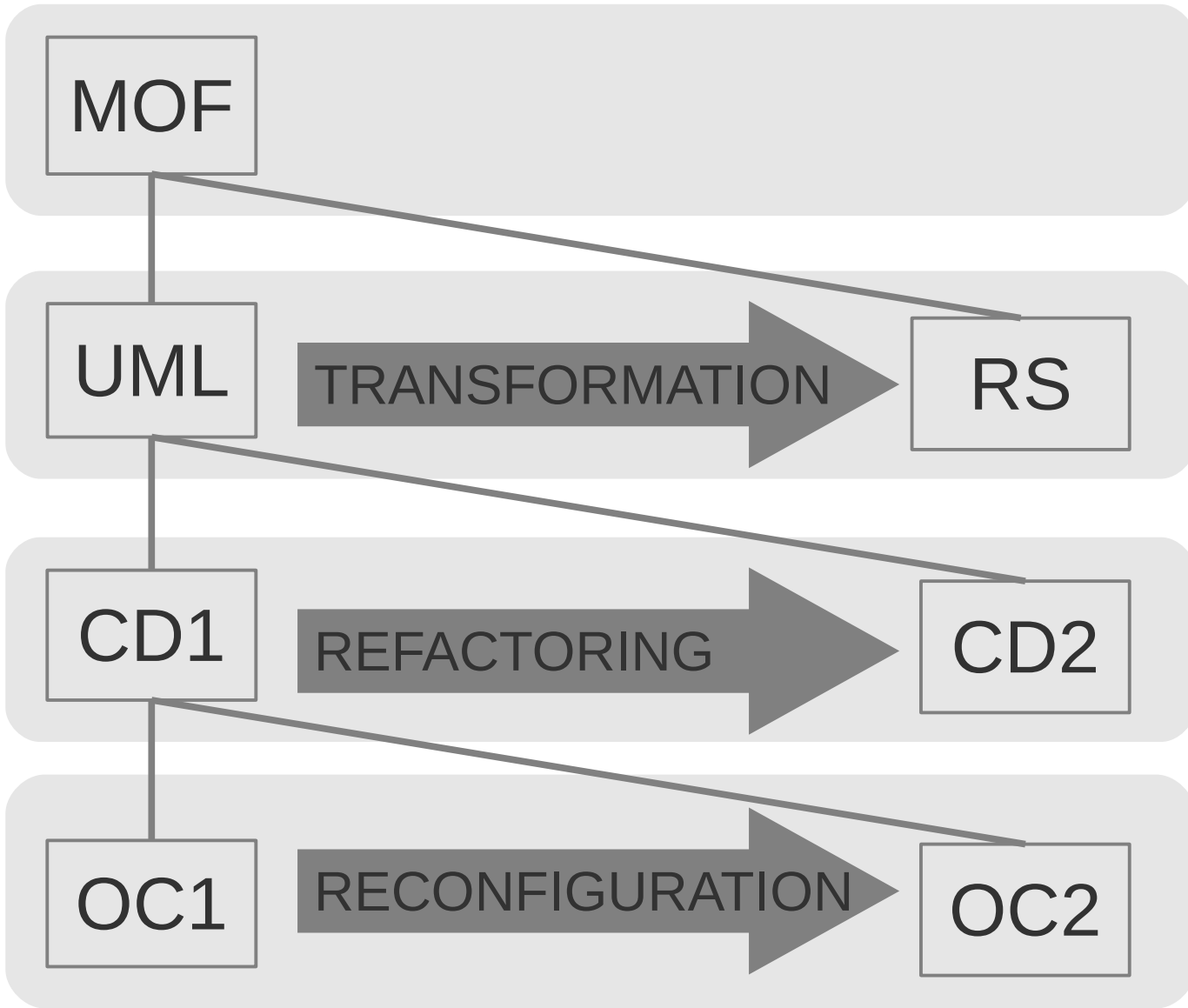


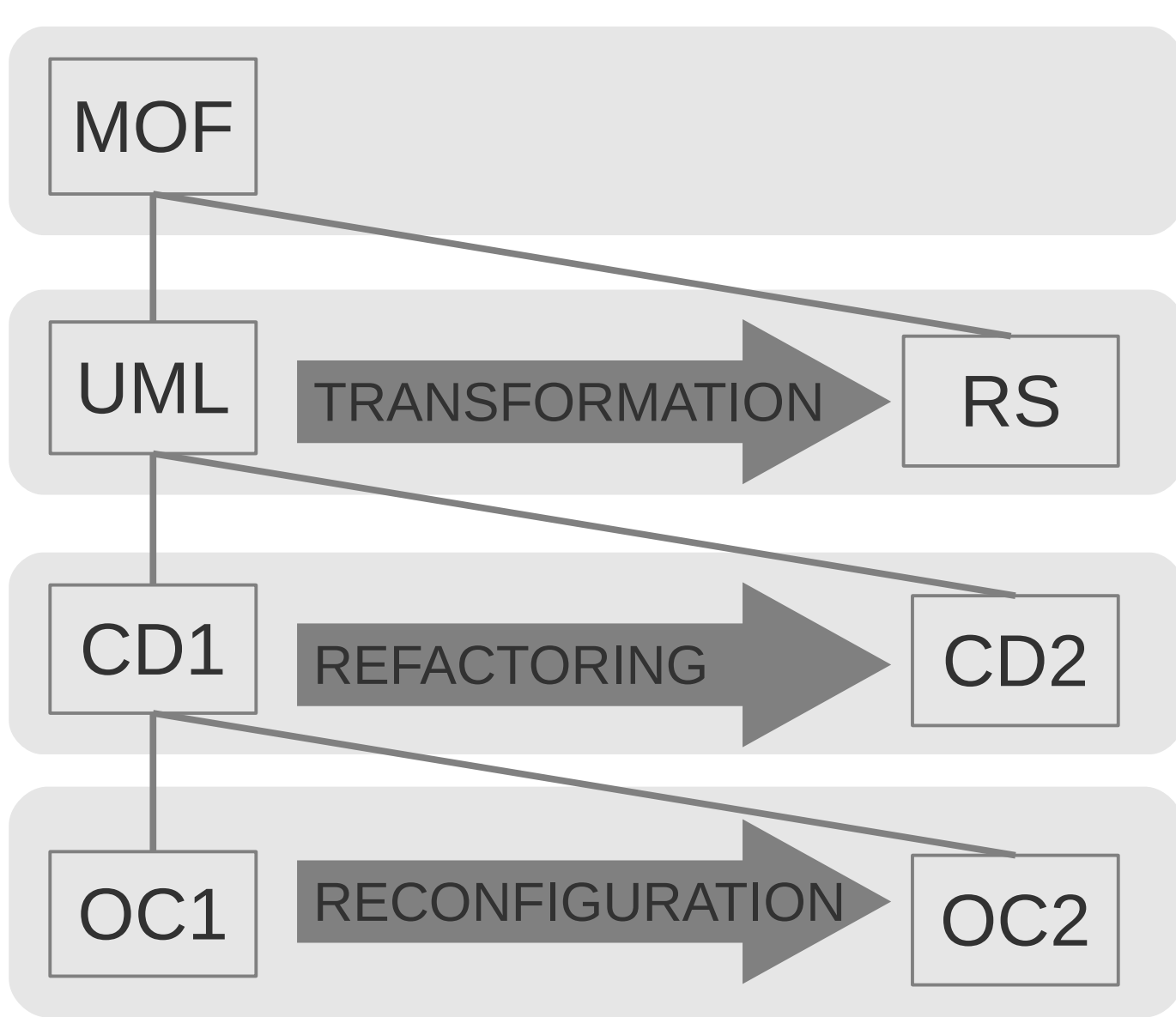
Exploiting the hierarchical structure of rule-based specifications for decision planning



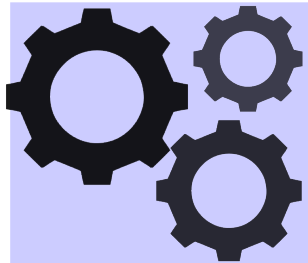
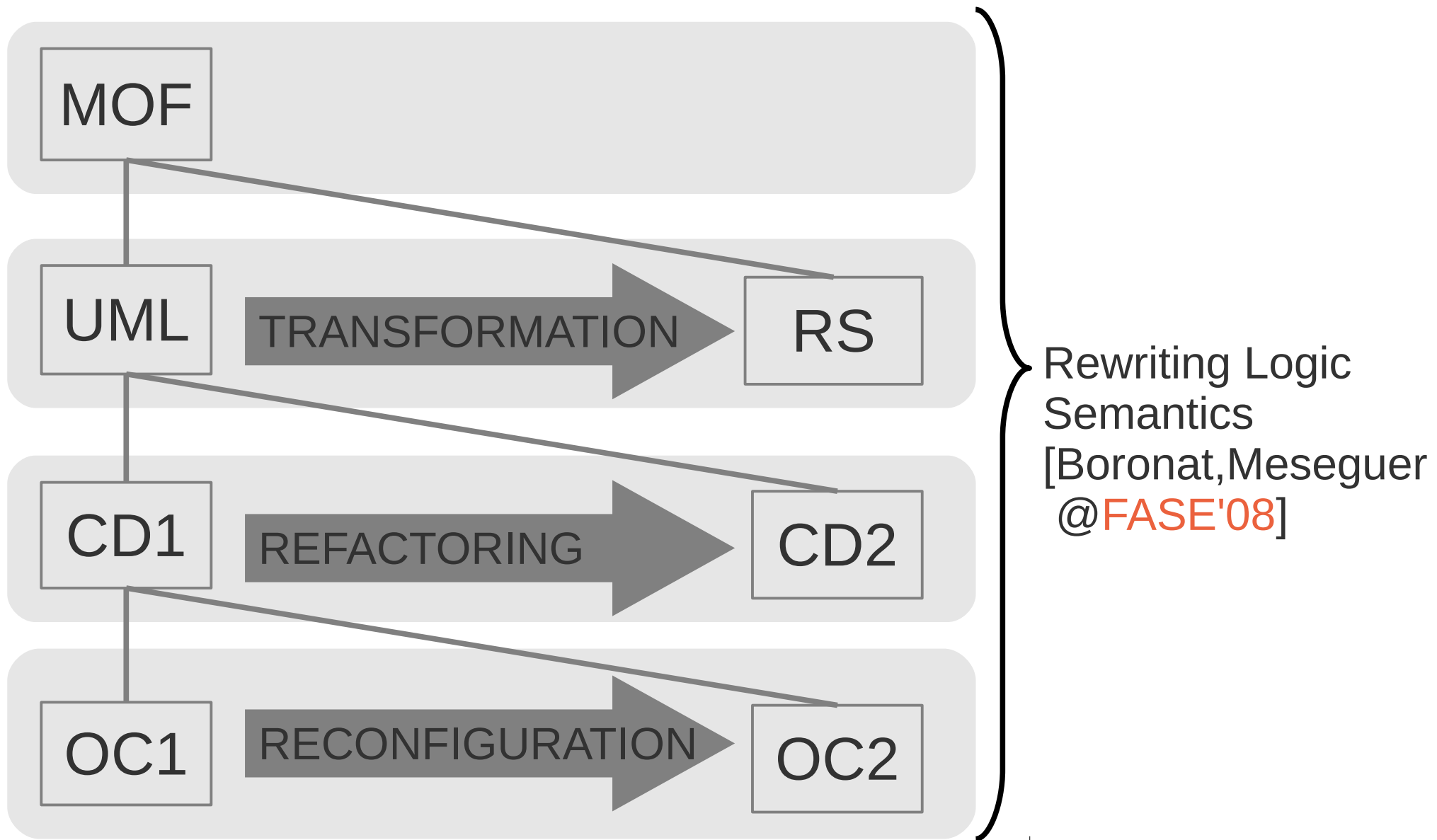
Alberto Lluch
Artur Boronat
Roberto Bruni
Ugo Montanari
Generoso Paolillo

IFIP International Conference on Formal Techniques for Distributed Systems
June 7 - 10, 2010, Amsterdam

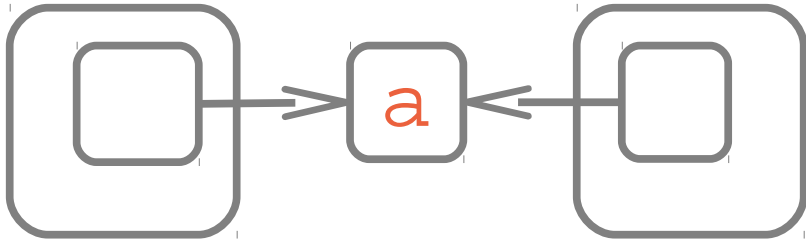


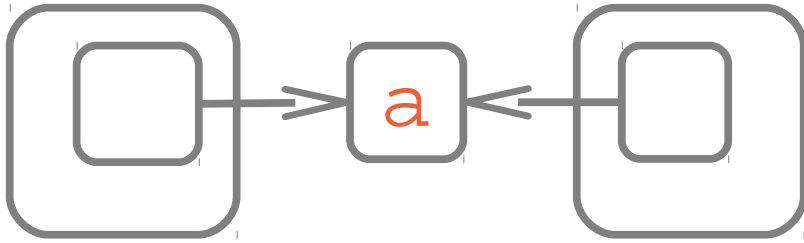


Rewriting Logic
Semantics
[Boronat, Mesequer
@FASE'08]

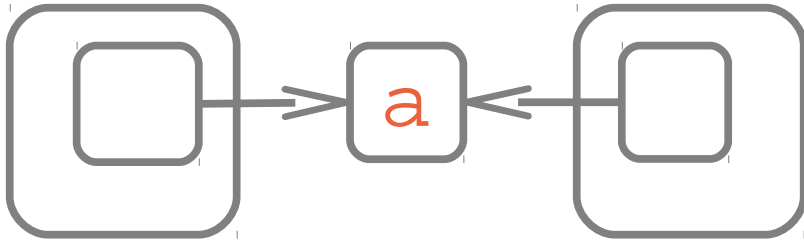


MOMENT2=ECLIPSE+MAUDE





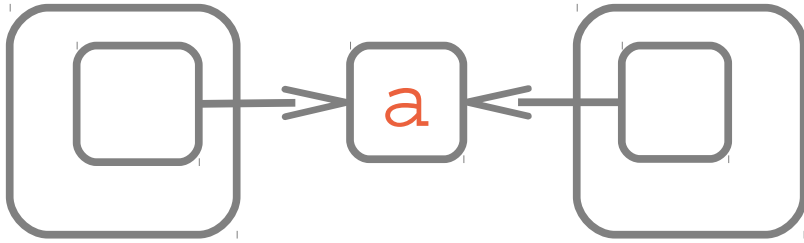
[G (a)] | [H (a)]



[G (a)] | [H (a)]

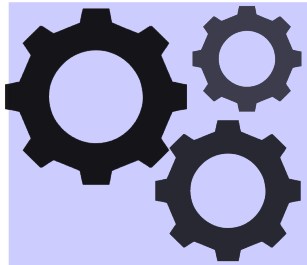
SOS-like rules



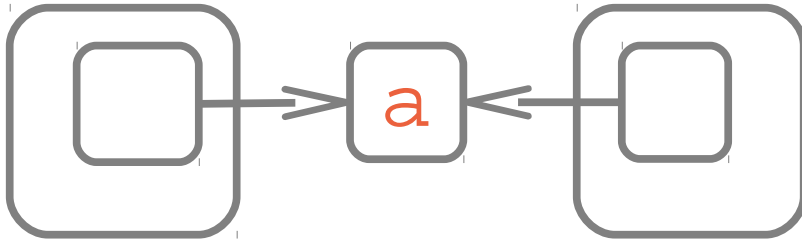


$[G(a)] \mid [H(a)]$

SOS-like rules

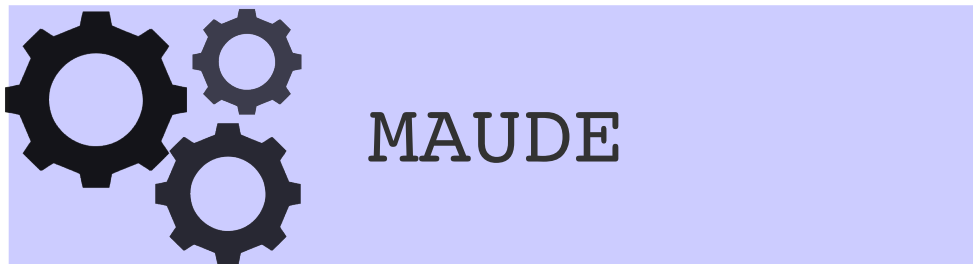
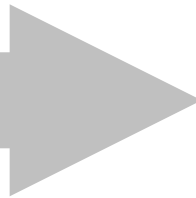


MAUDE



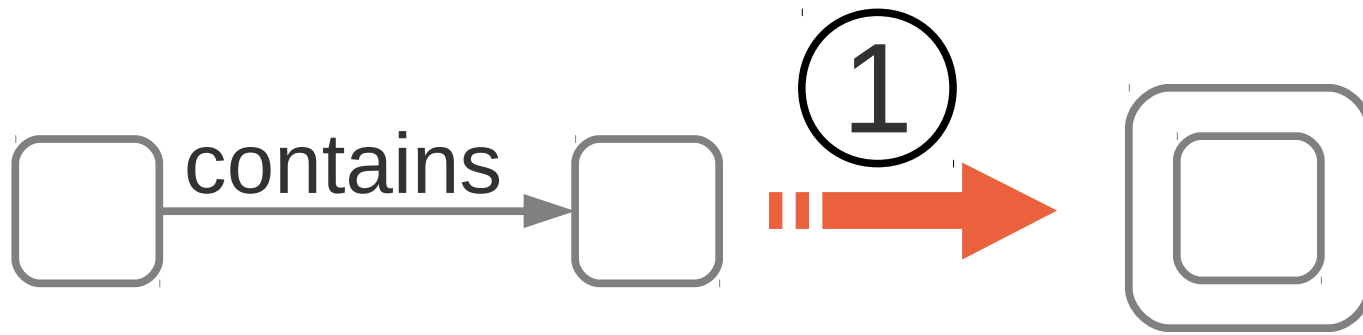
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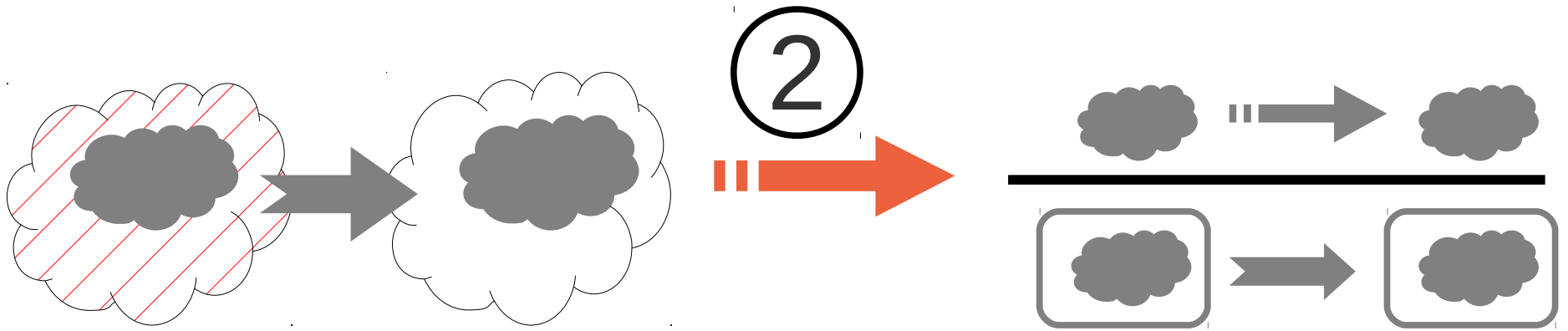
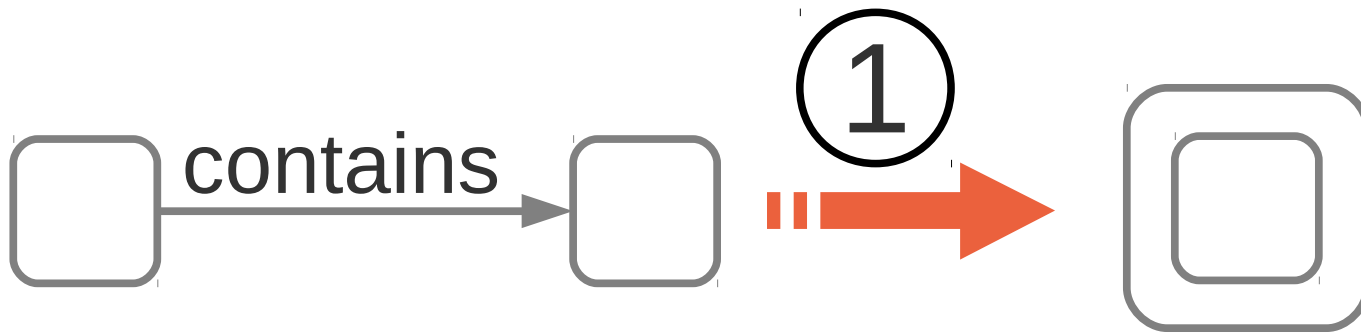
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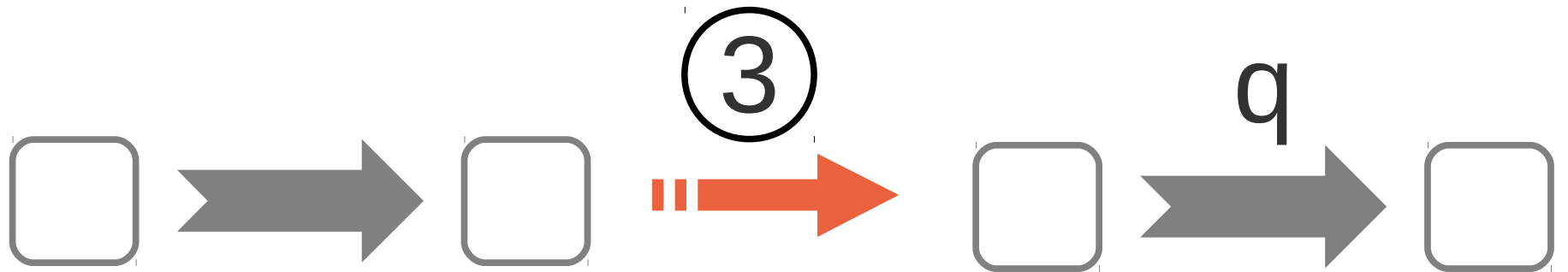
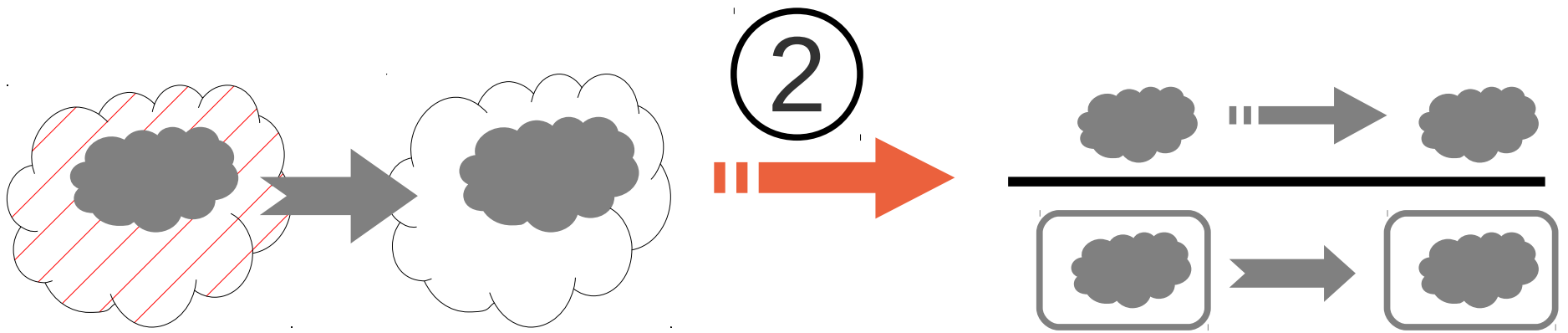
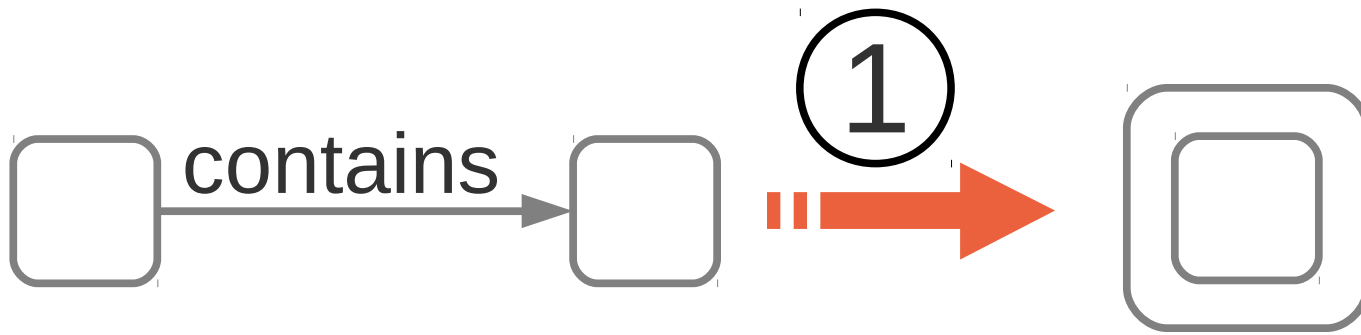


