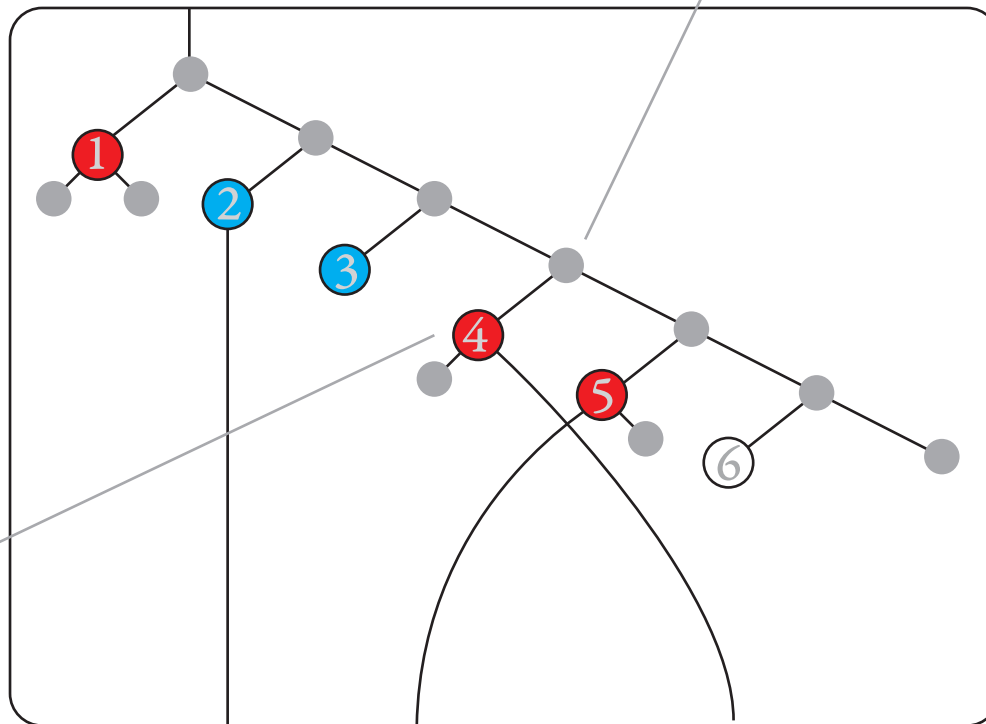
input



number the non-port
nodes in the input term
according to their
appearance in the
pre-order traversal

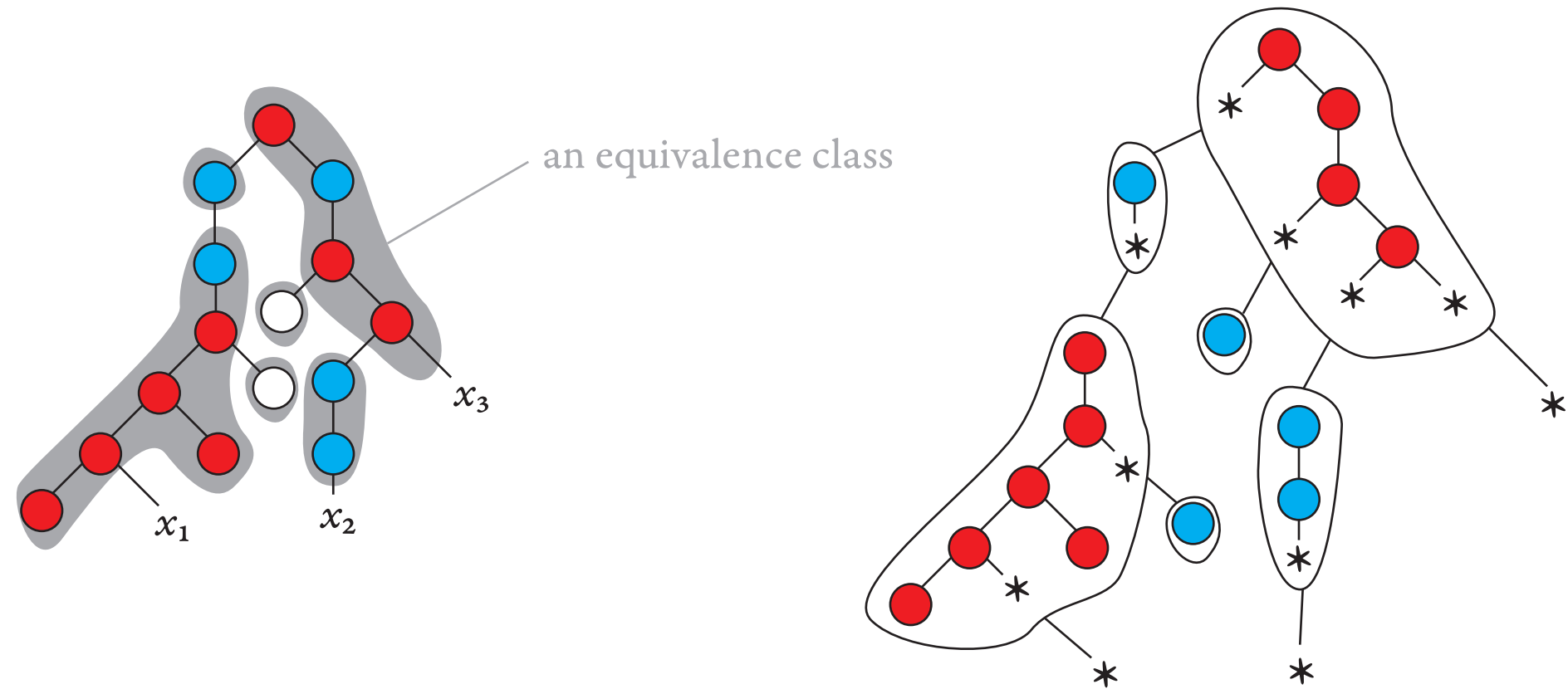
use a copy of the corresponding node, with
edges to the ports inherited, and other edges
plugged by ●