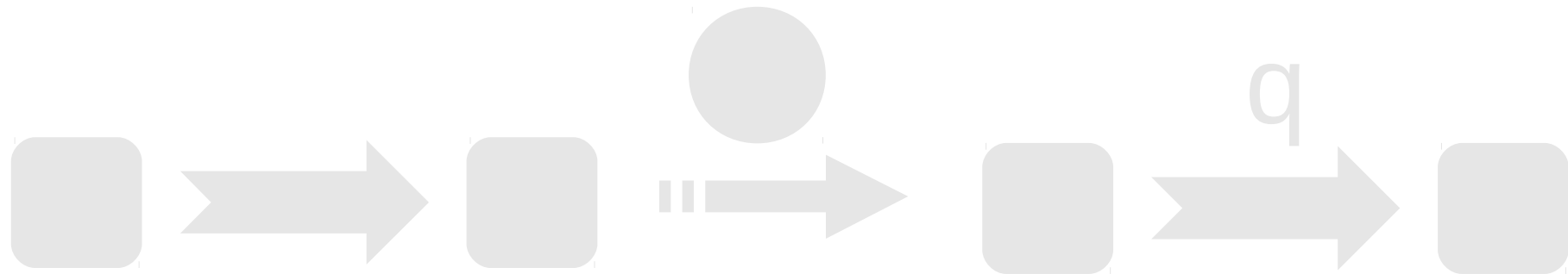
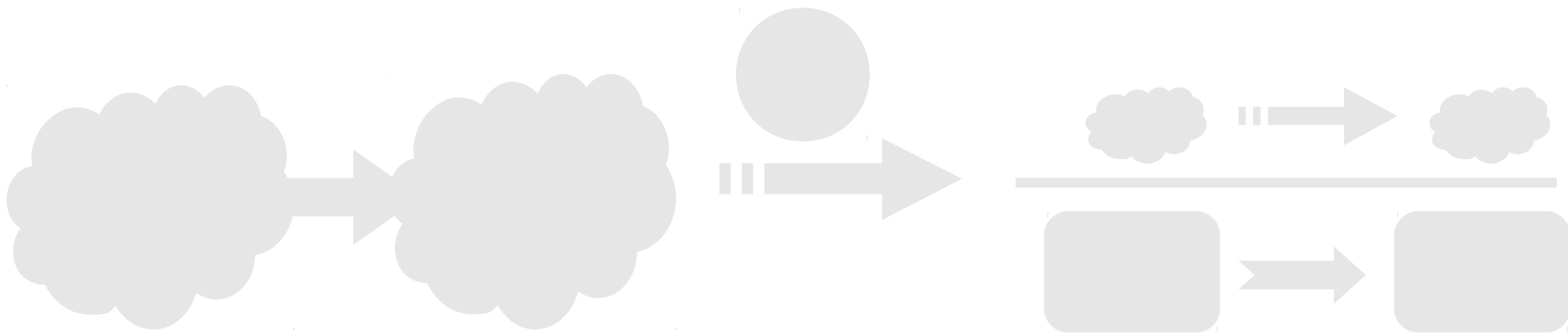
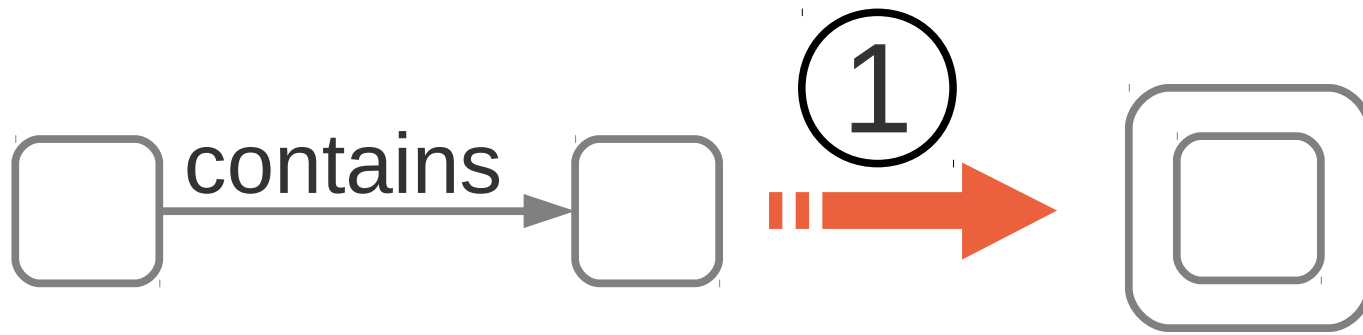
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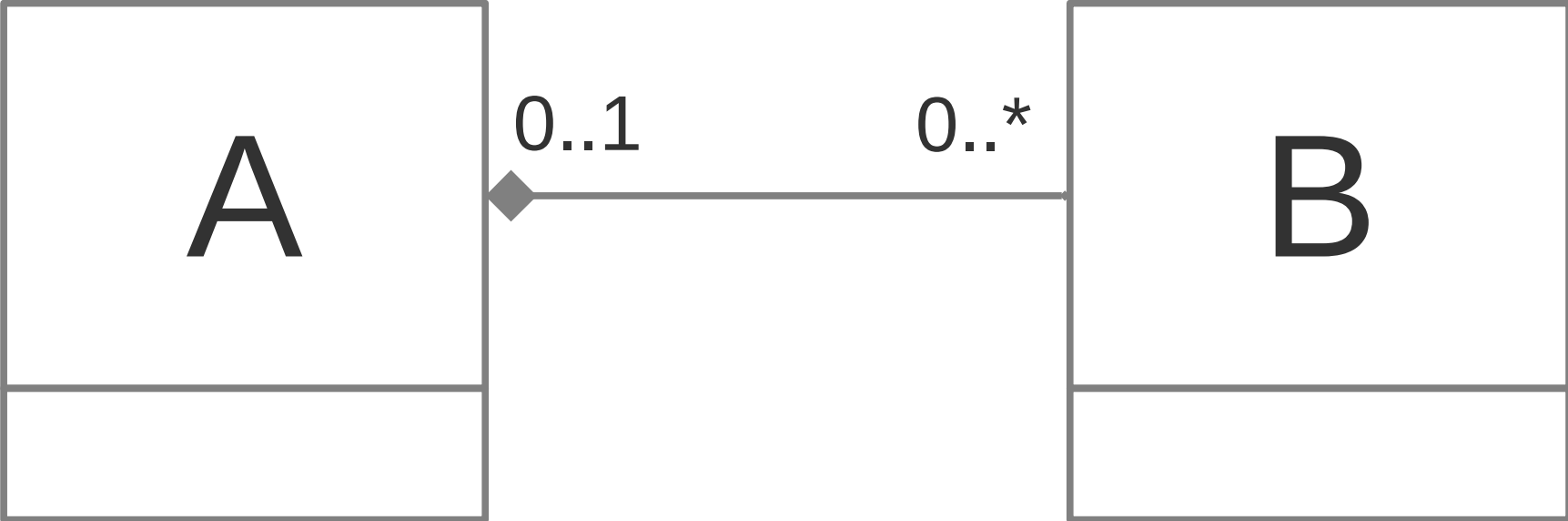
[Montanari, Bruni, Lluh,
Gadducci, Tuosto, etc.
@TGC'10]

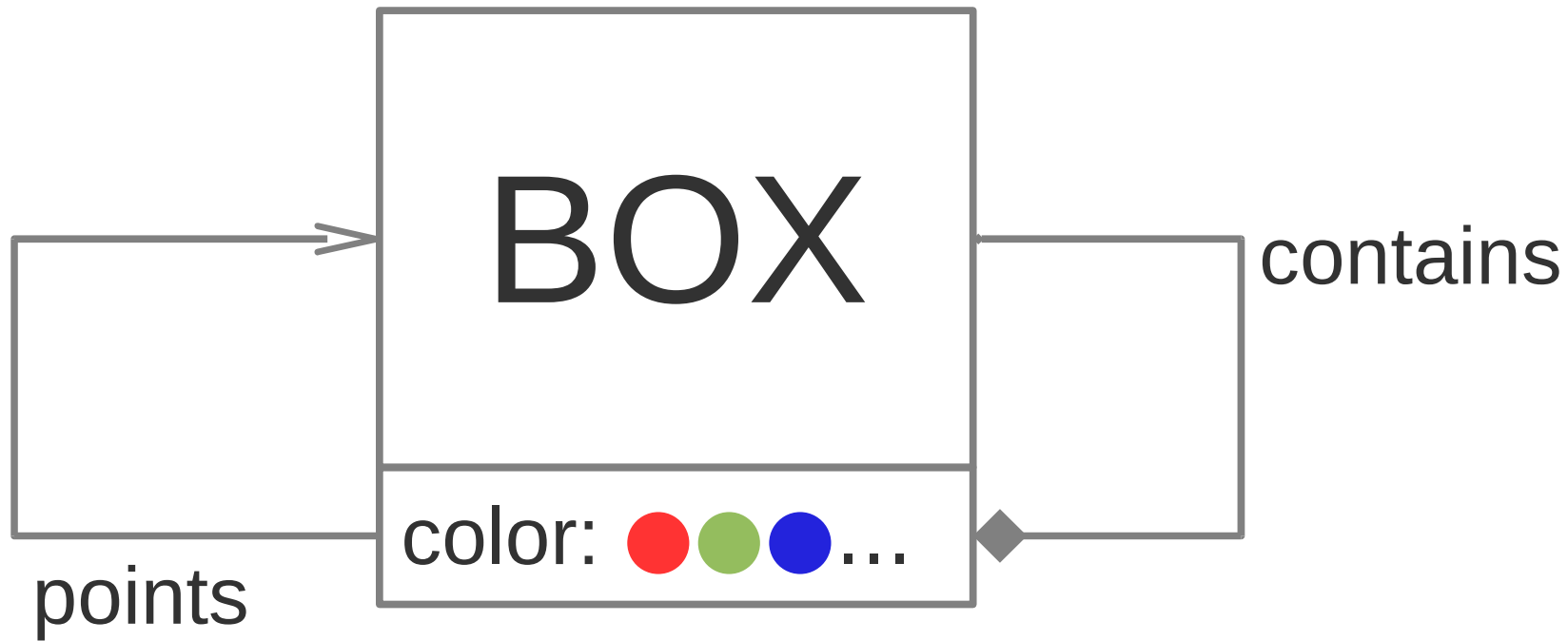


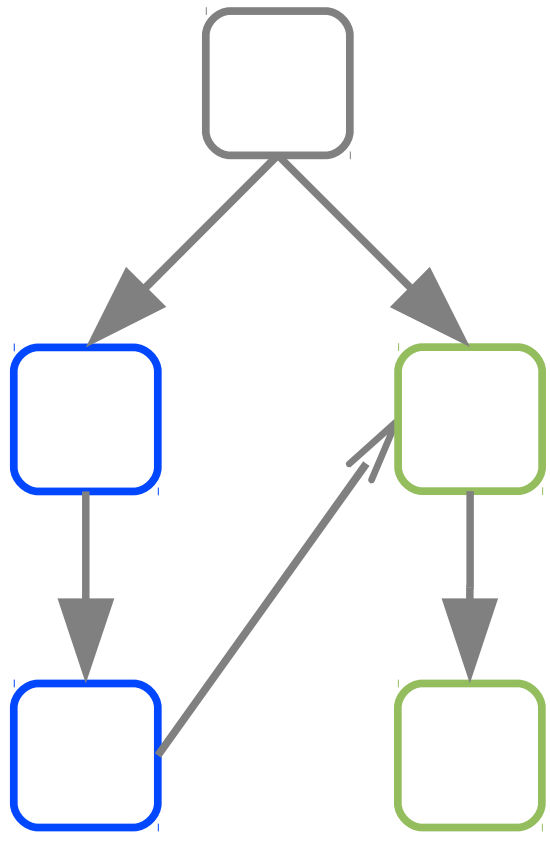


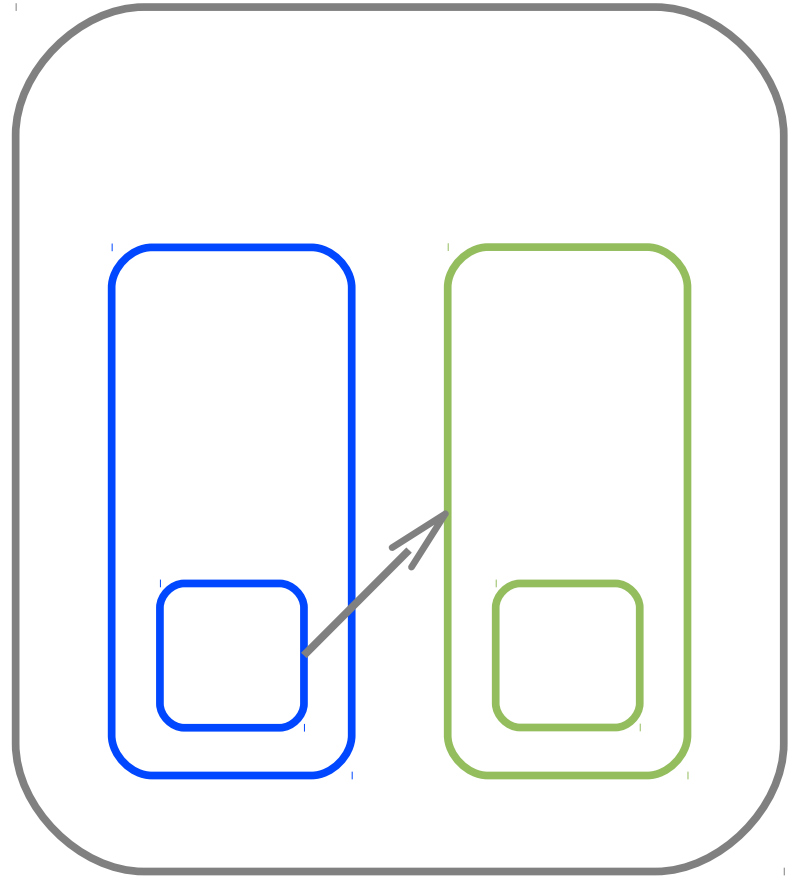
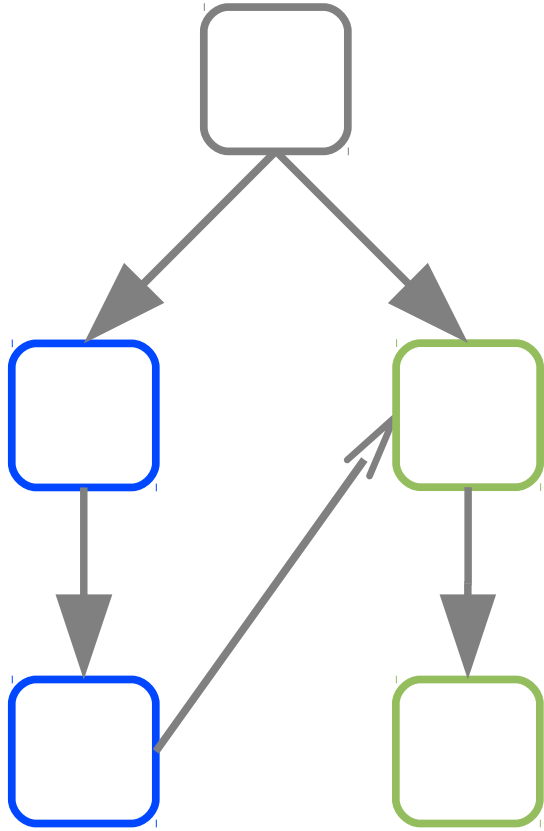










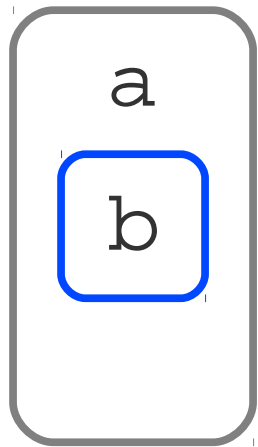




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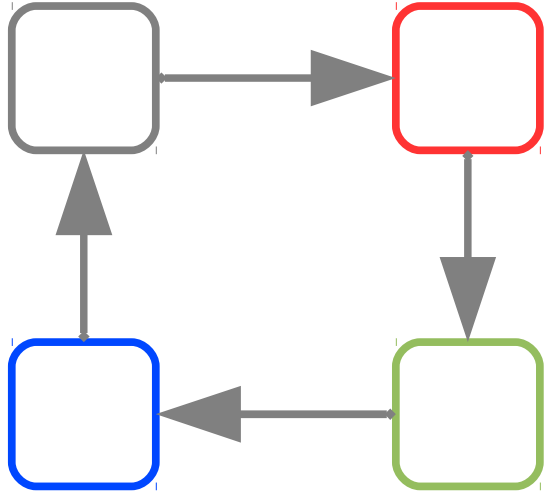
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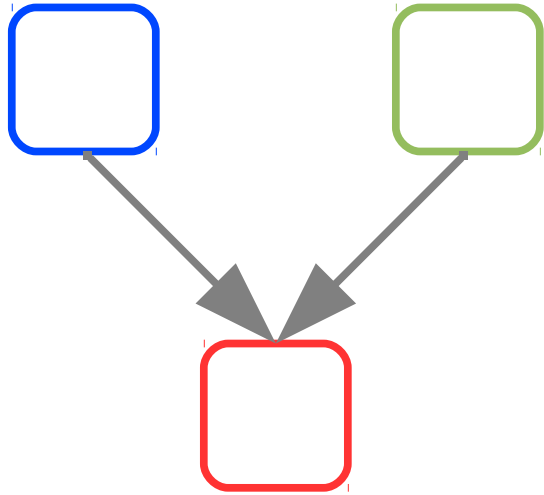
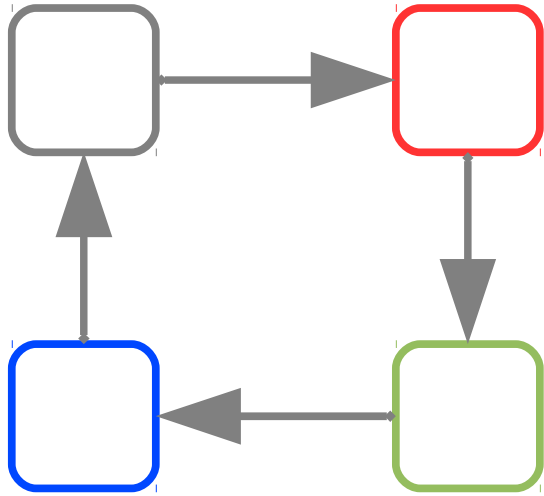