output

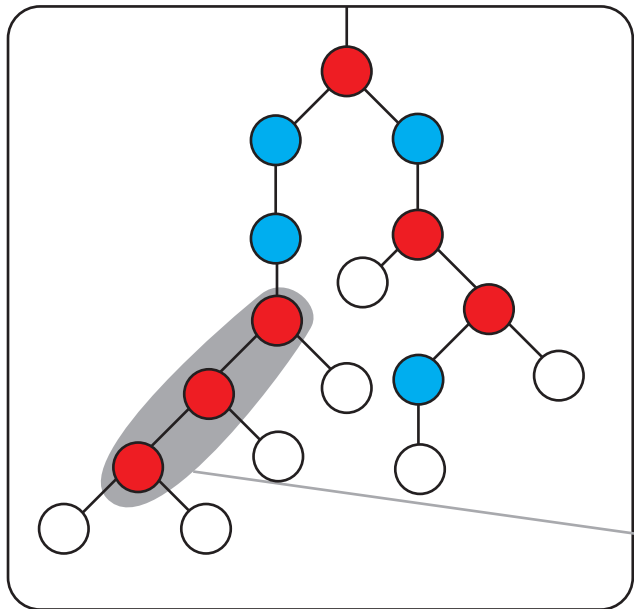


create a binary node for
each non-port node in
the input term

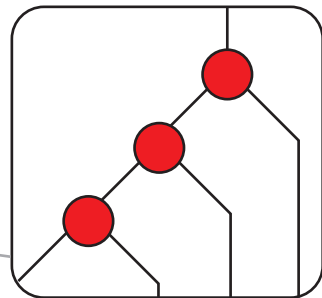
a factorisation equivalence



a tree



a factor of the
tree, viewed
as a term





input alphabet

arity 2



arity 1



arity 0



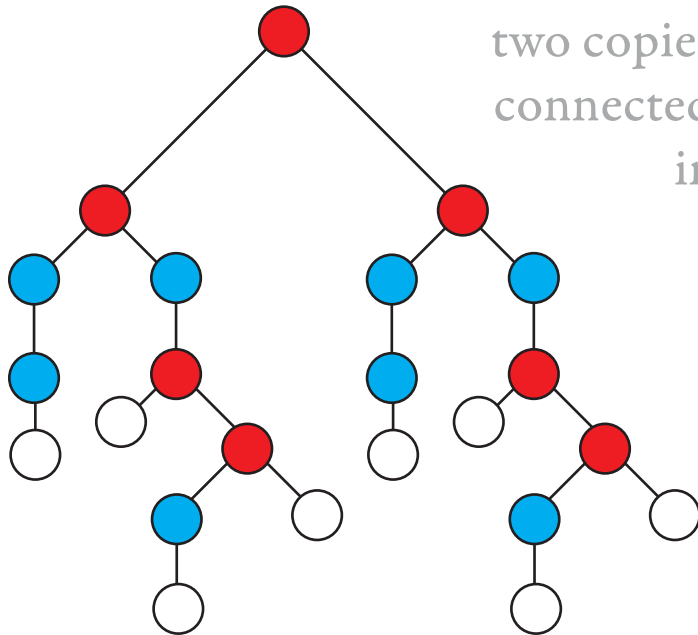
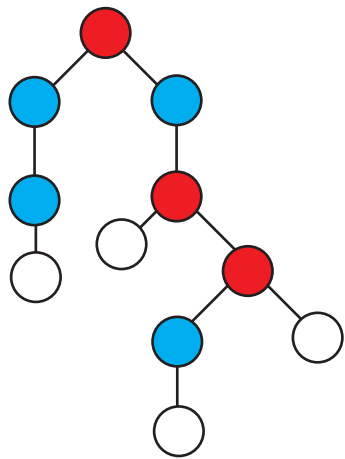
output alphabet

arity 2



arity 0





two copies of the input tree,
connected by a binary node
in the root





input alphabet

arity 2



arity 1



arity 0



output alphabet

arity 2



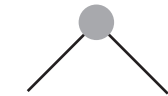
arity 1



arity 0

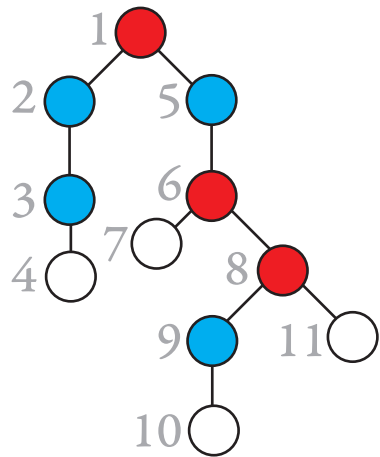


arity 2

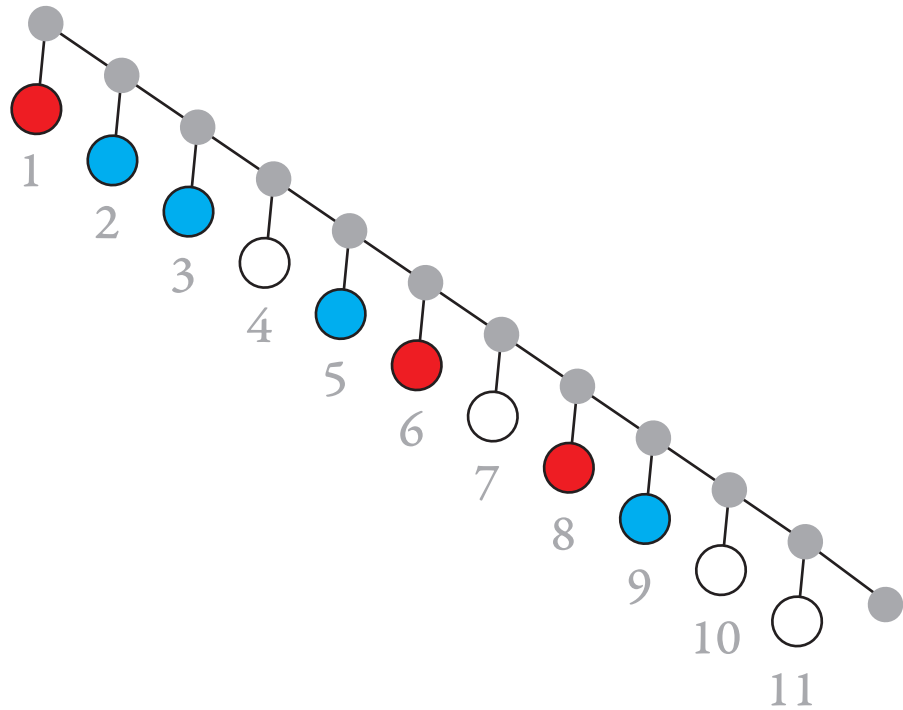