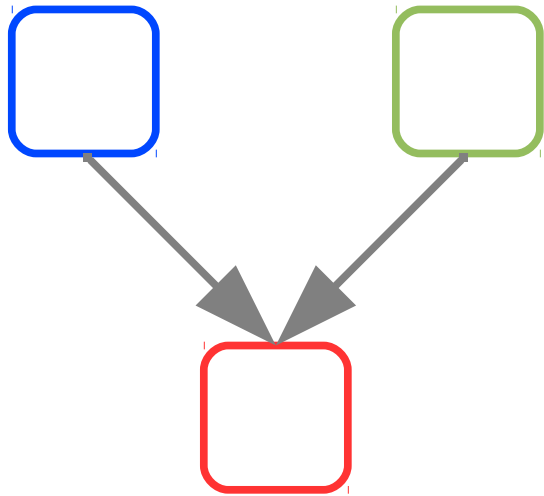
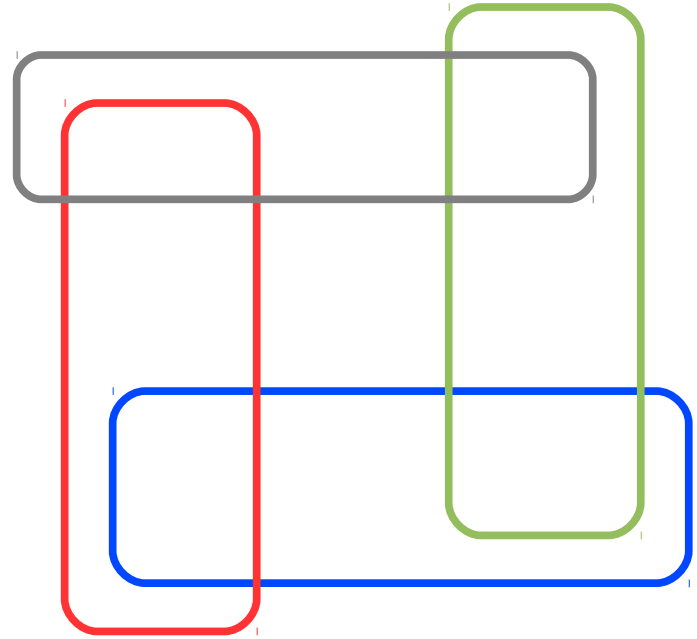
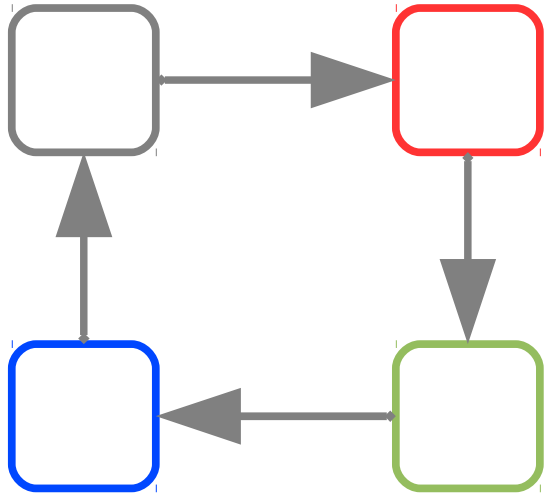
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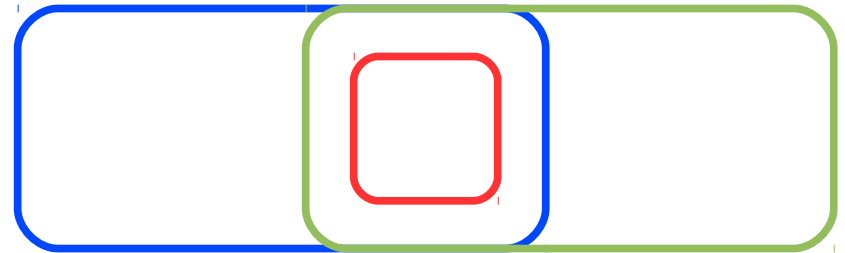
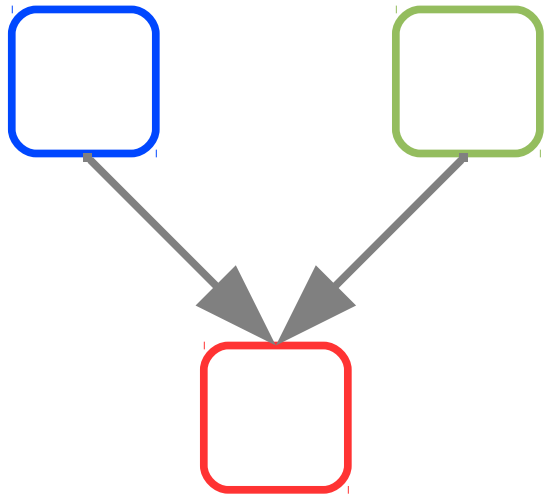
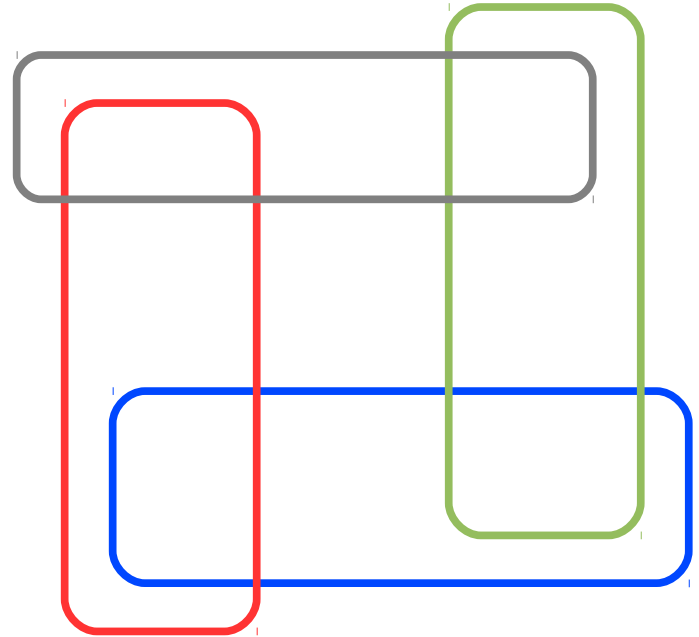
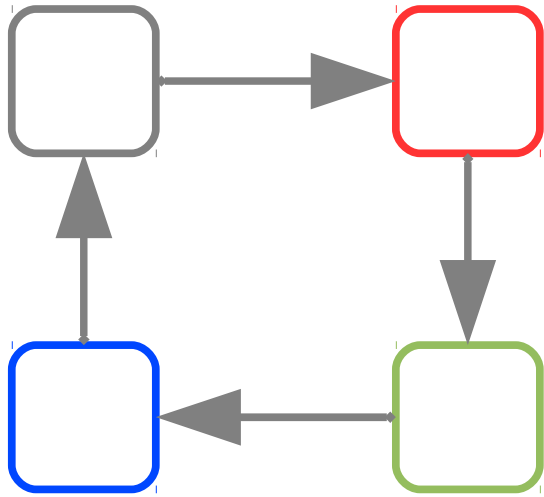
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Object Collections (flat graphs)

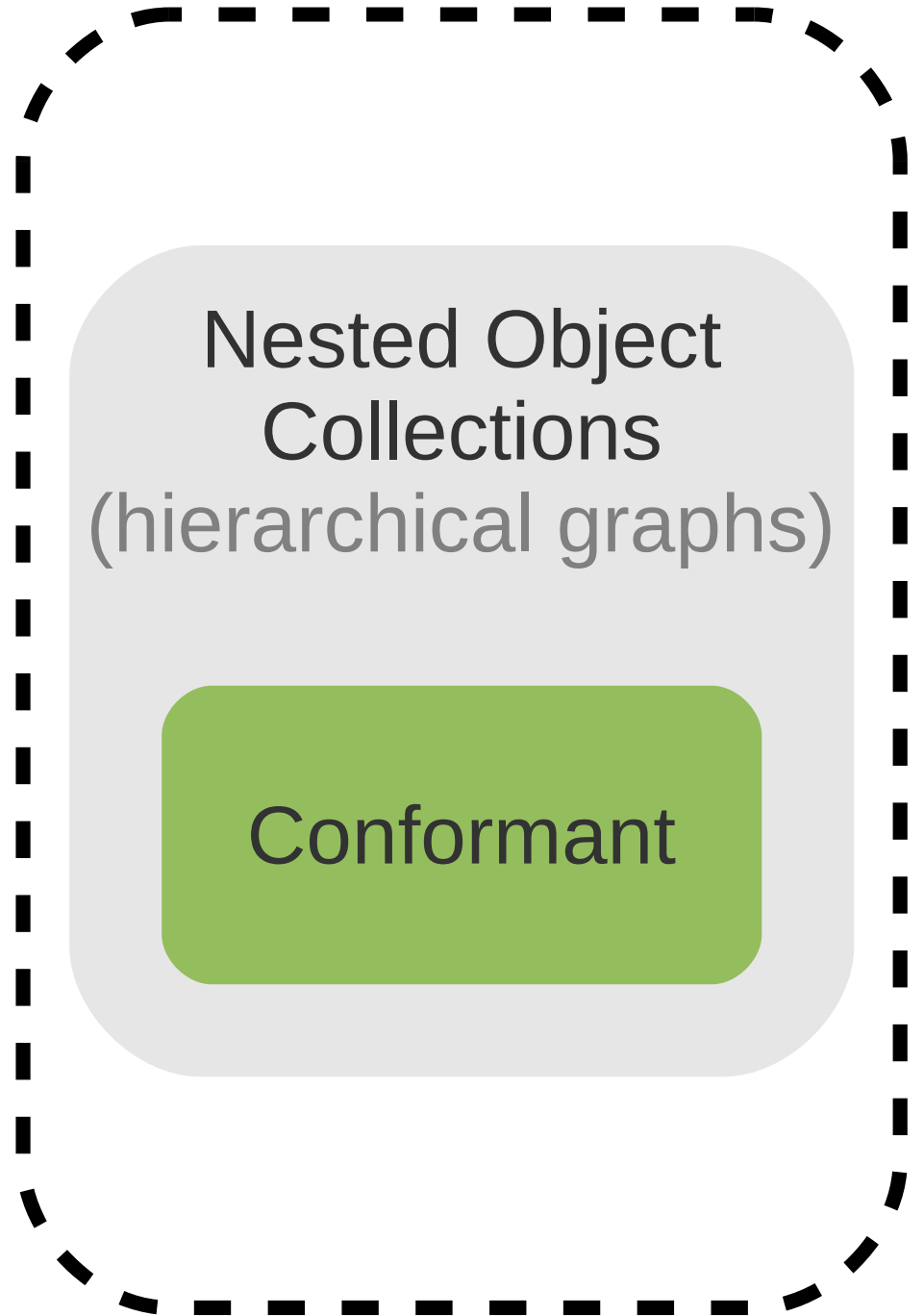
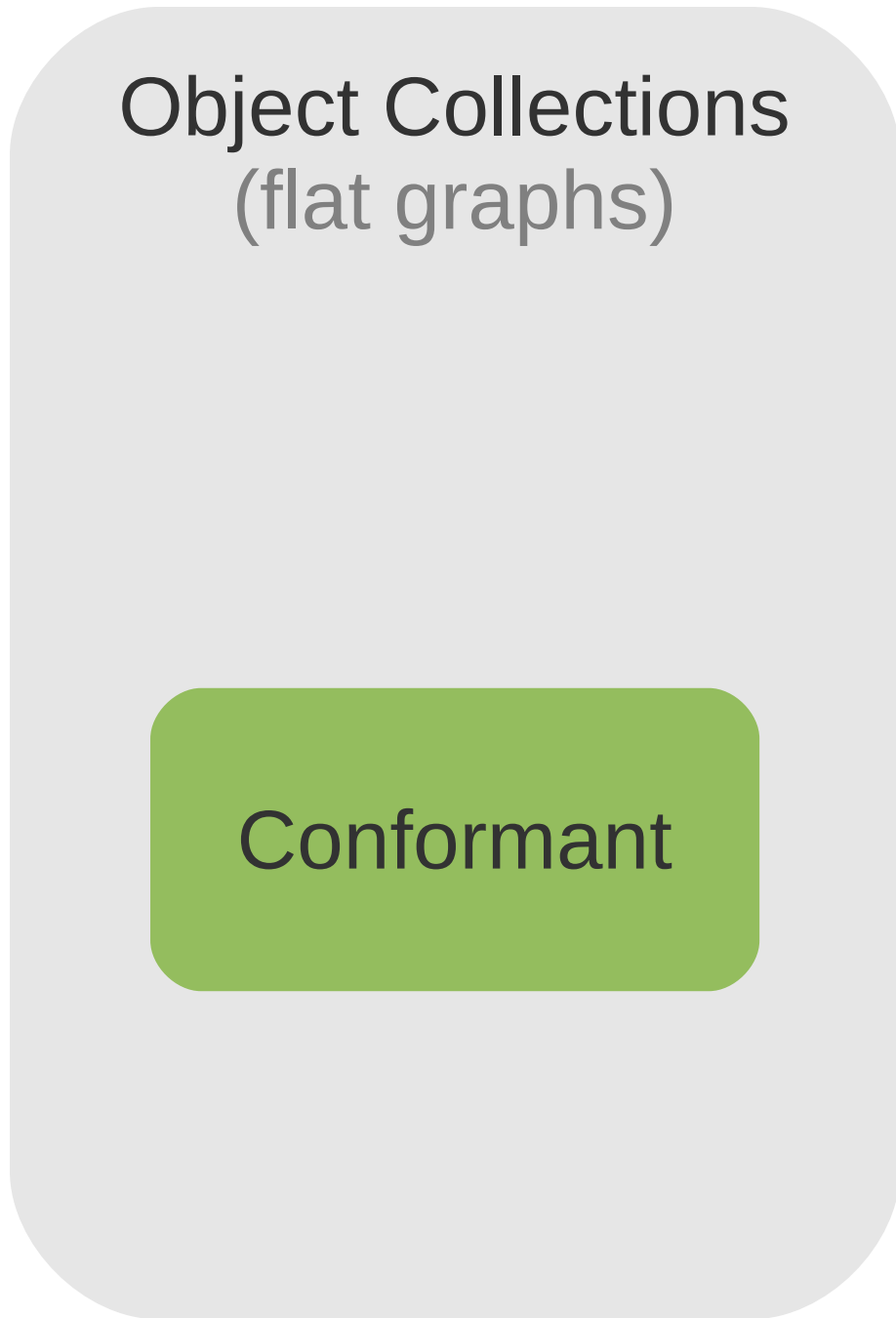
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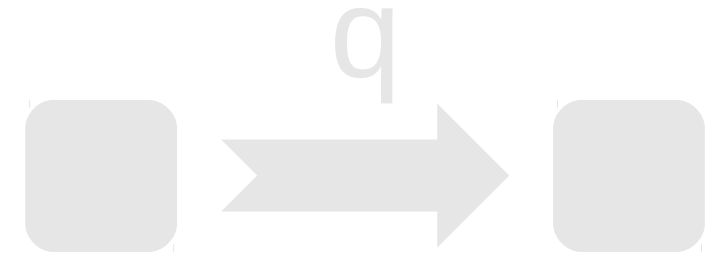
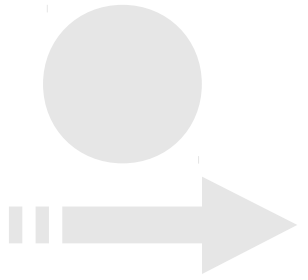
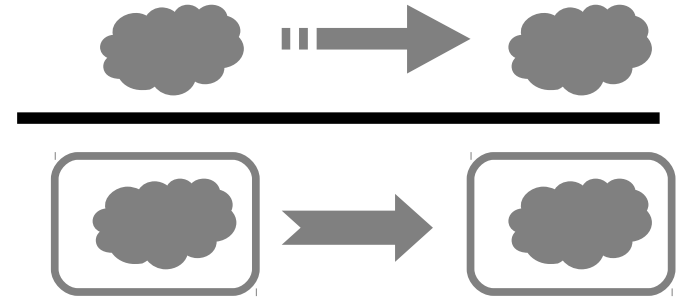
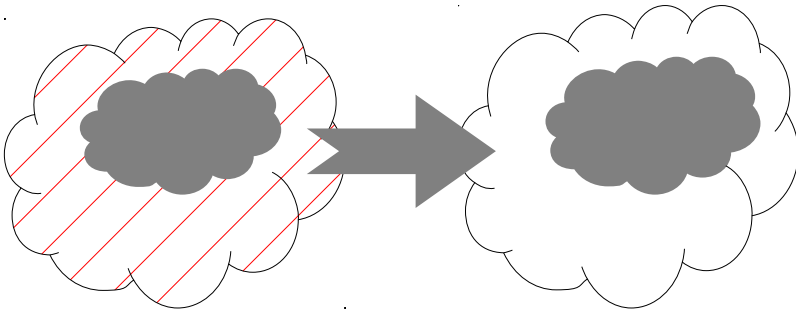
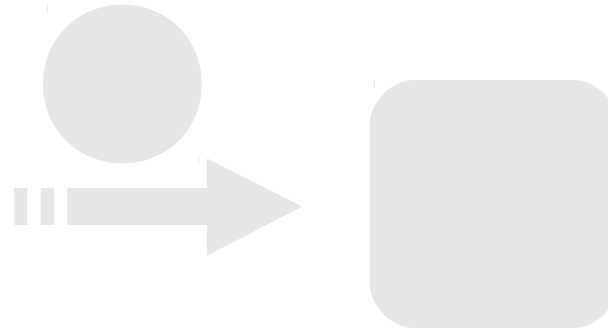
Object Collections
(flat graphs)

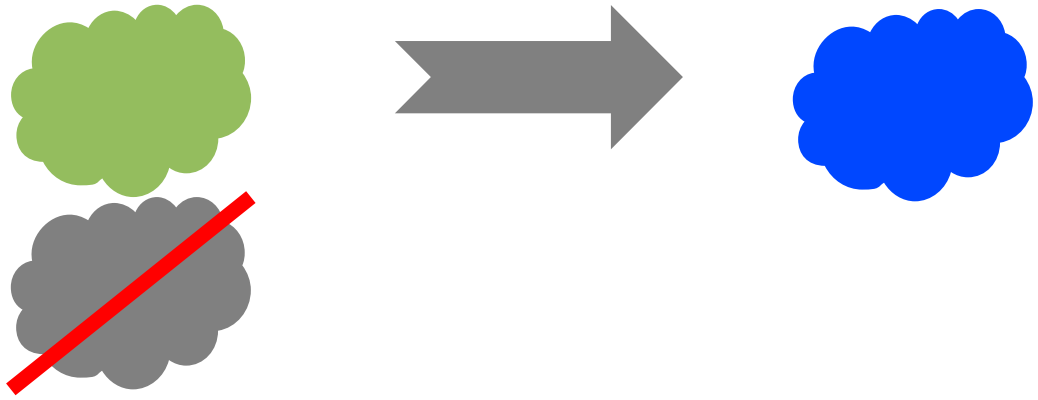
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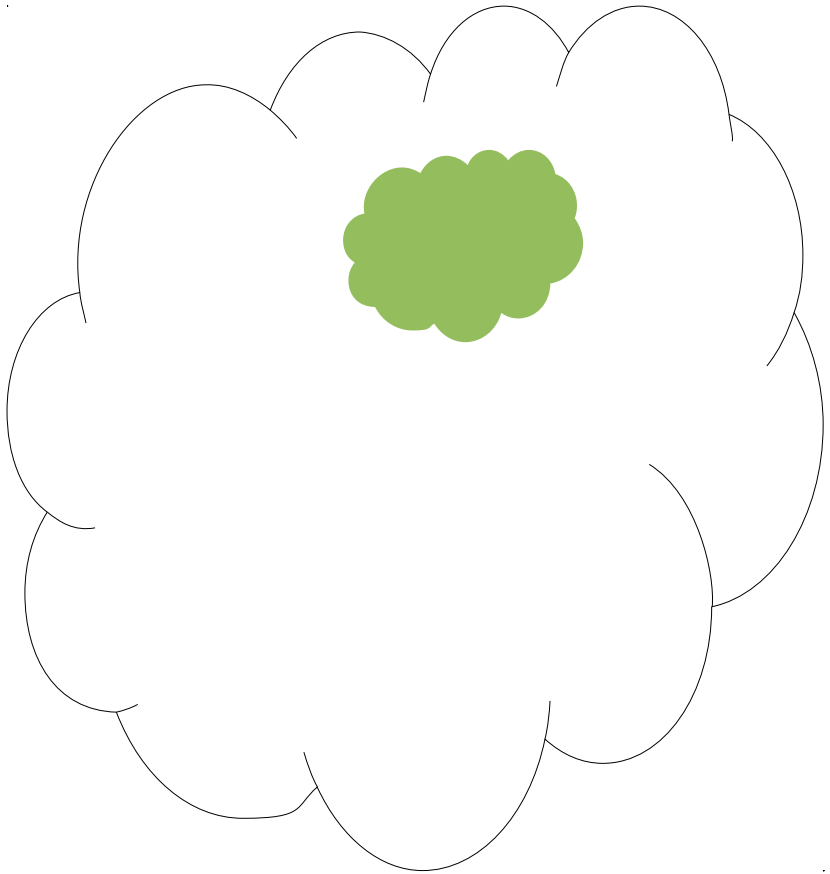
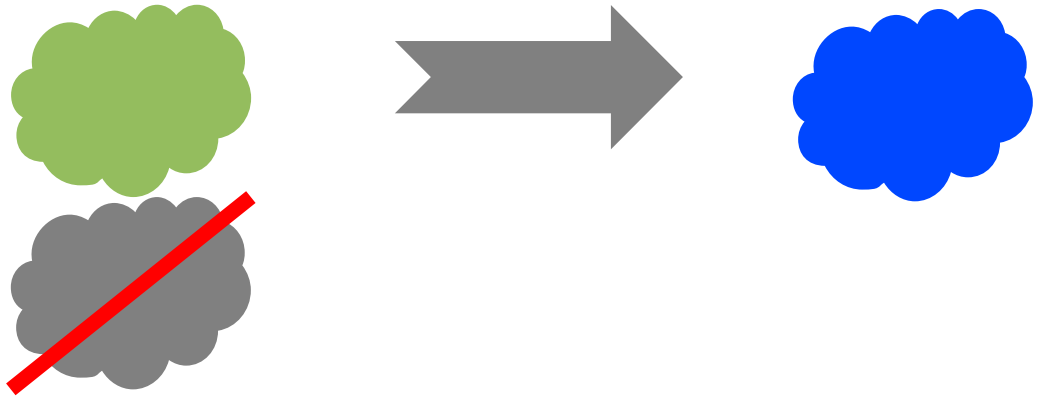
Nested Object
Collections
(hierarchical graphs)

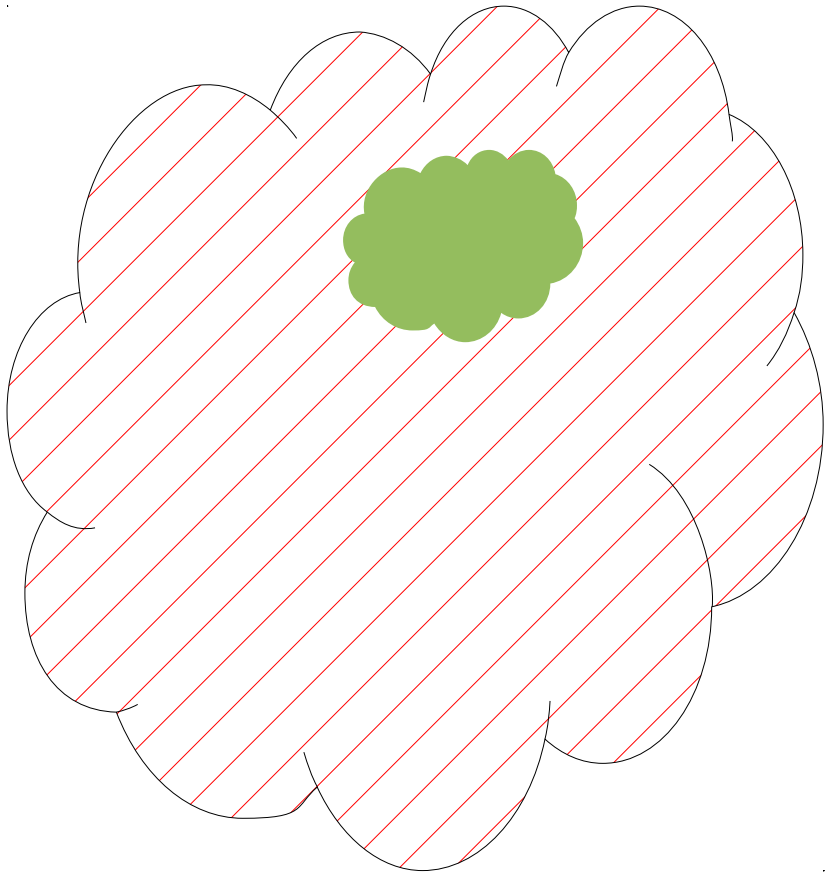
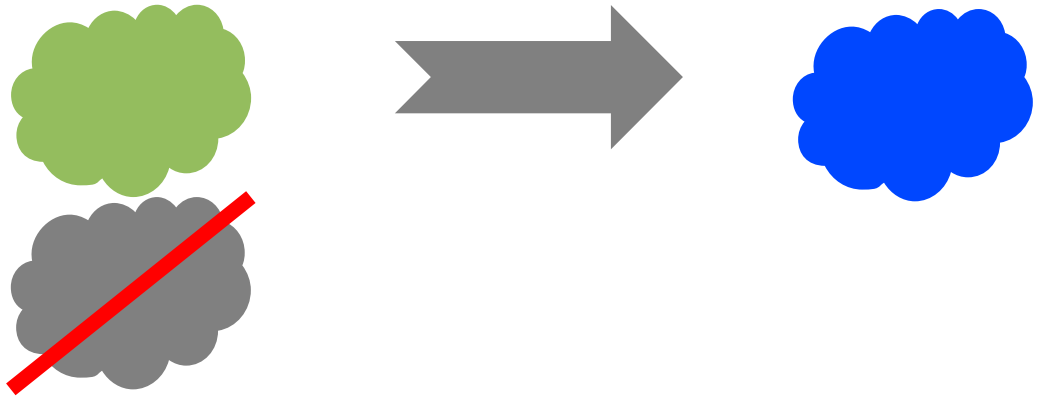
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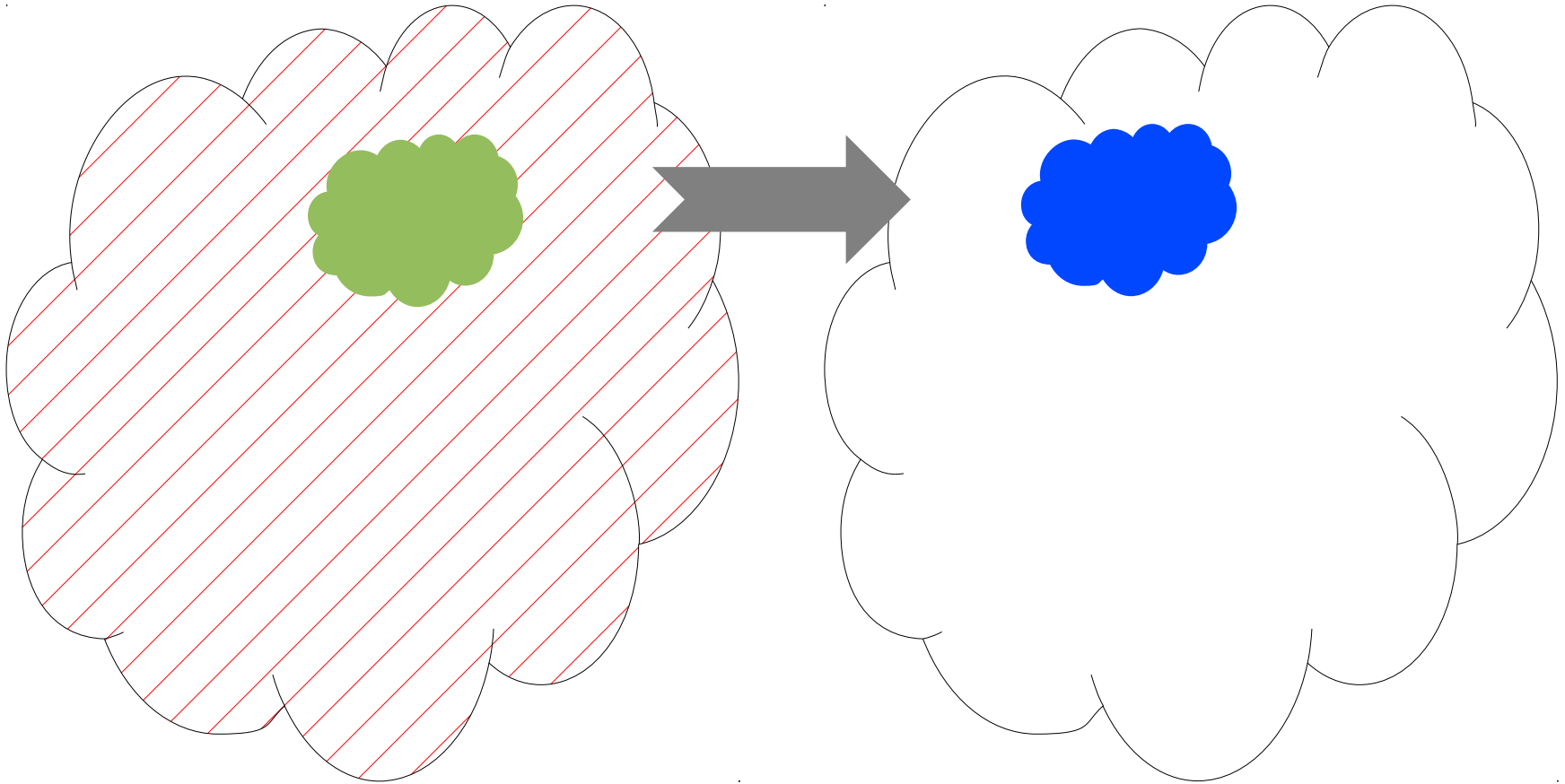
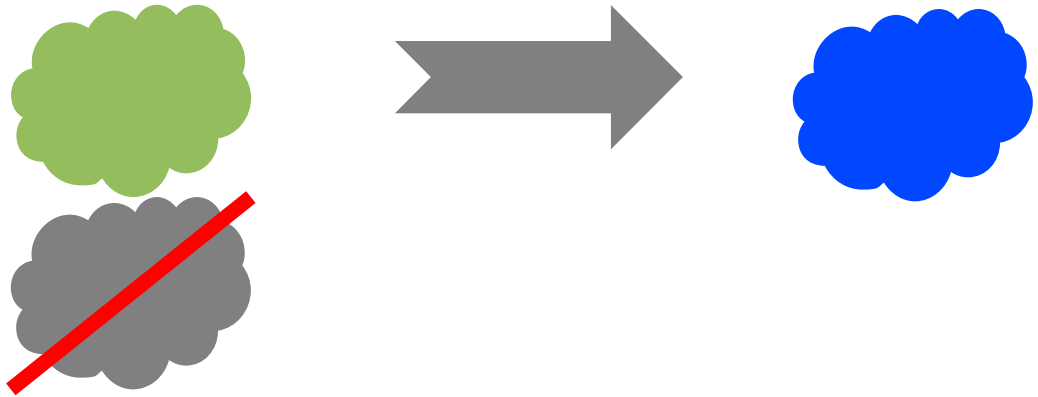


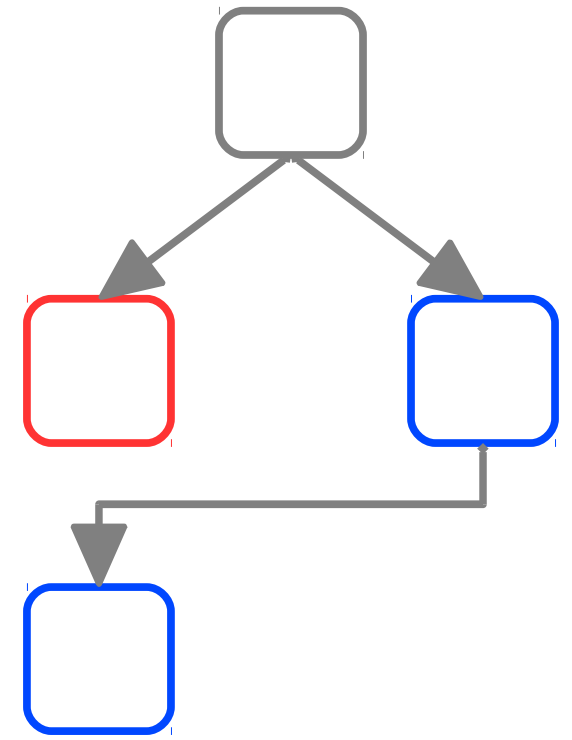
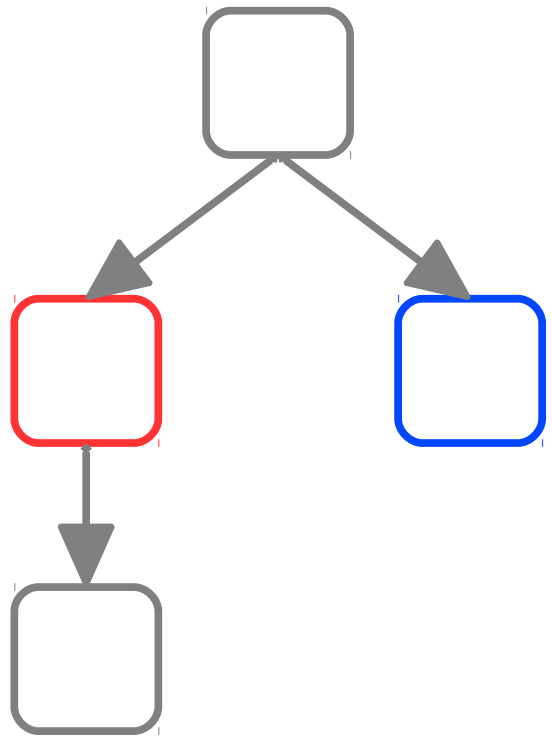


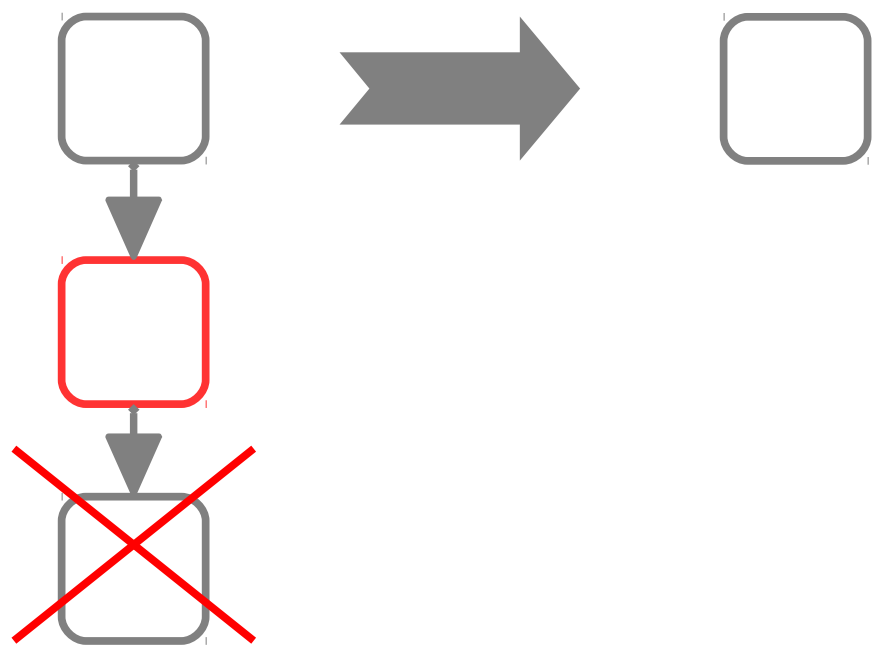


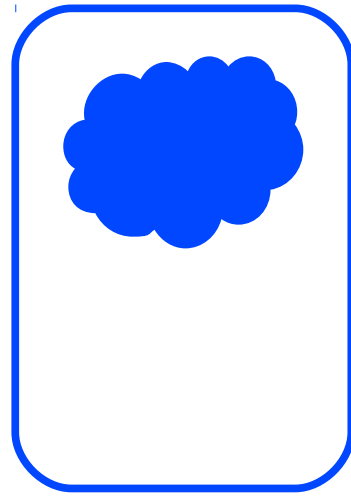
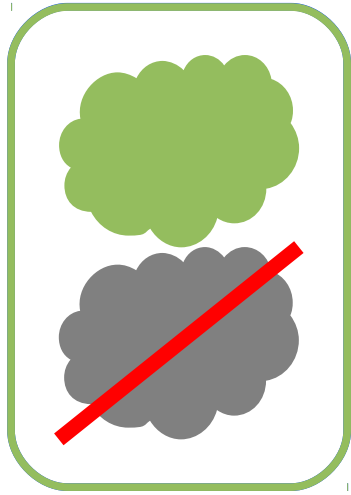


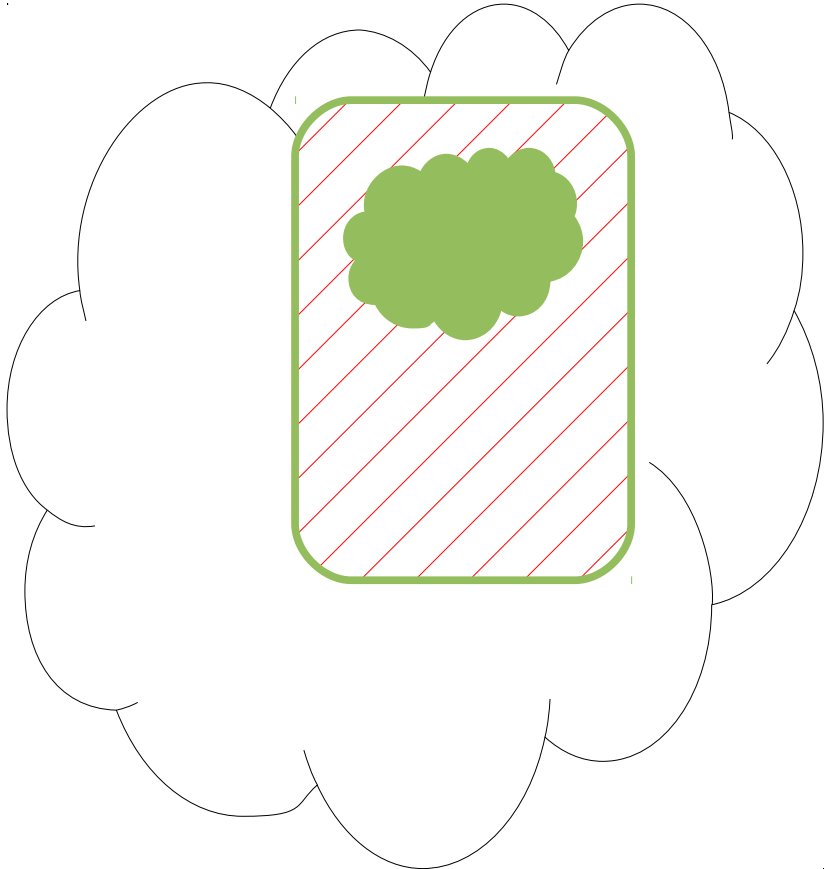
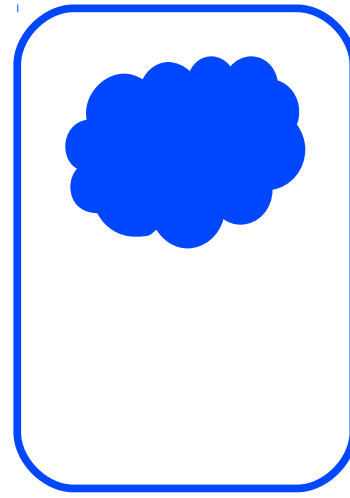
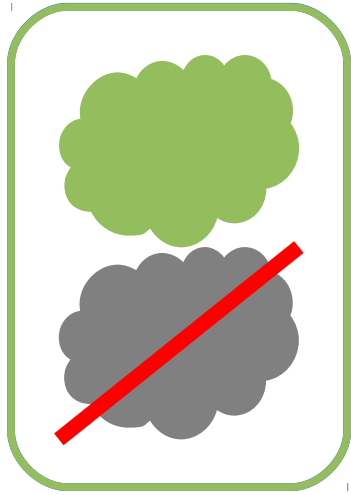