arity 0





\mapsto





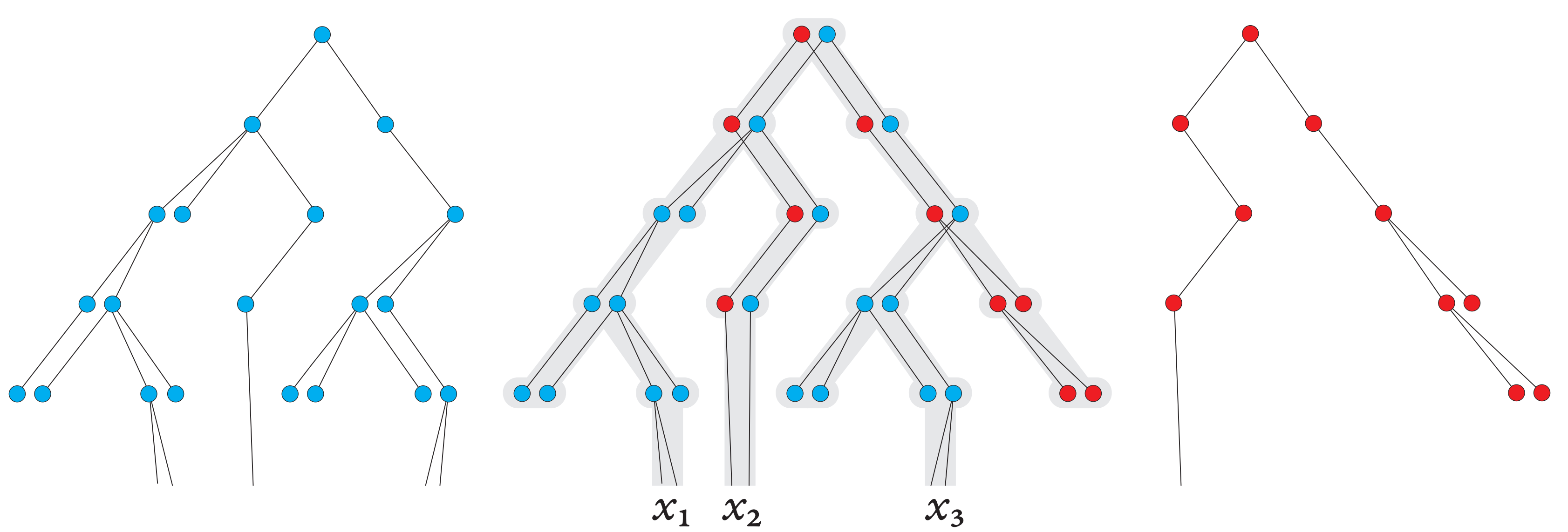


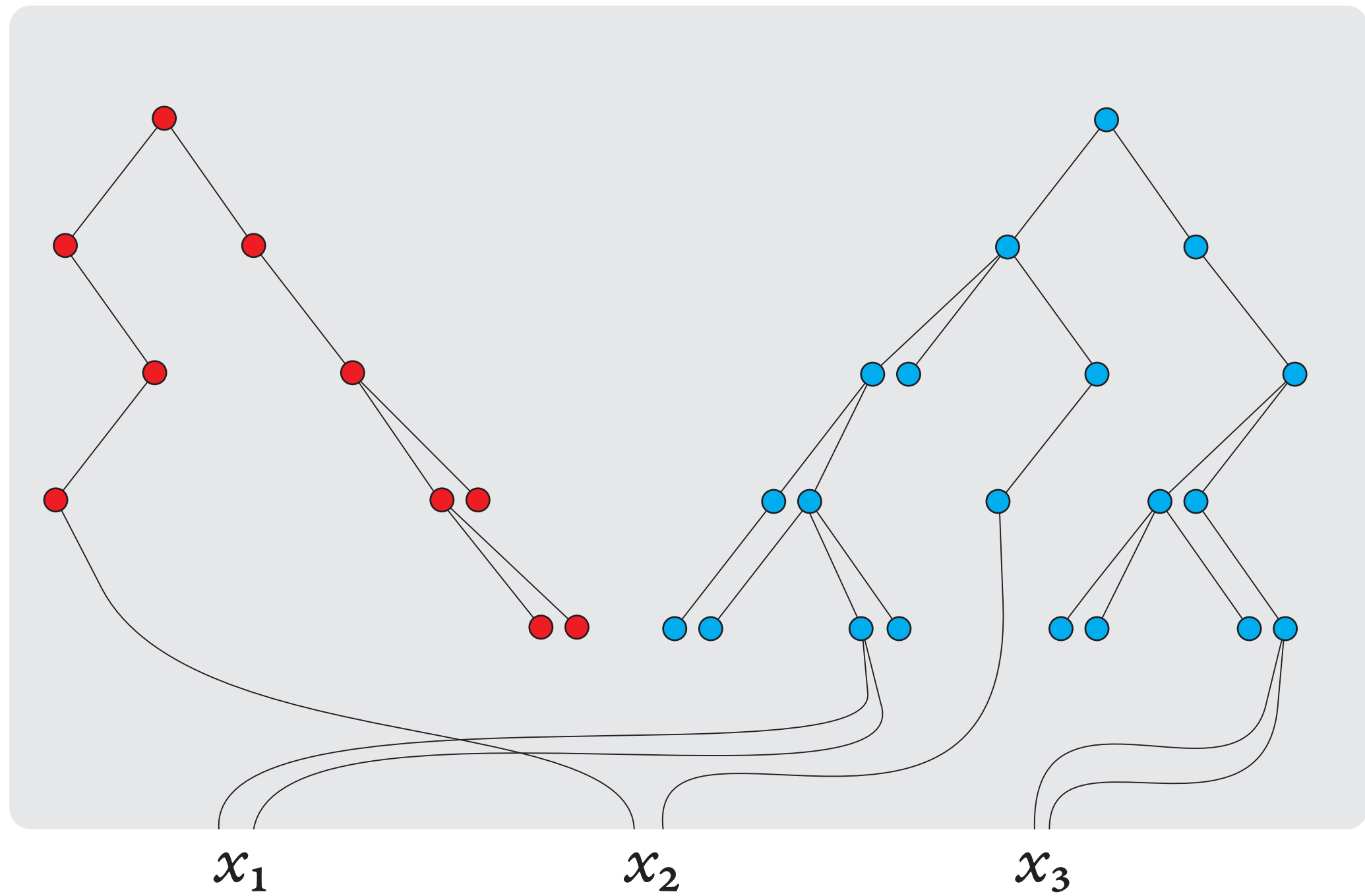
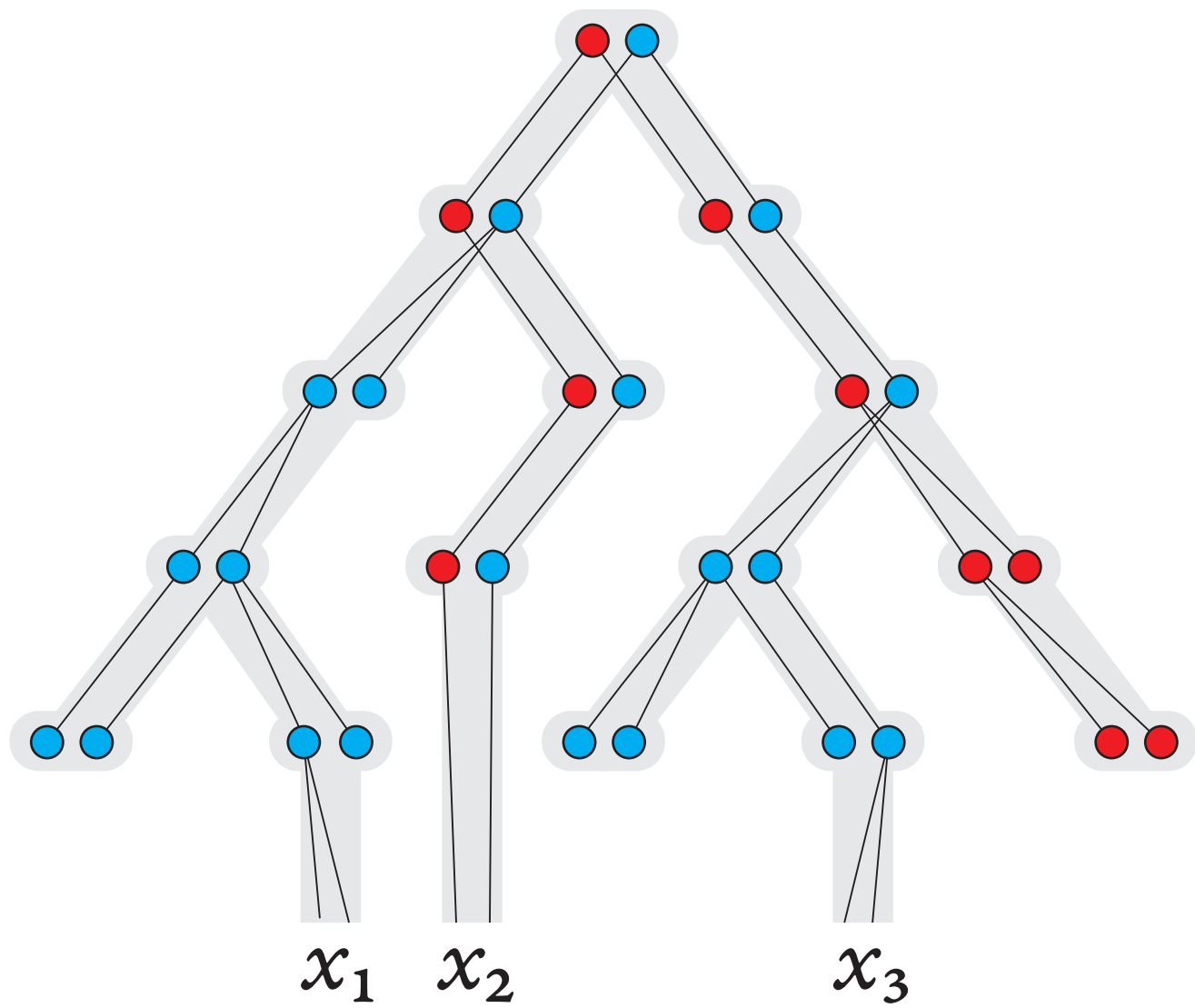
a term of arity 4