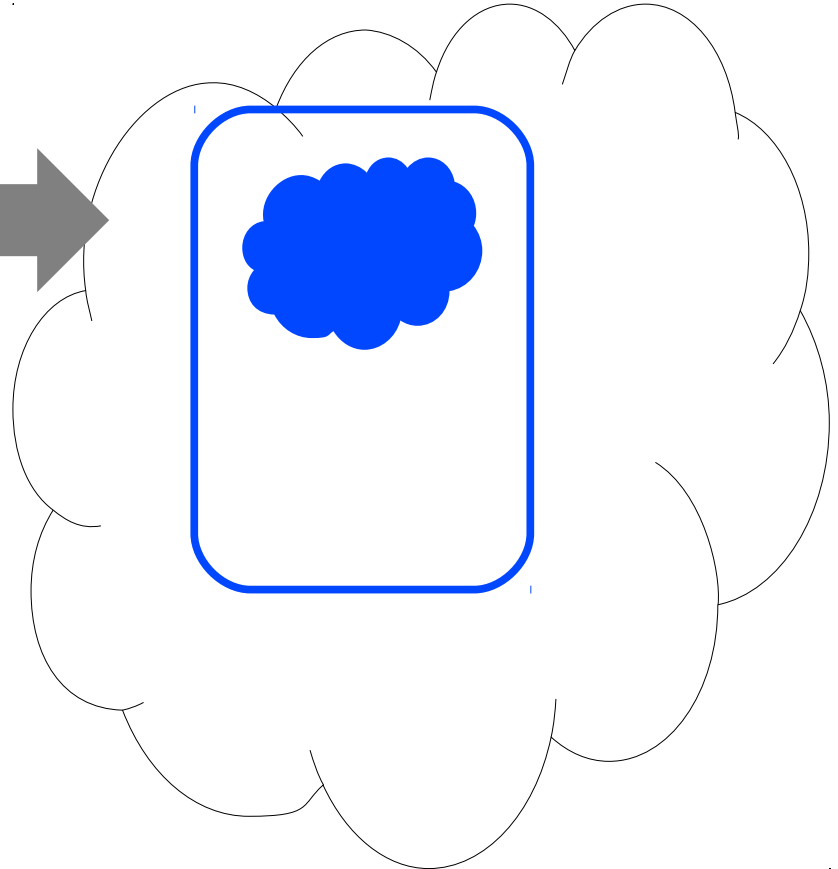
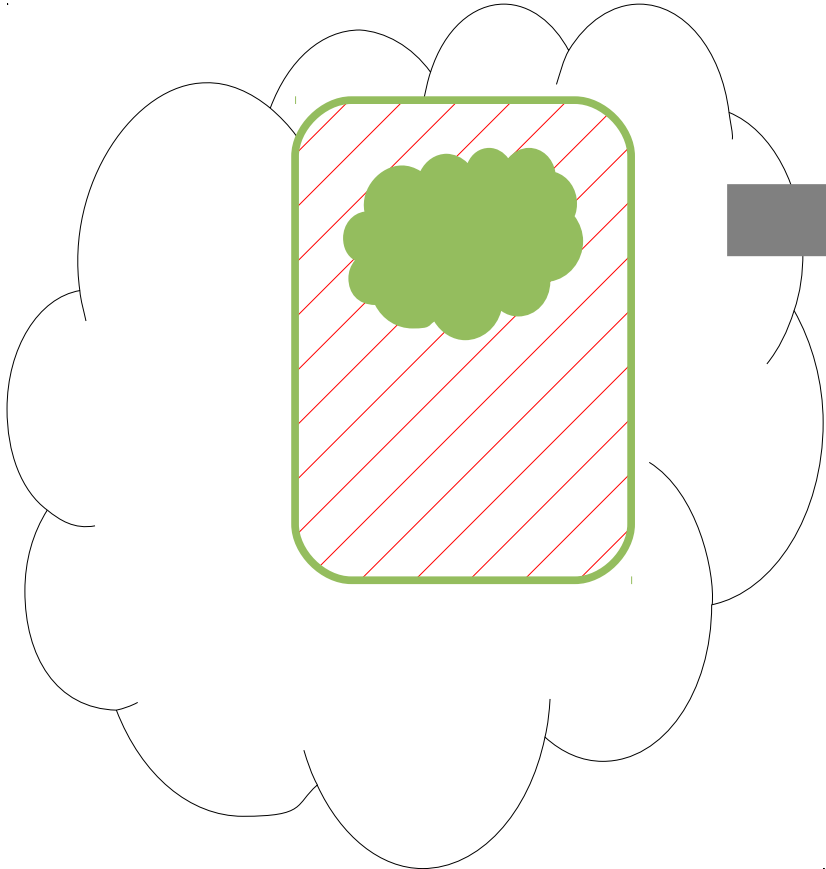
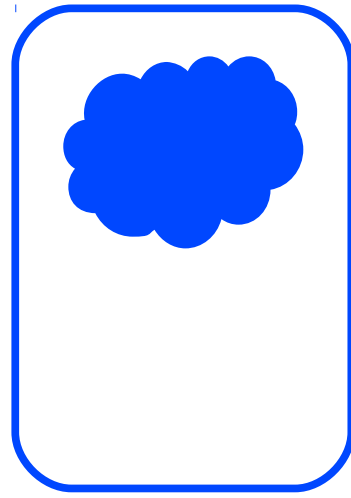
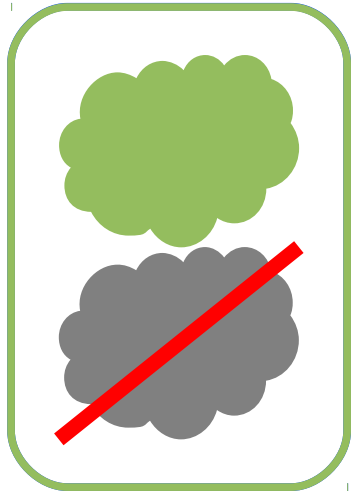


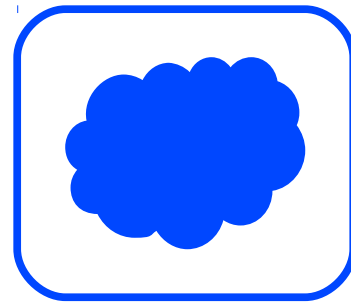


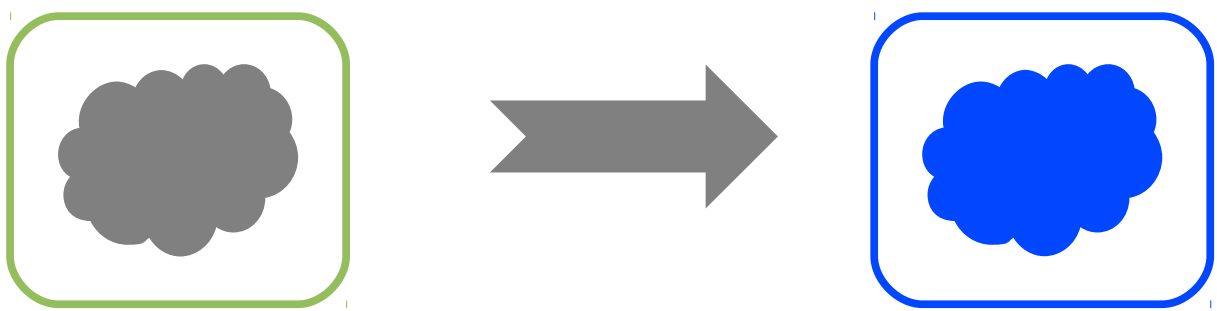
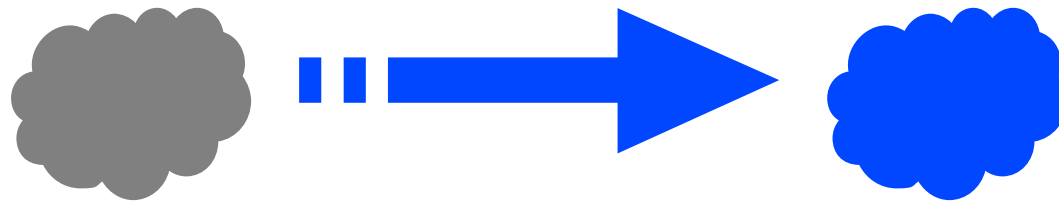


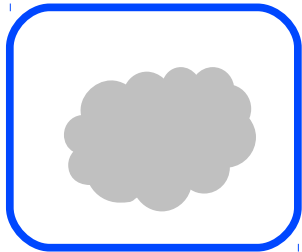
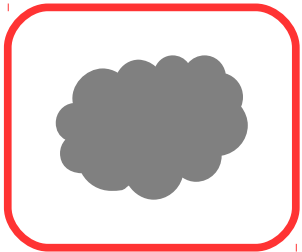


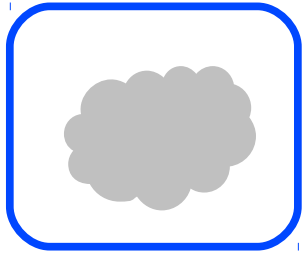
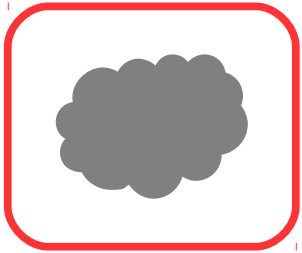


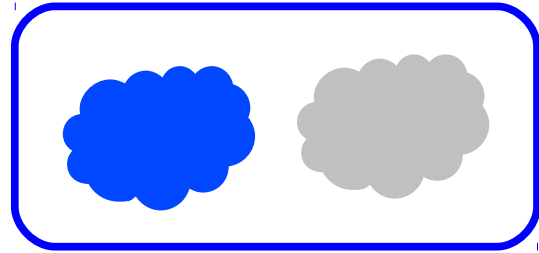
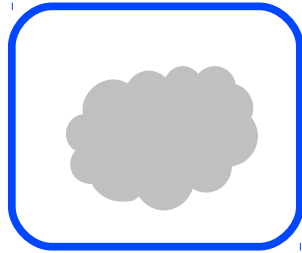
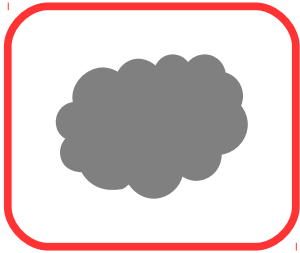






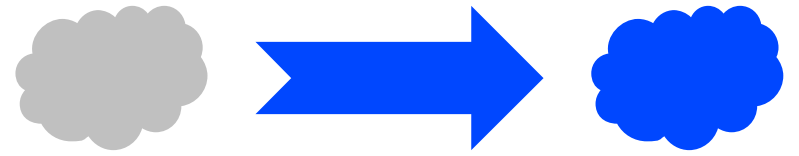


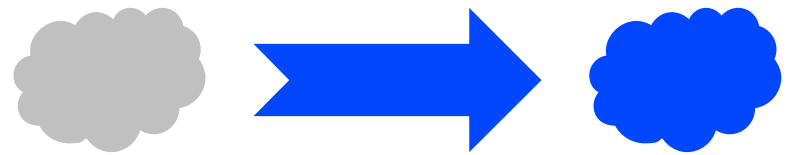


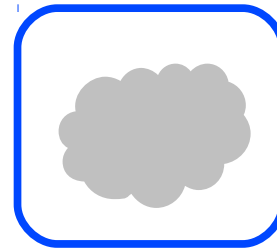
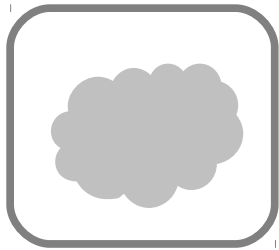




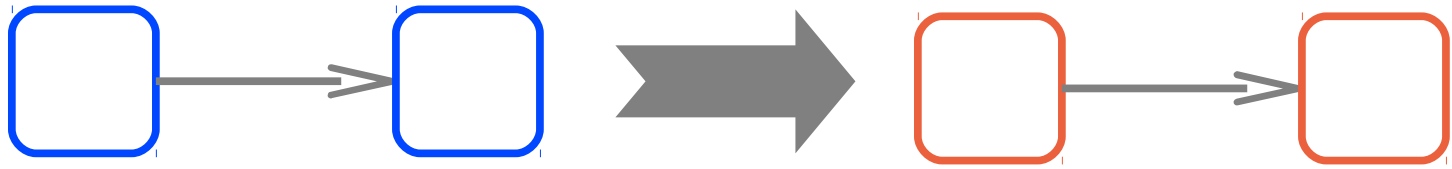


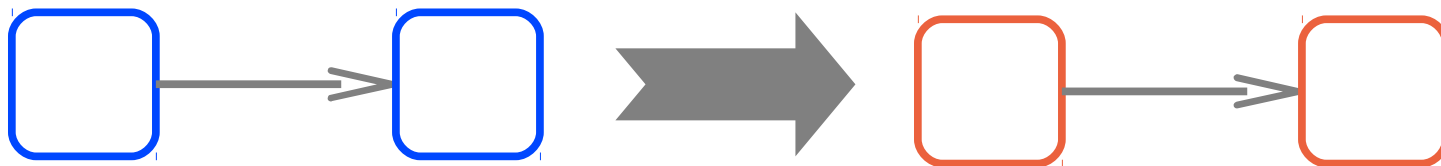




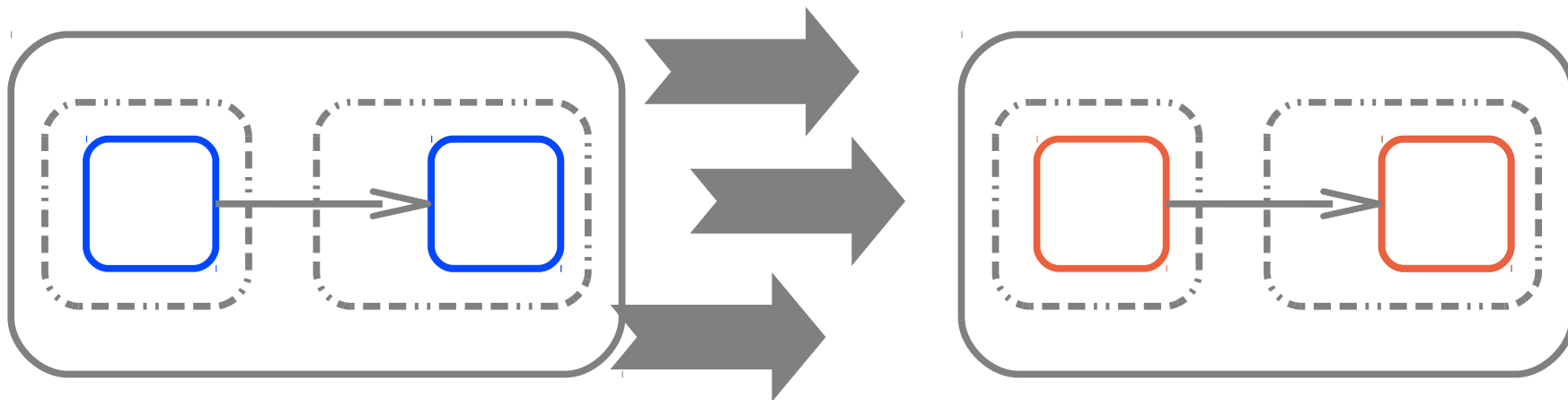


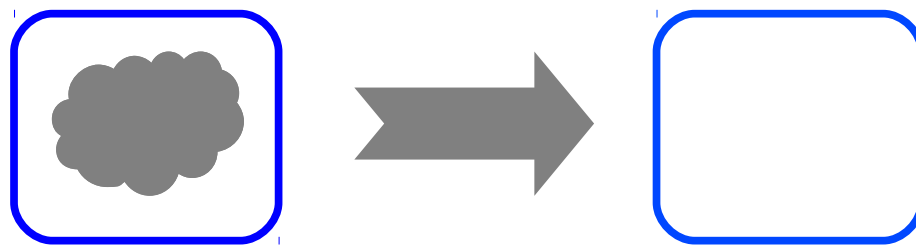
WHICH STYLE
IS BEST?

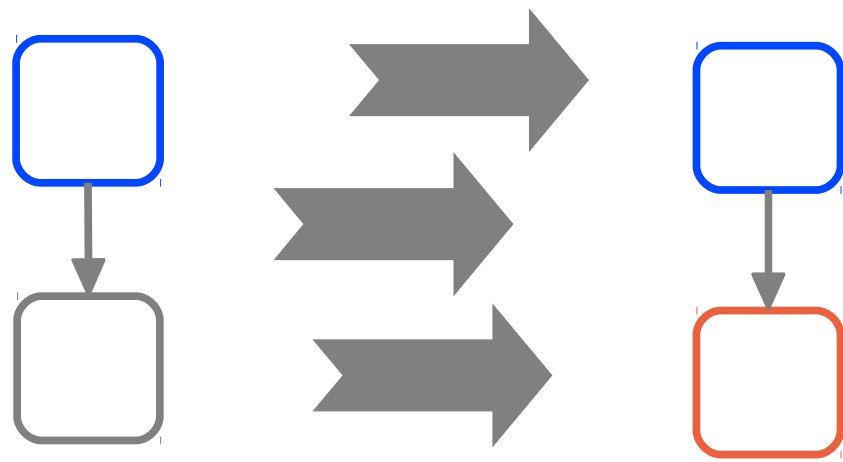




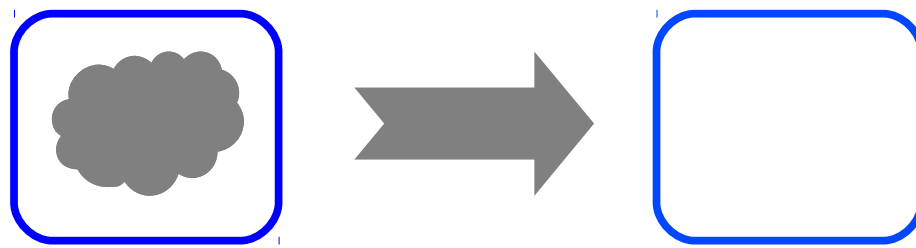
VS



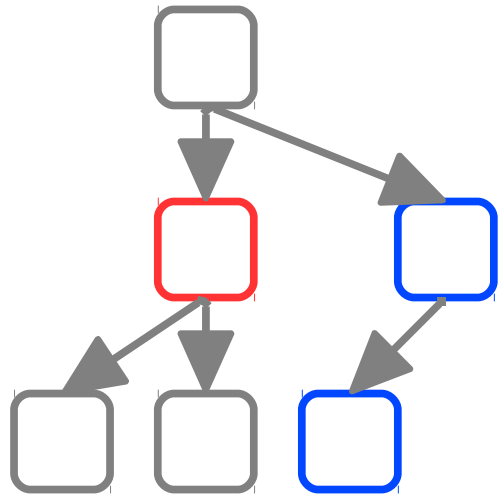
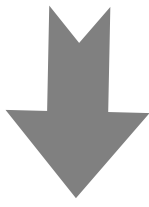
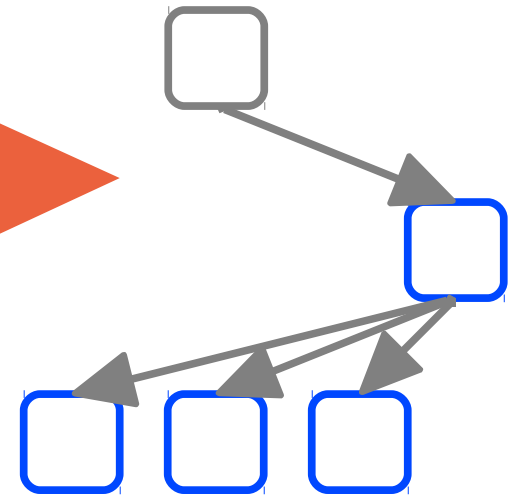
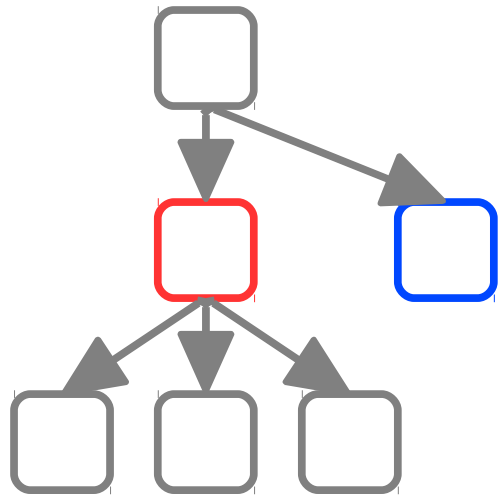