a term of arity 0





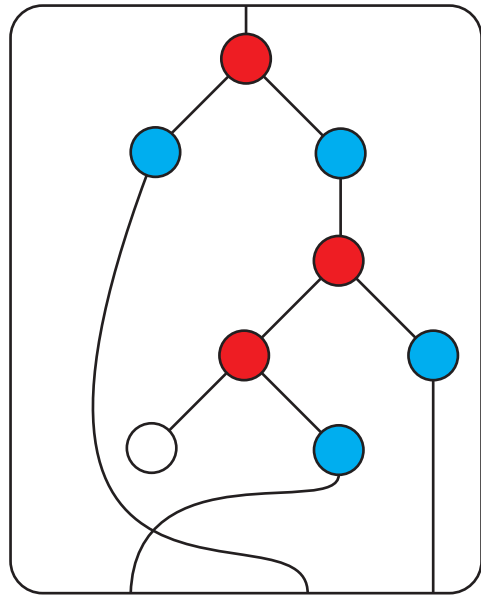




satisfies (*)

(*)

If the root has arity n ,
and $1 \leq i < j \leq n$, then
all ports of the j -th
subterm of the root are
after all ports of the
 i -th subterm of the root

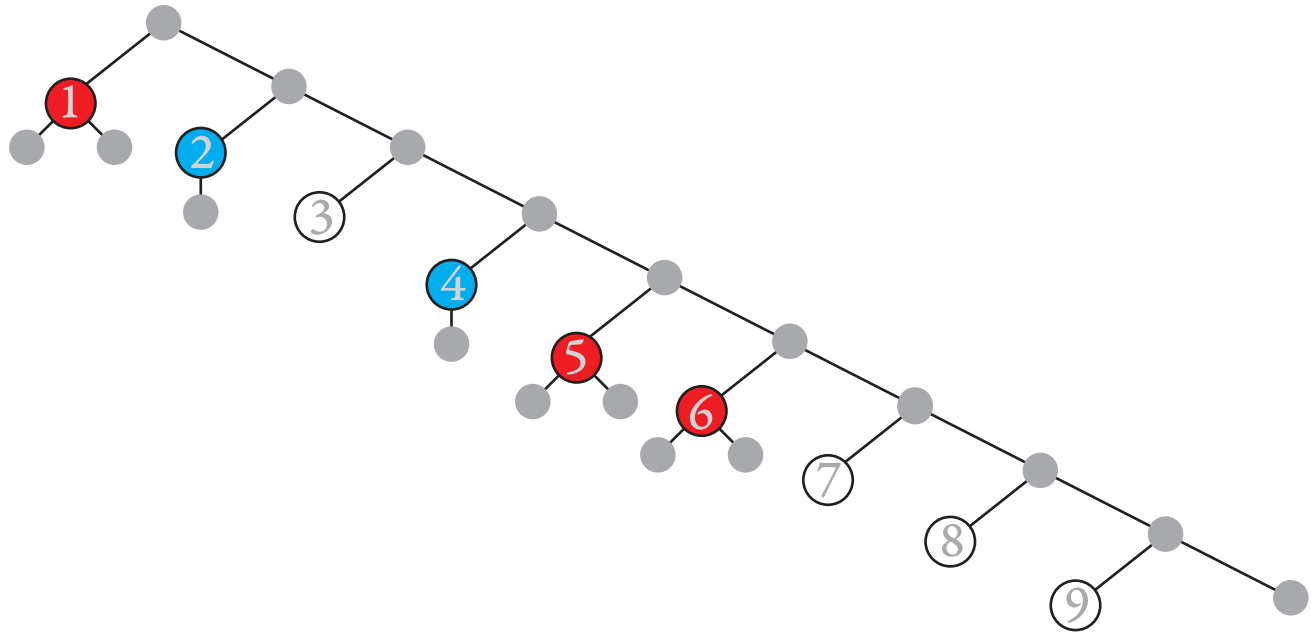


violates (*)

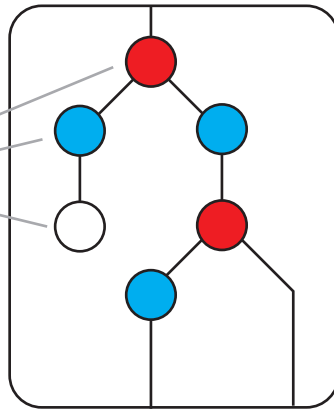
input



output

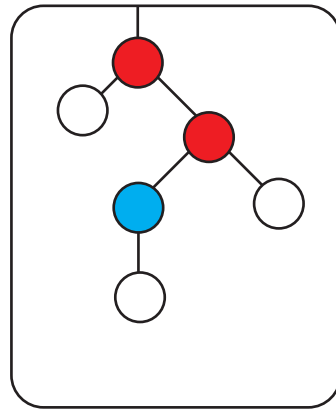


register r

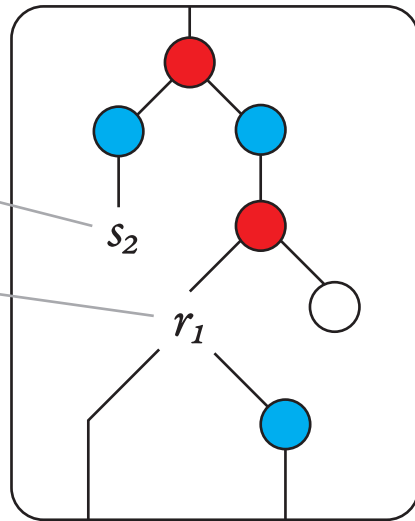


letters of the output alphabet

register s



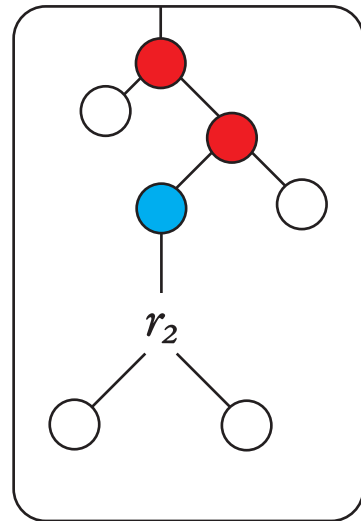
register r



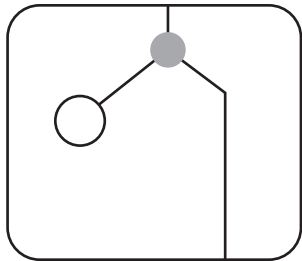
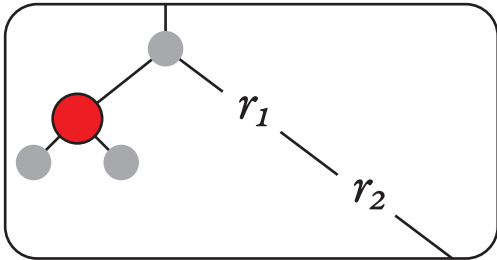
copy 2 of register s

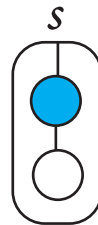
copy 1 of register r

register s













factors without
branching nodes



factors with
branching nodes