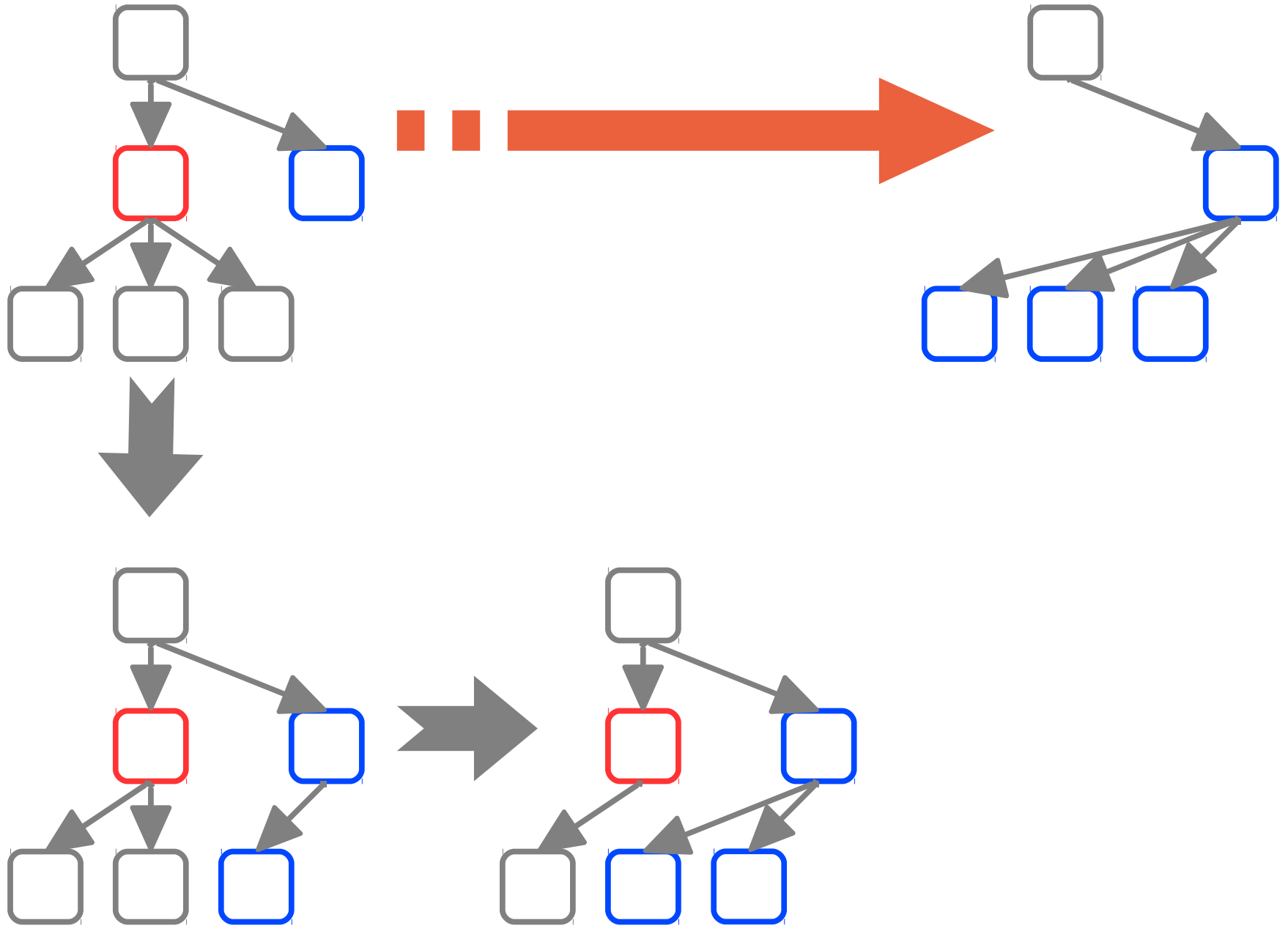


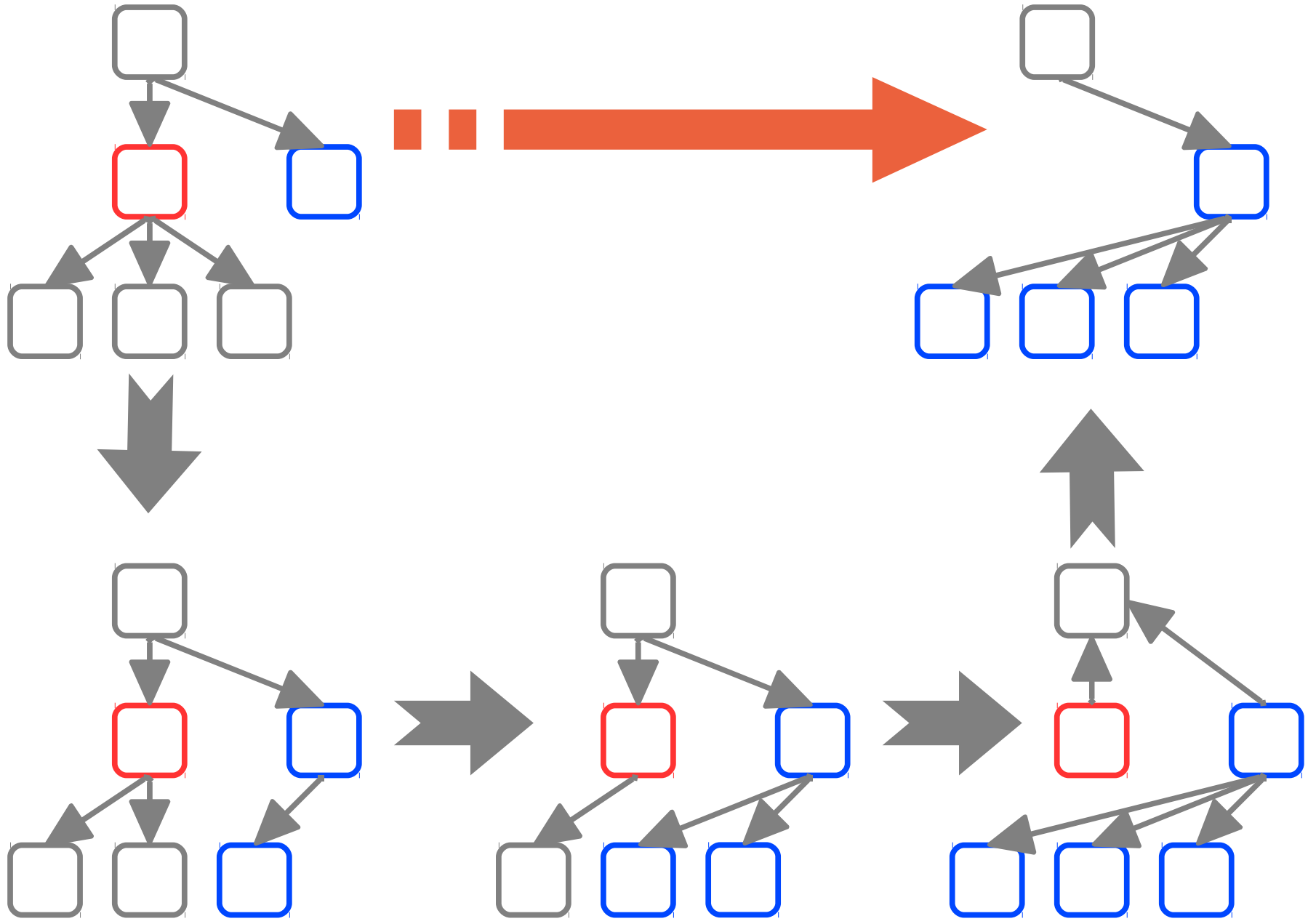
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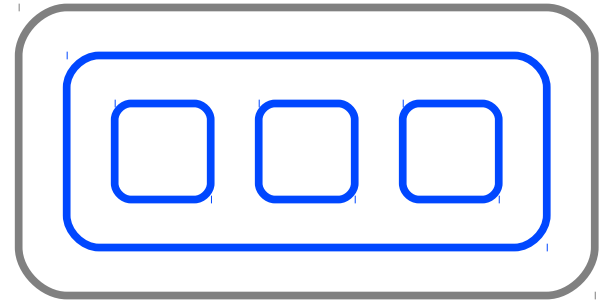
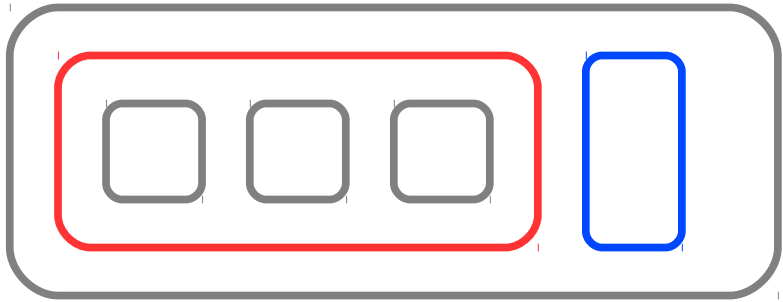


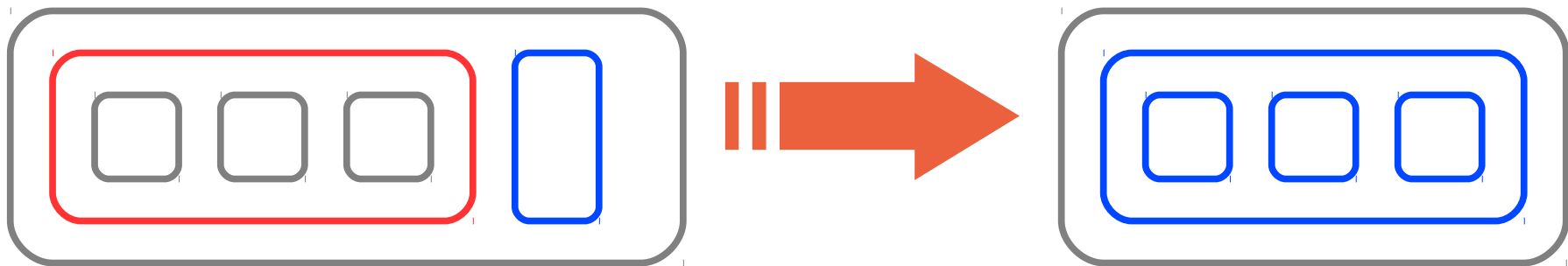


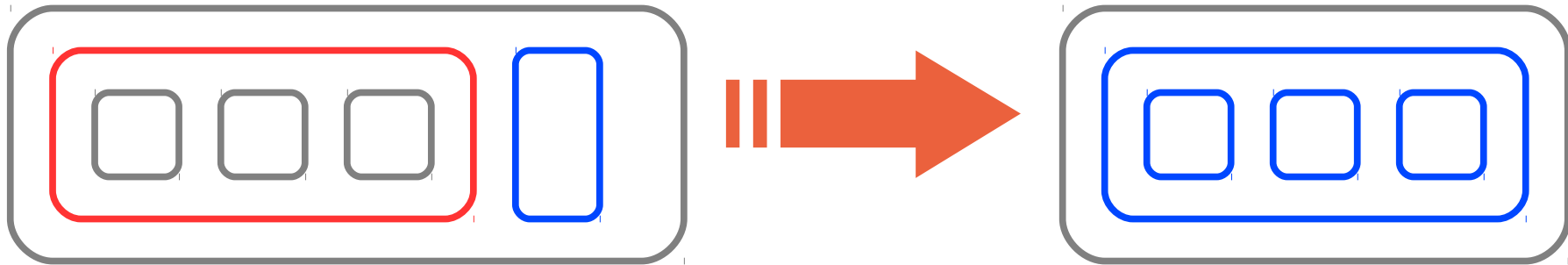


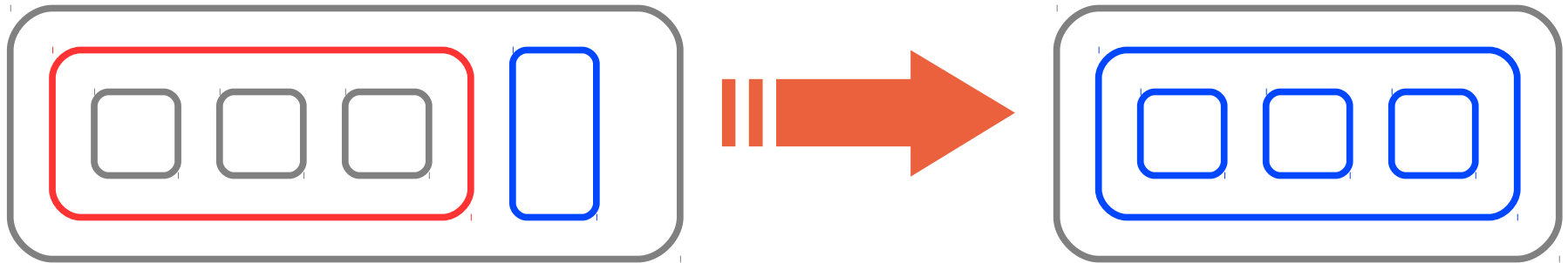












time

SPO

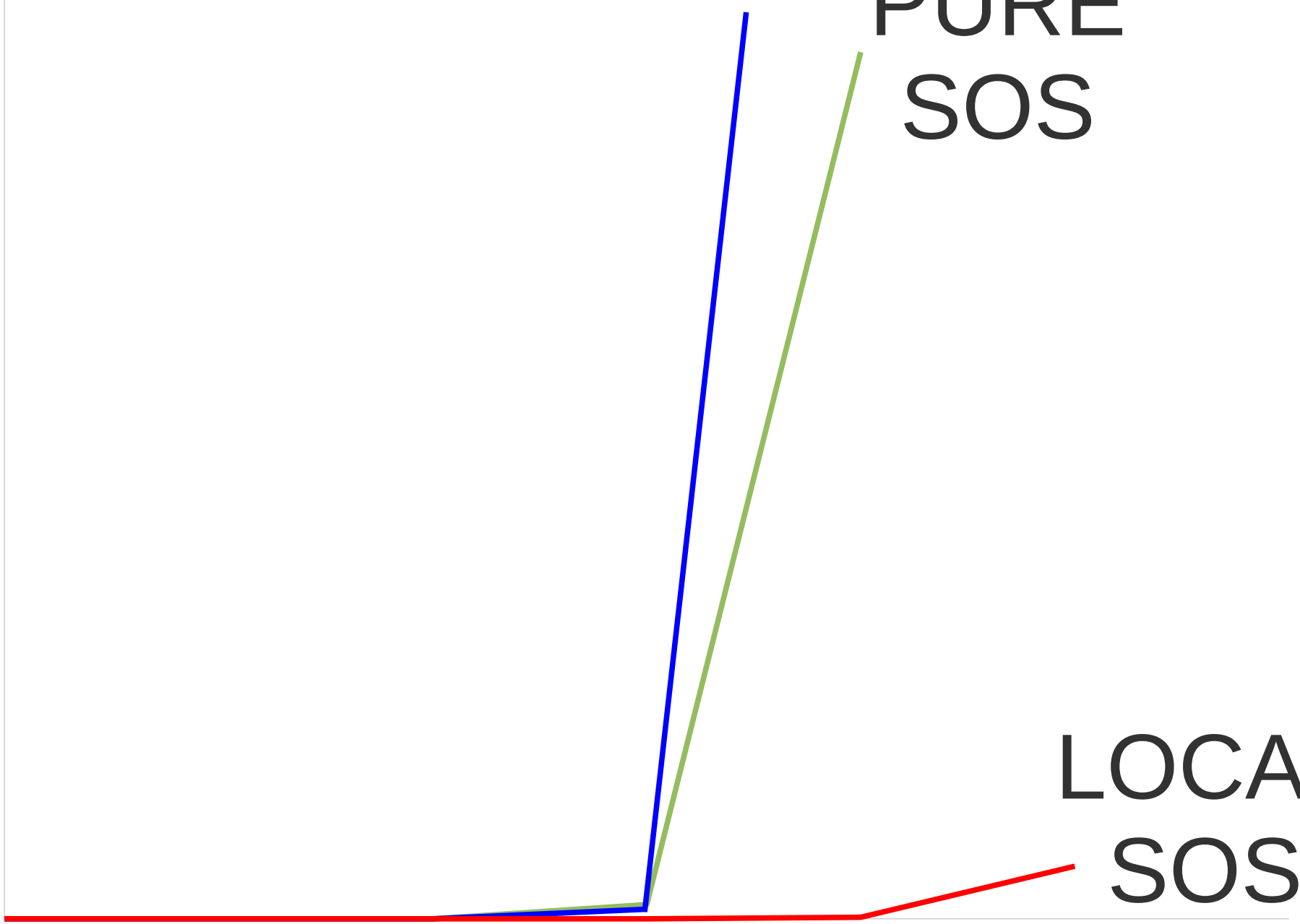
PURE
SOS

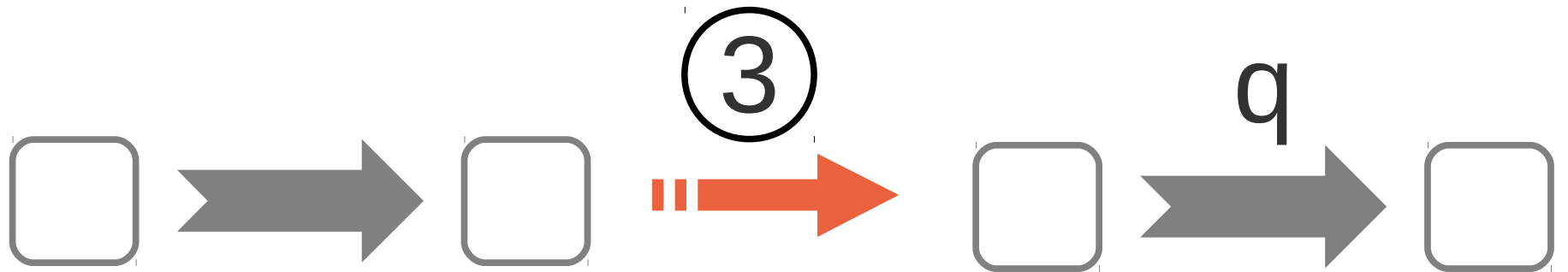
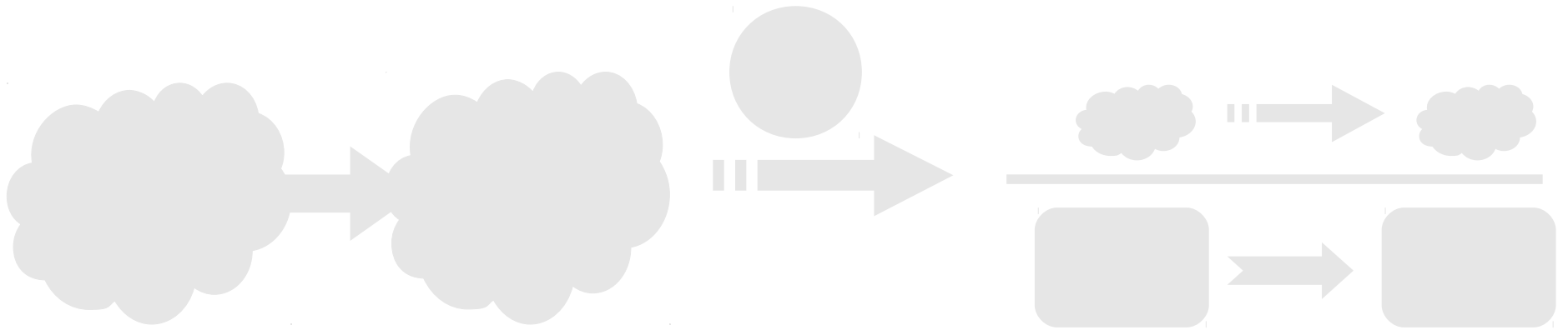
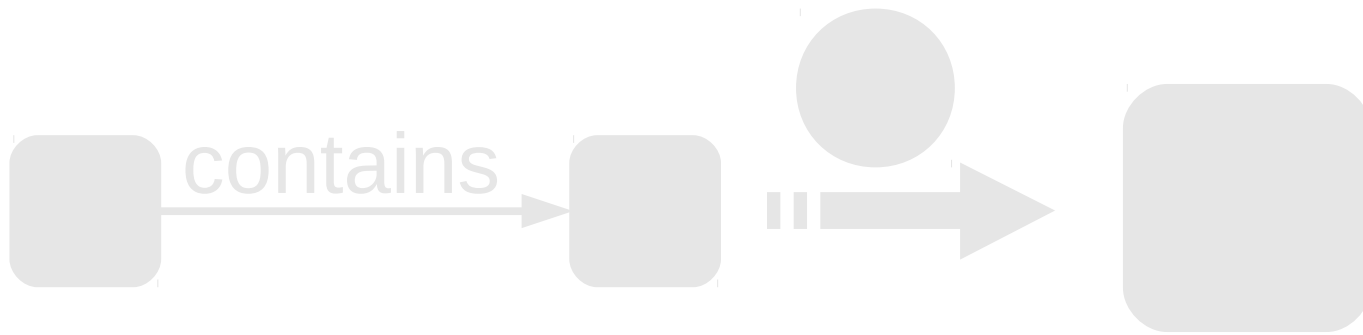
LOCAL
SOS

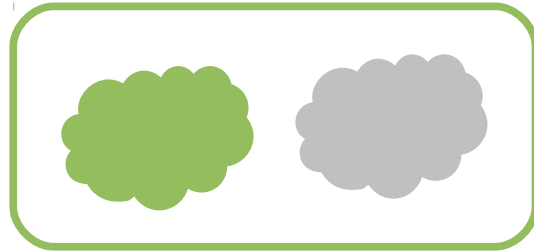
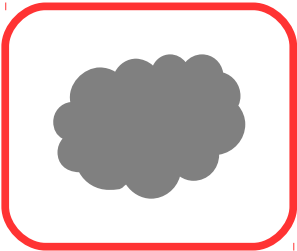
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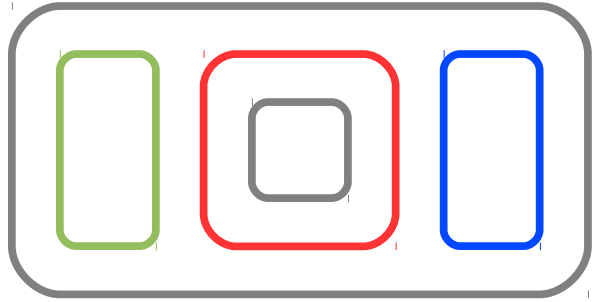
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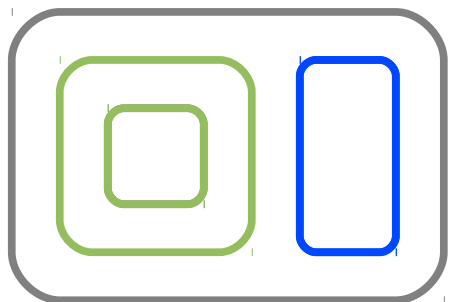
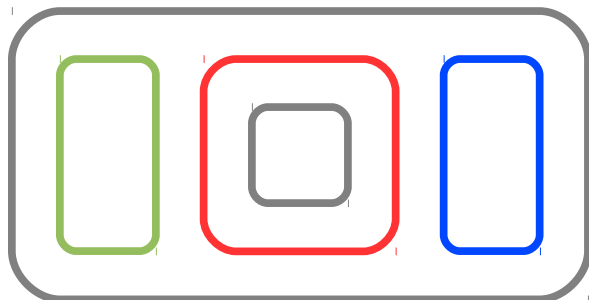
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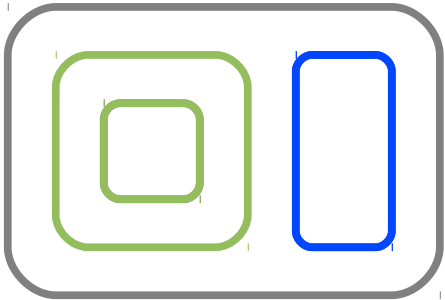
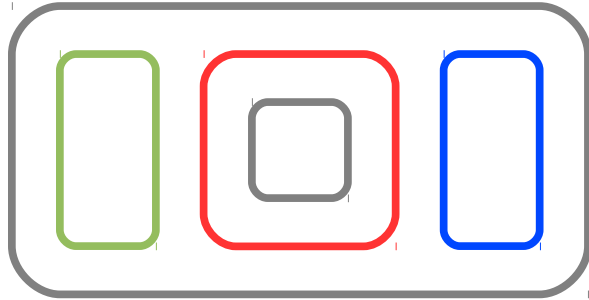






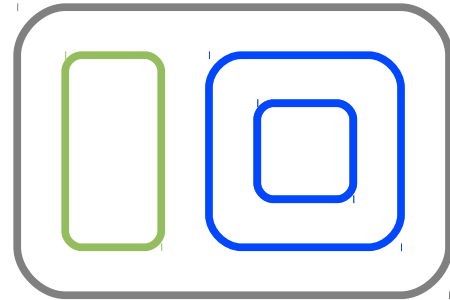


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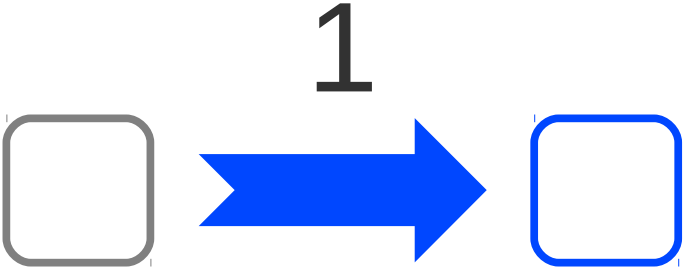


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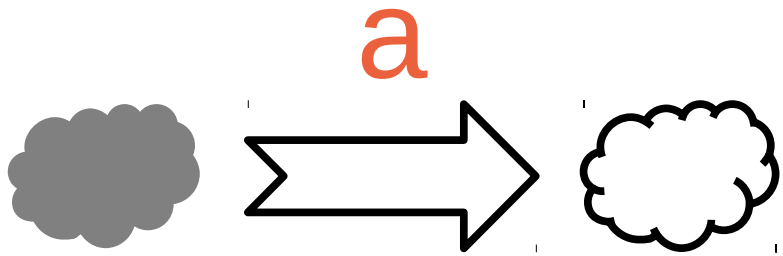
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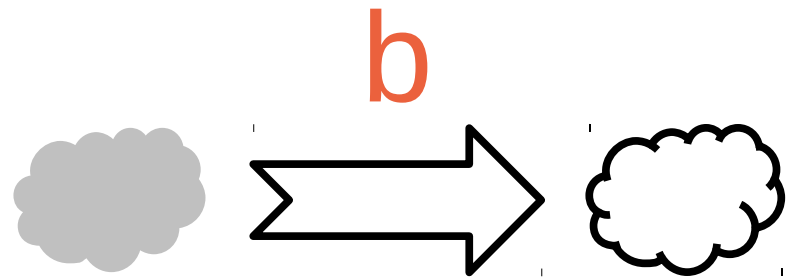
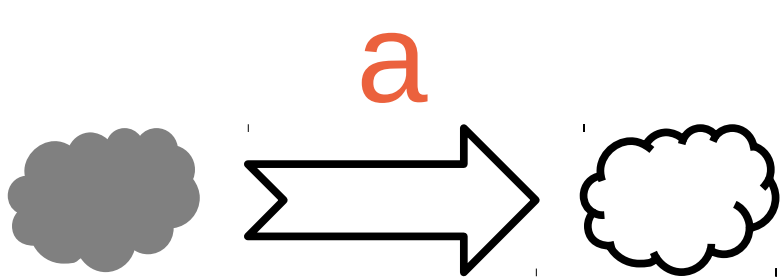


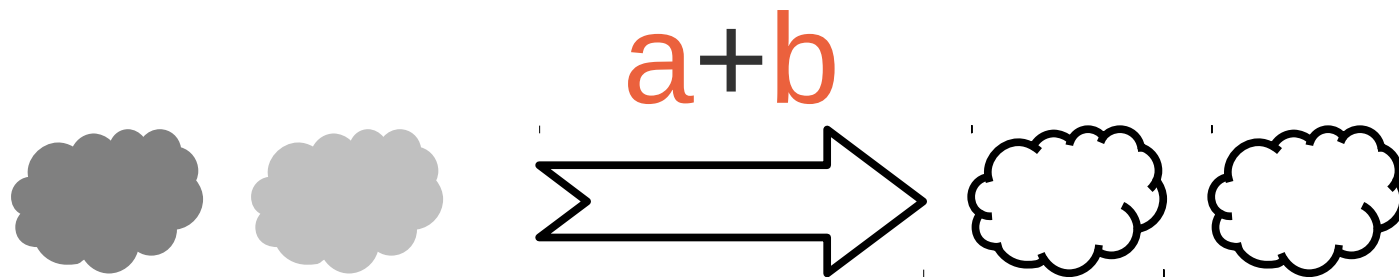
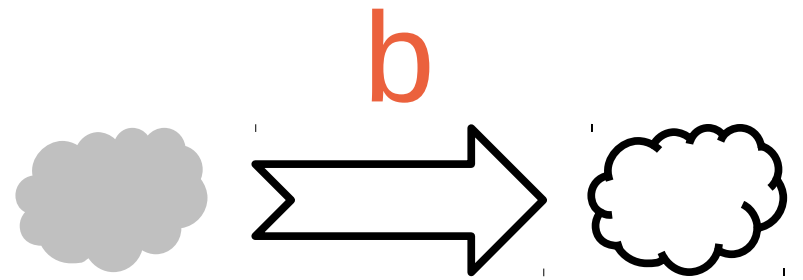
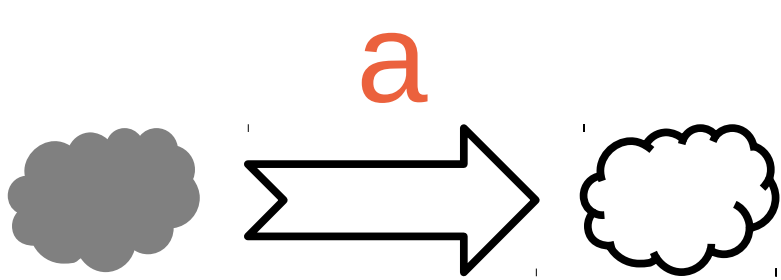
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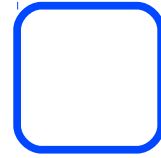
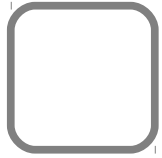




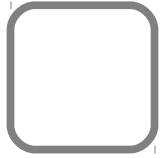


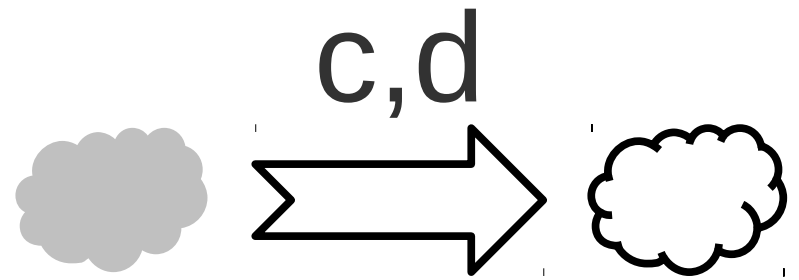
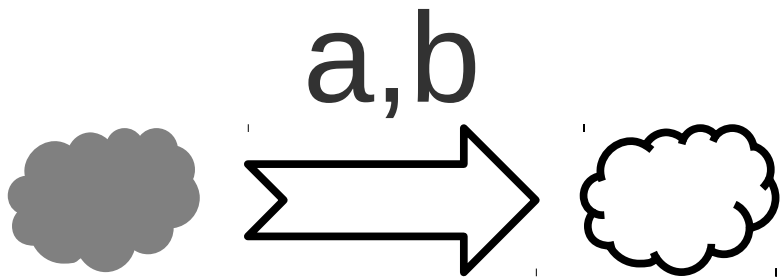


1\$, 2h



2\$, 1h





< A , + , x , 0 , 1 >

< Domain , choose , combine , worst , best >

< **A** , **+** , **x** , **0** , **1** >

< Domain , choose , combine , worst , best >

< Nat^∞ , min , + , ∞ , 0 >

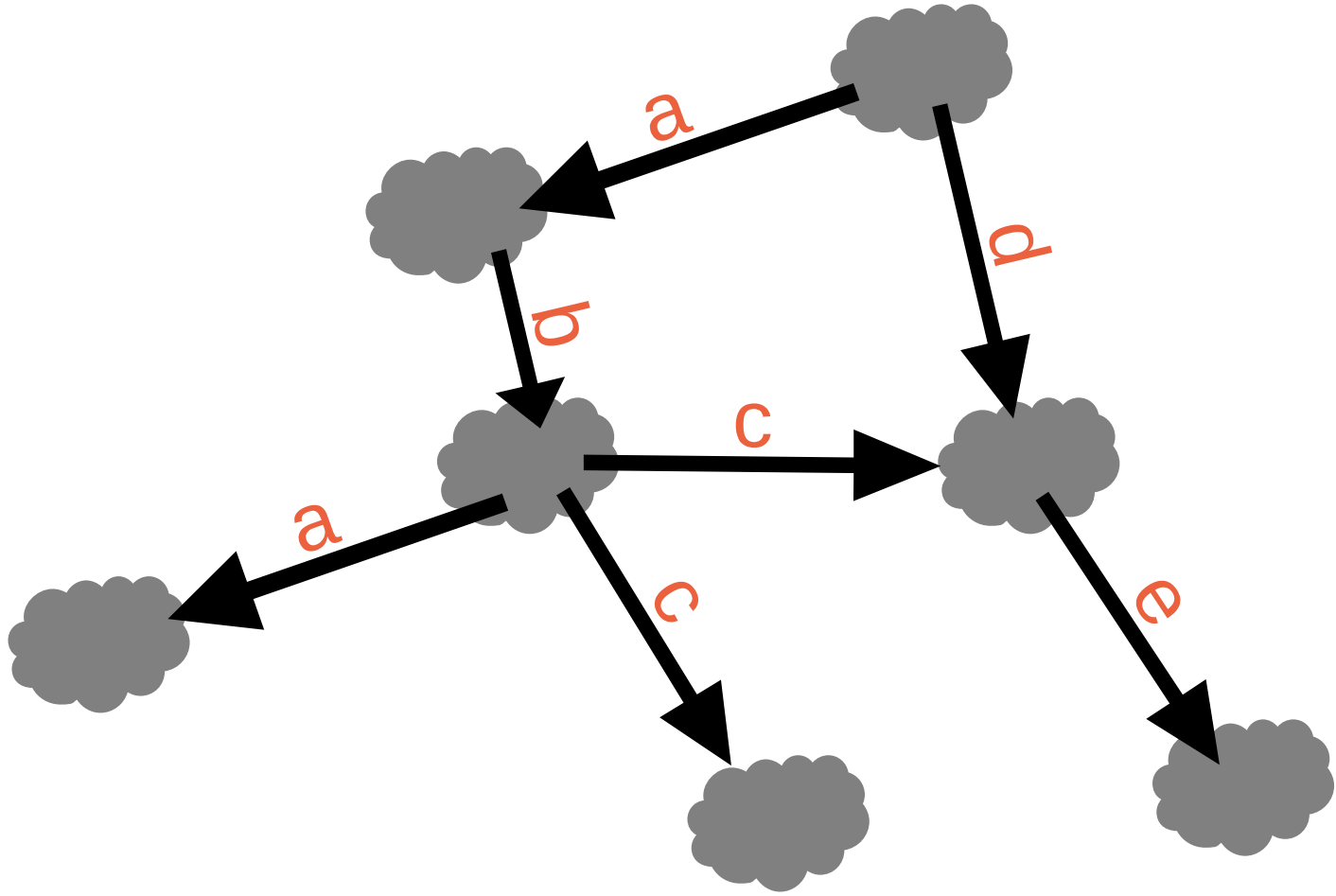
< [0,1] , min , max , 0 , 1 >

< Bool , or , and , false , true >

$\langle A, +, x, 0, 1 \rangle \times \langle B, +, x, 0, 1 \rangle$

$=$

$\langle A \times B, (+, +), (x, x), (0, 0), (1, 1) \rangle$





IMPLEMENTATION NOTES

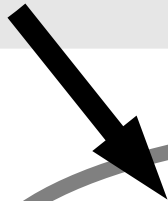
Object Configuration Module



Nested Object Configuration Module



Rewrite rules



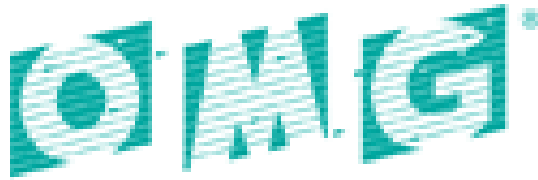
STATE SPACE

MOMENT2

<http://www.cs.le.ac.uk/people/aboronat/tools/moment2-gt/>



FRONT-END



WE SET THE STANDARD

INTERFACE



MAUDE

BACK-END

MOMENT2

<http://www.cs.le.ac.uk/people/aboronat/tools/moment2-gt/>



FRONT-END



INTERFACE

MAUDE

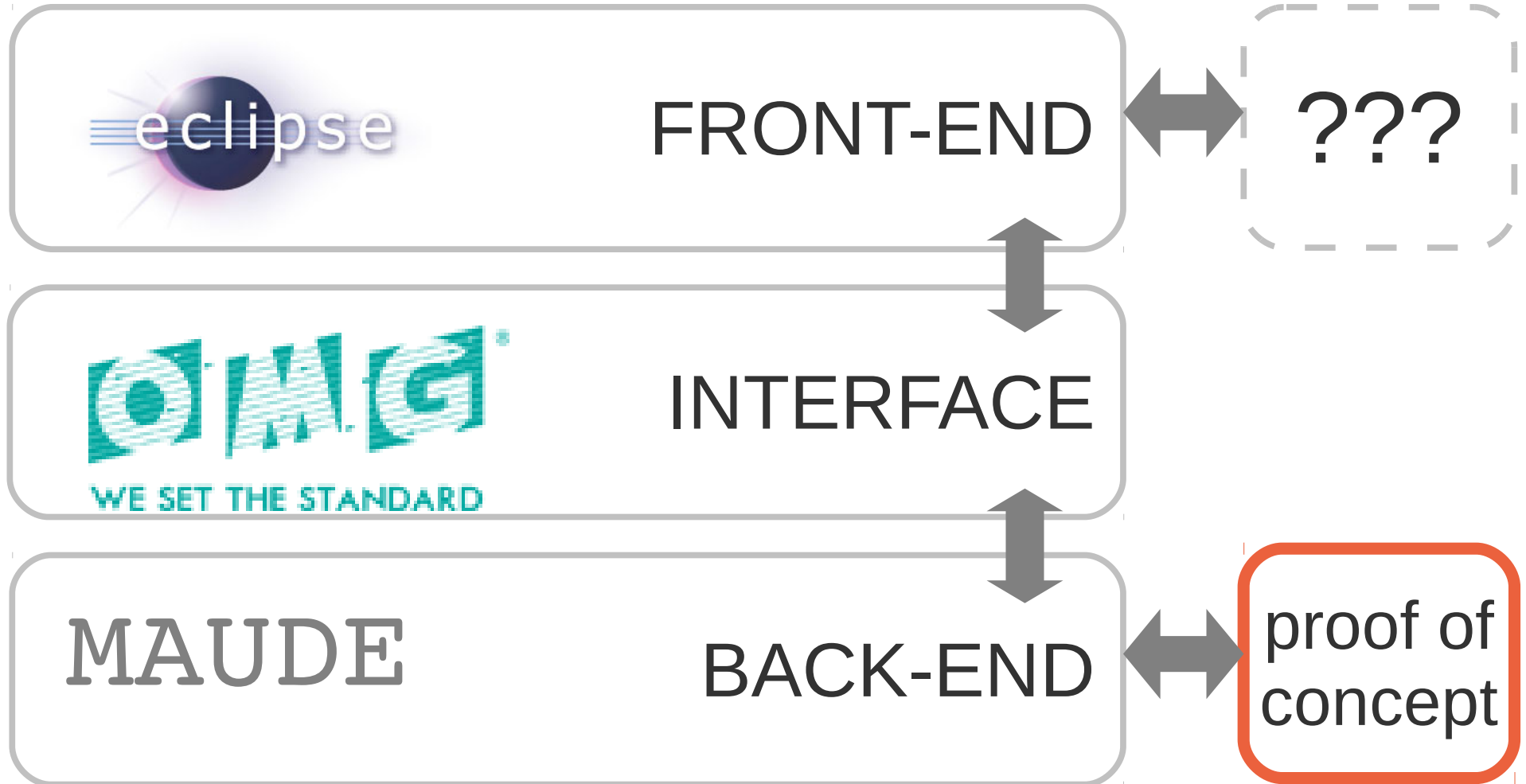
BACK-END

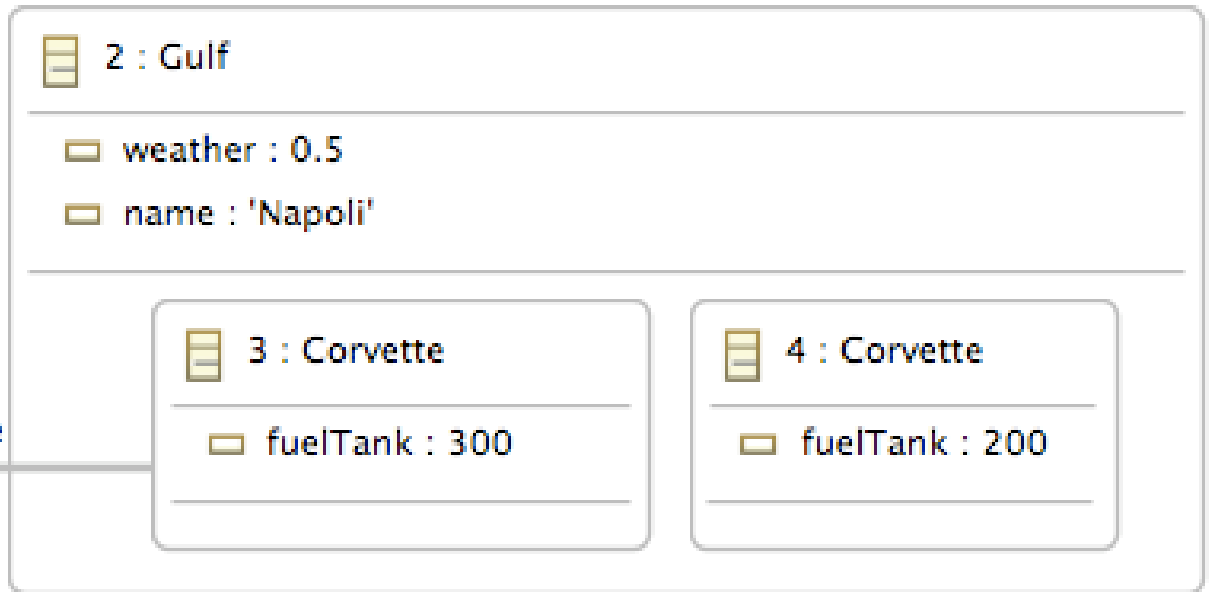
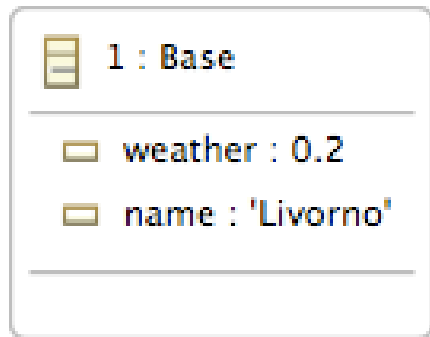
proof of
concept



MOMENT2

<http://www.cs.le.ac.uk/people/aboronat/tools/moment2-gt/>





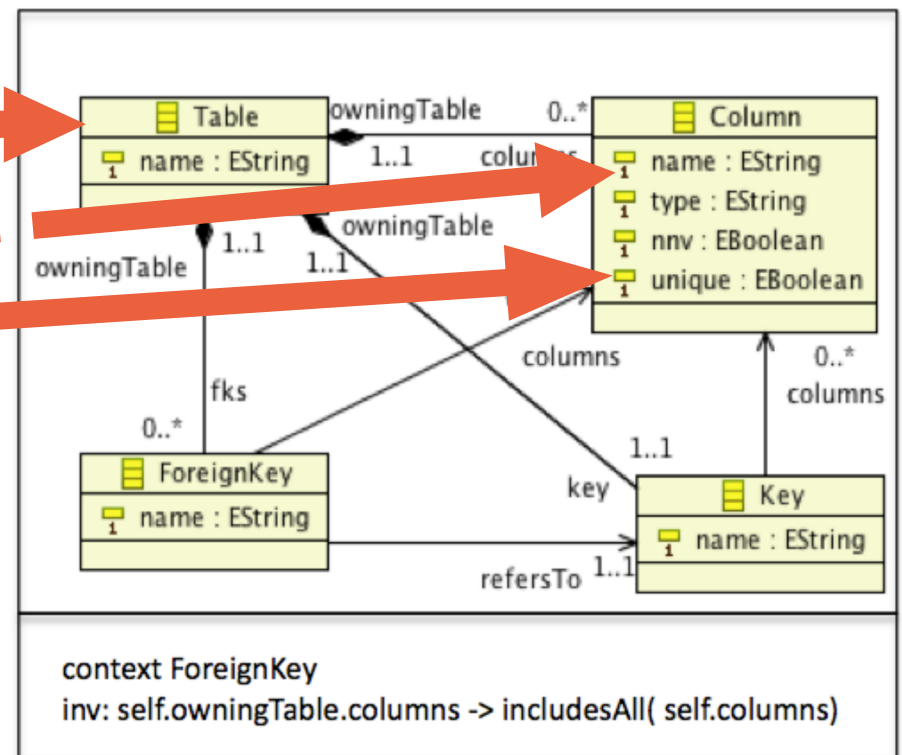
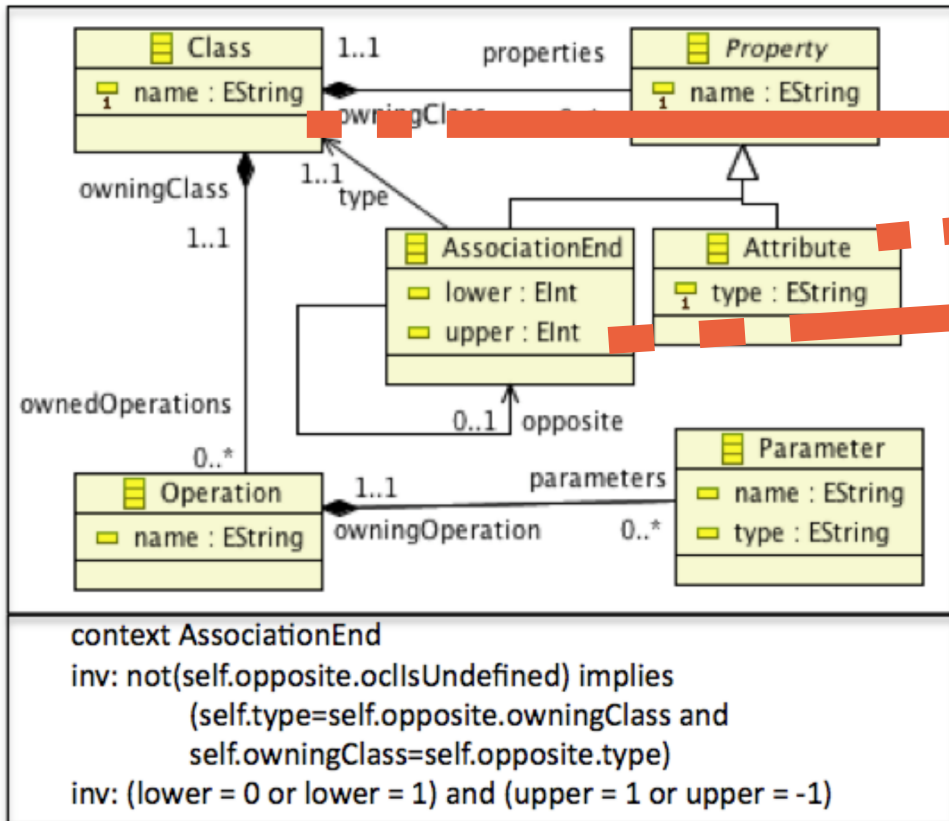
homebase

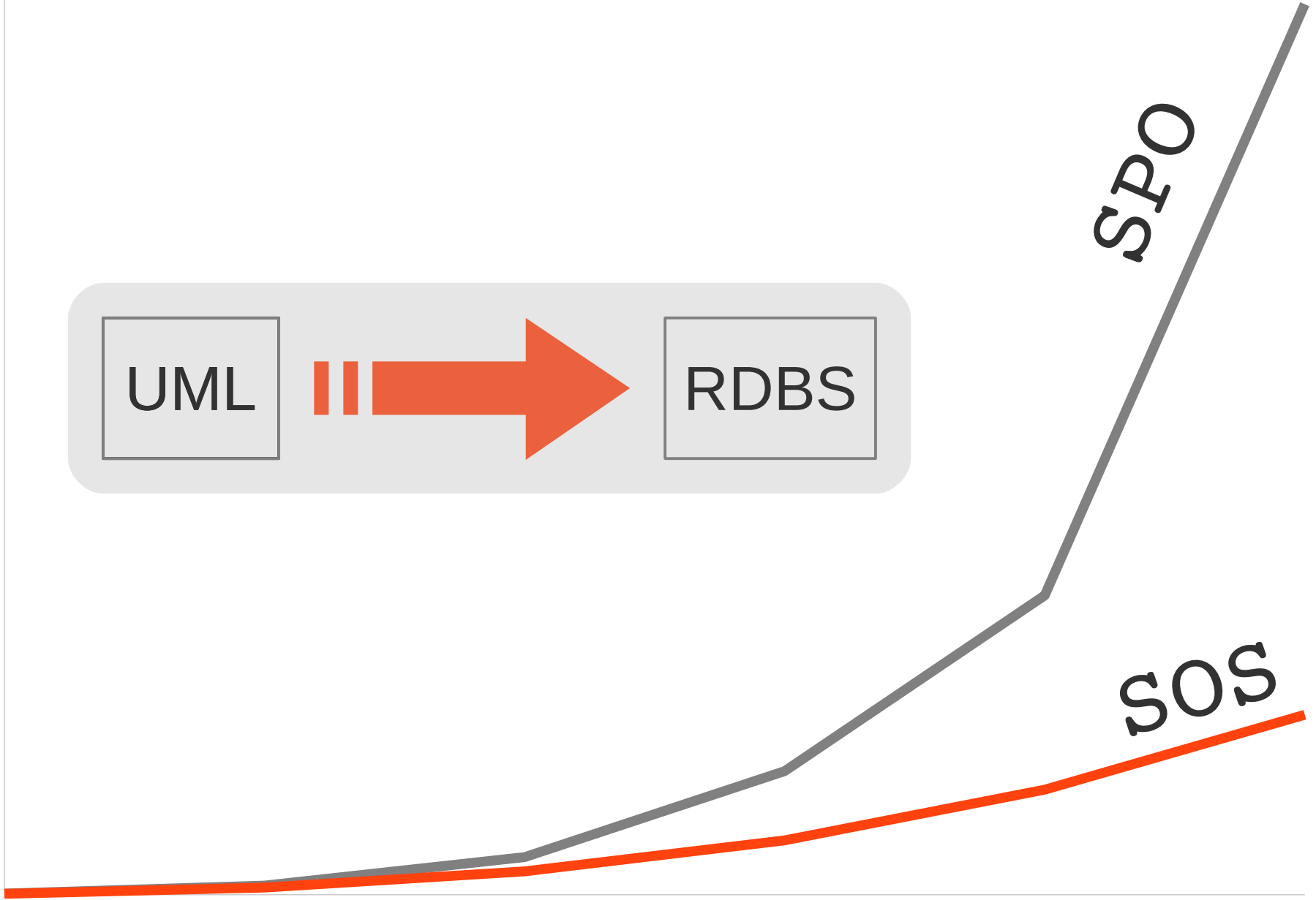
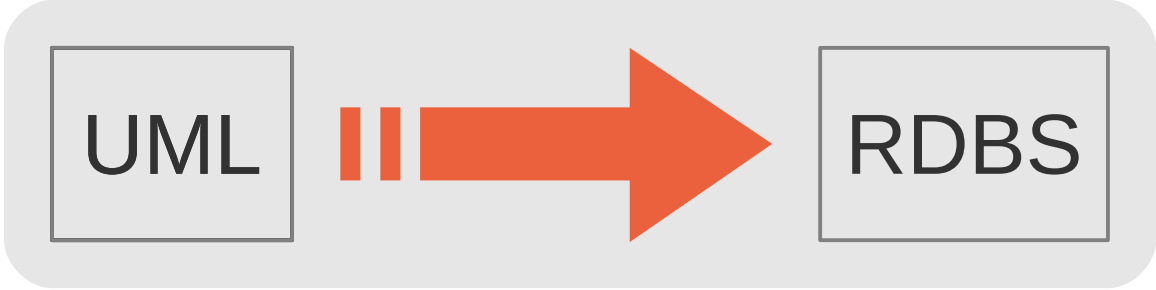


UML



RDBS





CONCLUSION

FLAT  HIERARCHICAL

FLAT

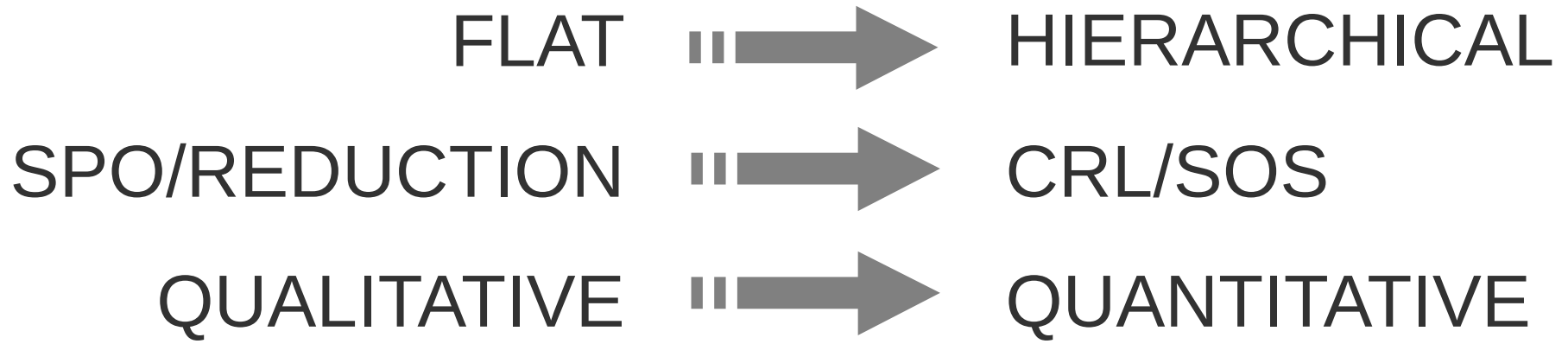


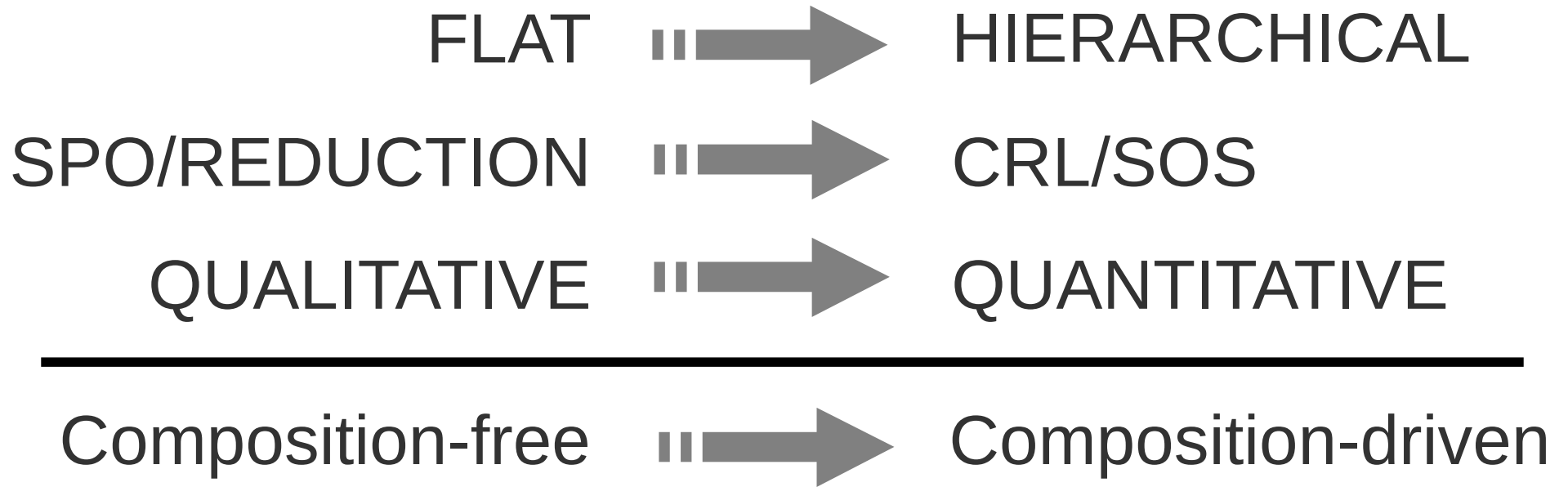
HIERARCHICAL

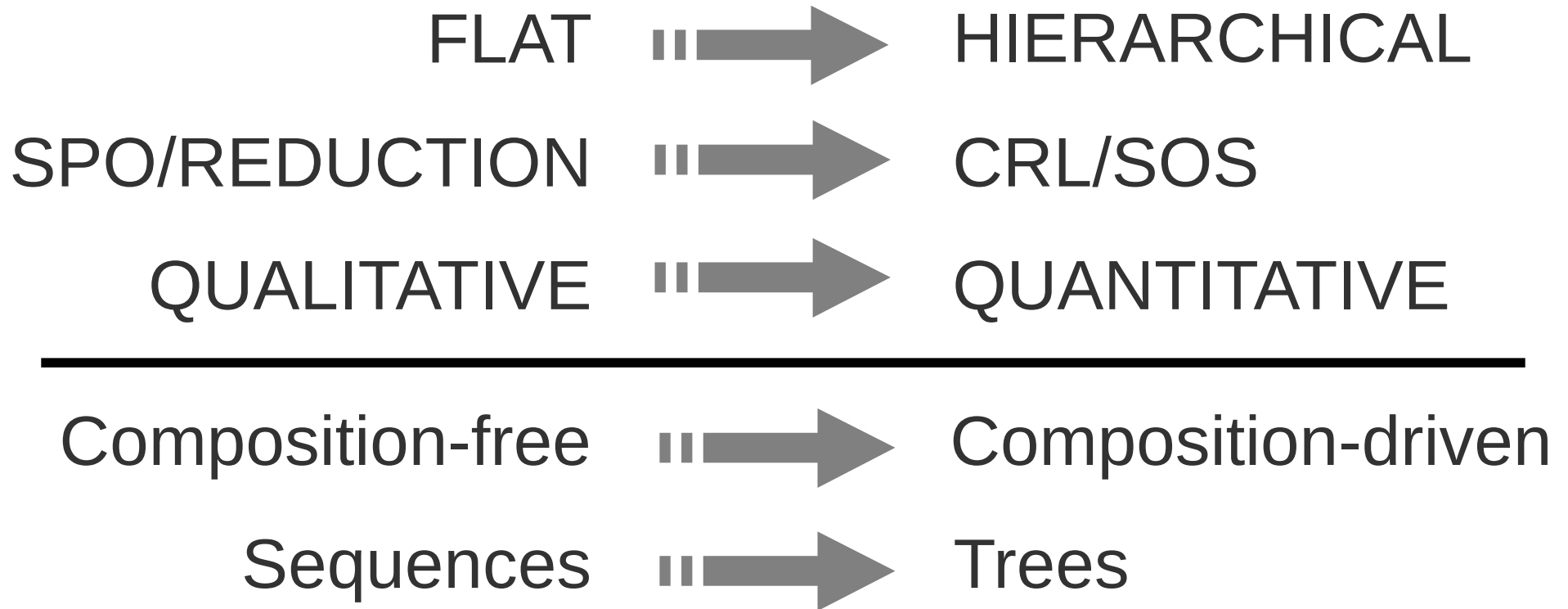
SPO/REDUCTION

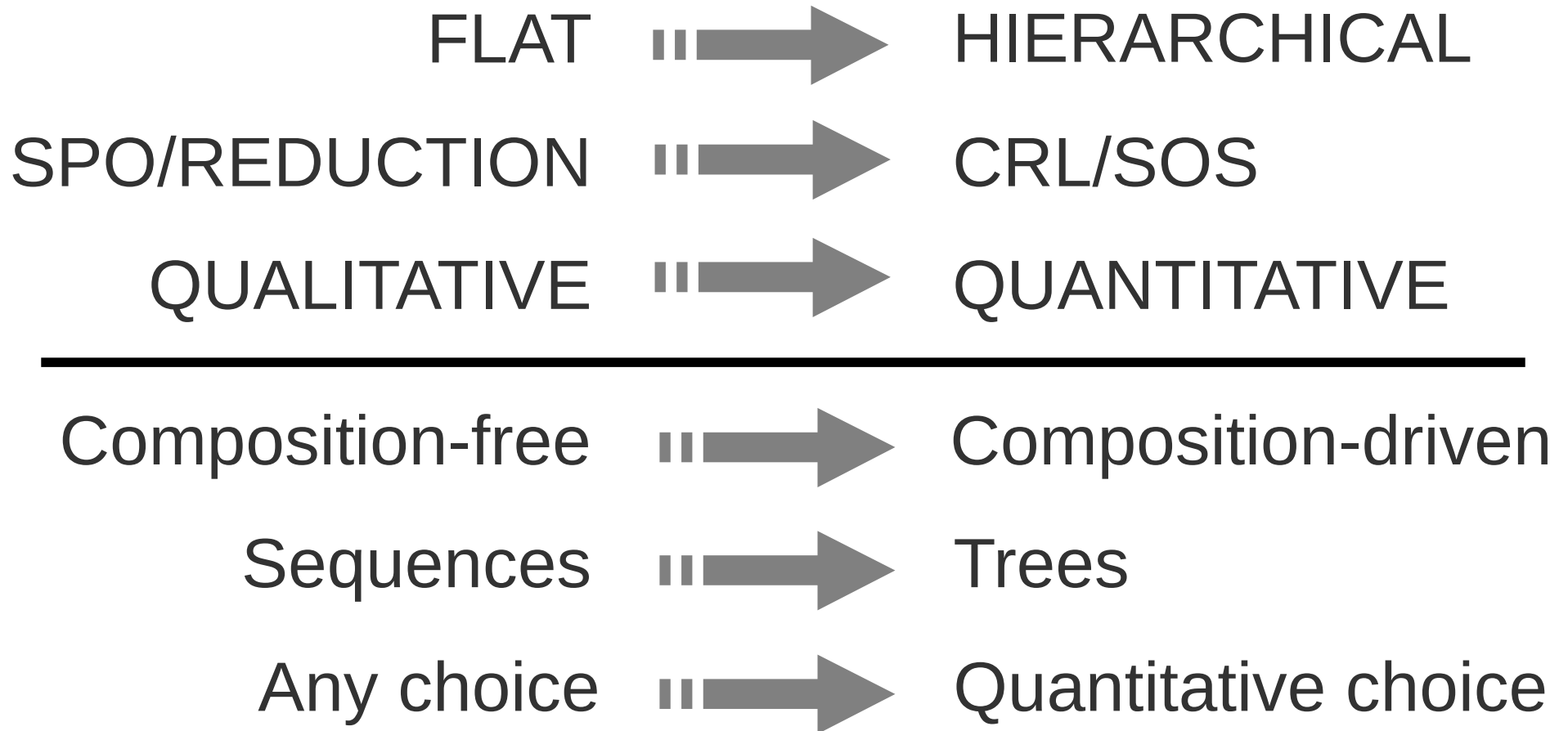


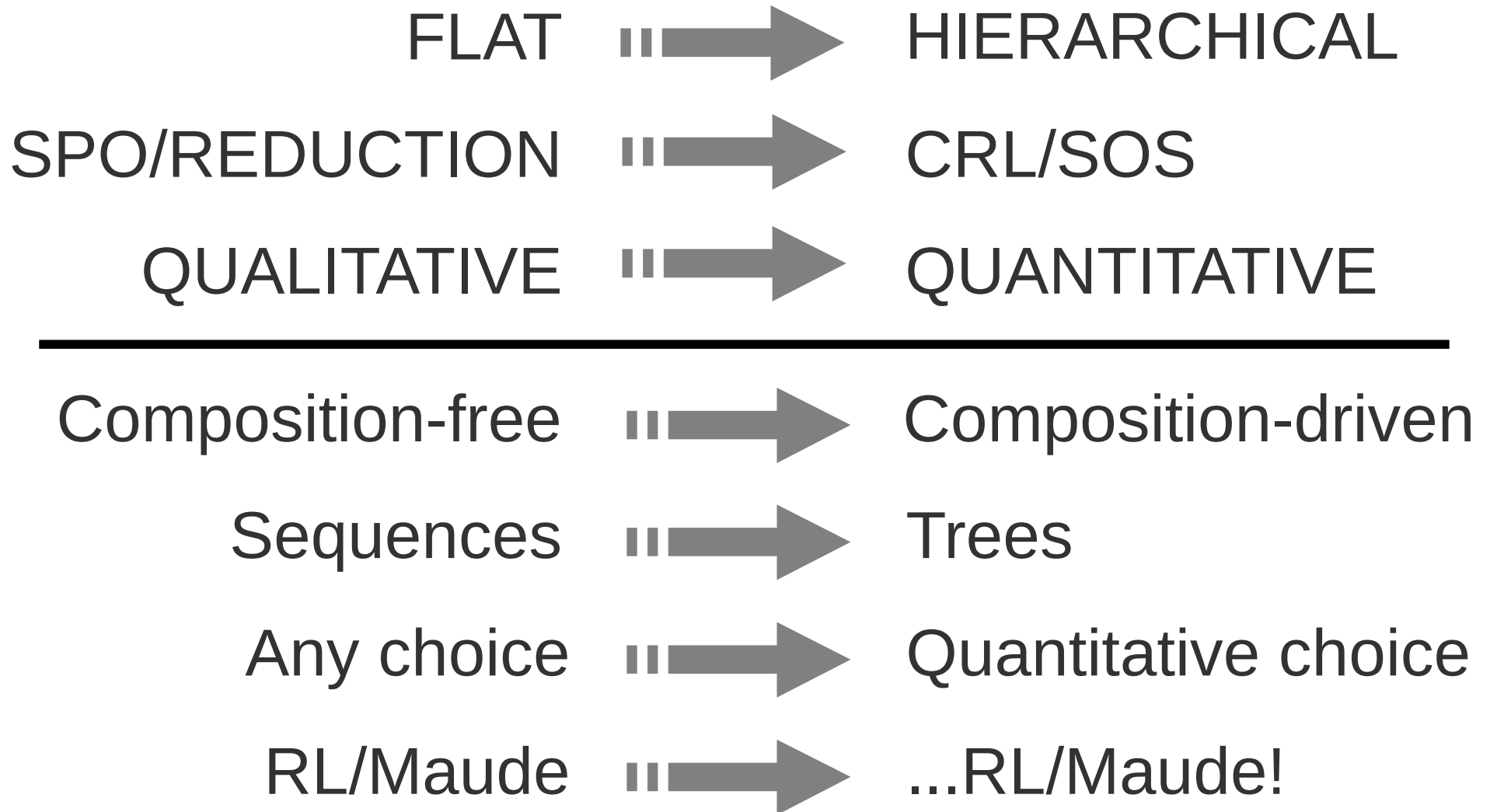
CRL/SOS











THANKS!



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