



Istvan David



Eugene Syriani

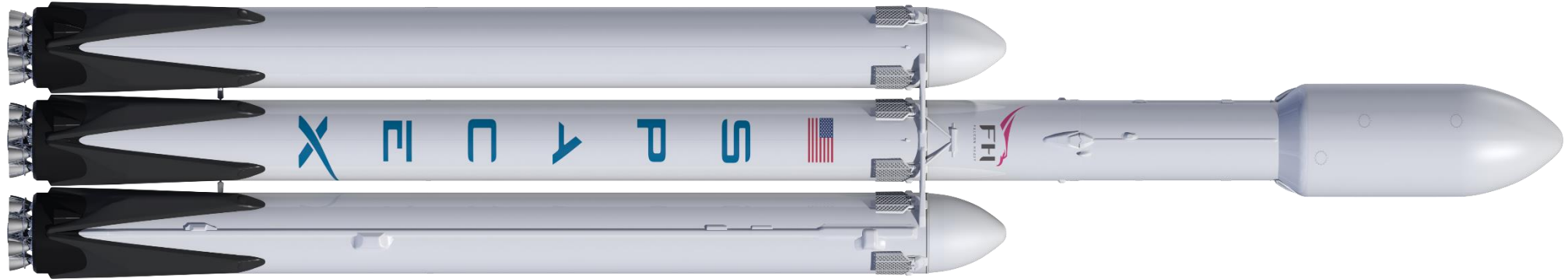
Département d'informatique et de recherche opérationnelle
Université de Montréal

istvan.david@umontreal.ca

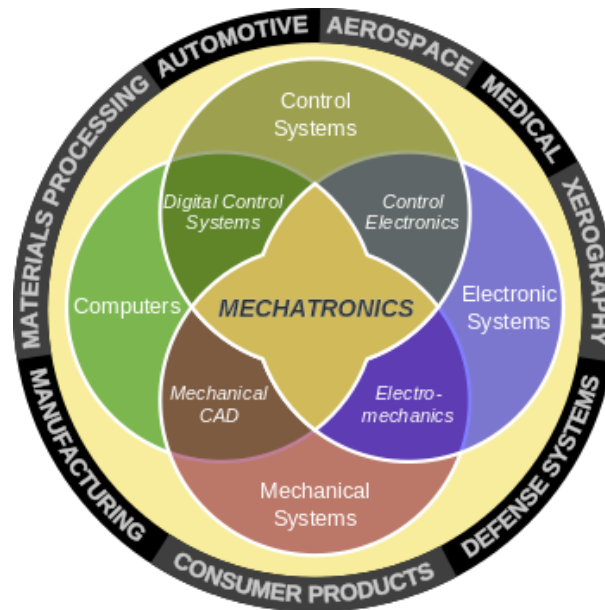
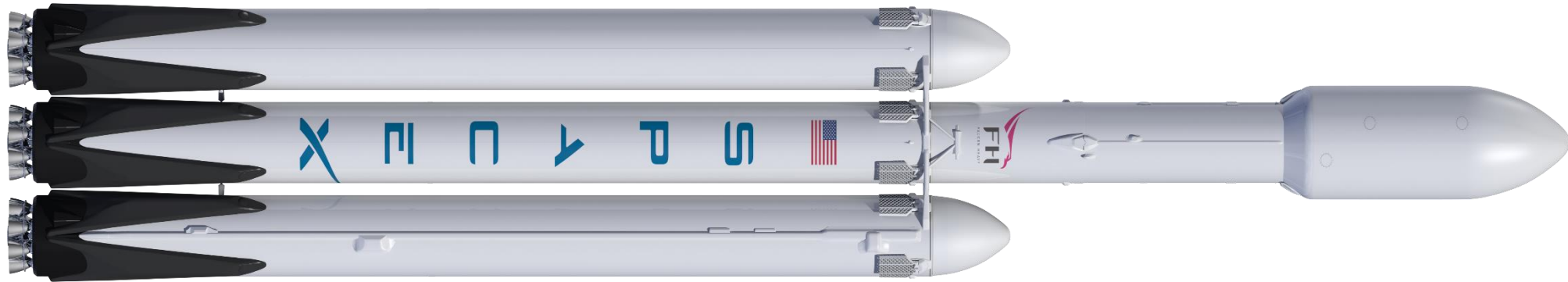


REAL-TIME COLLABORATIVE MODELING

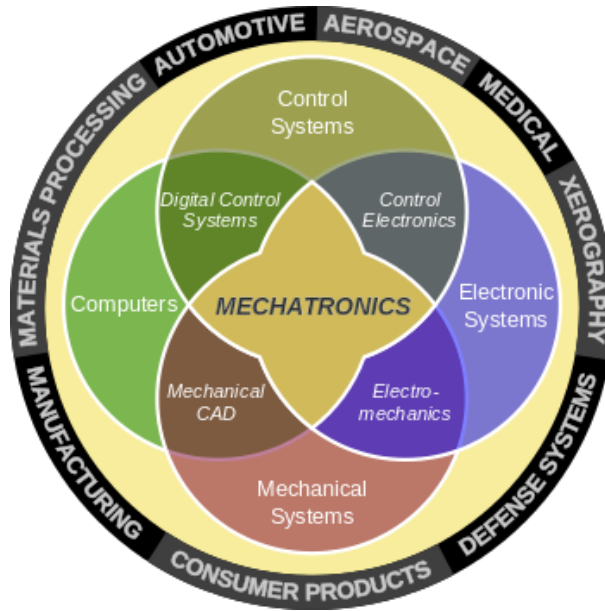
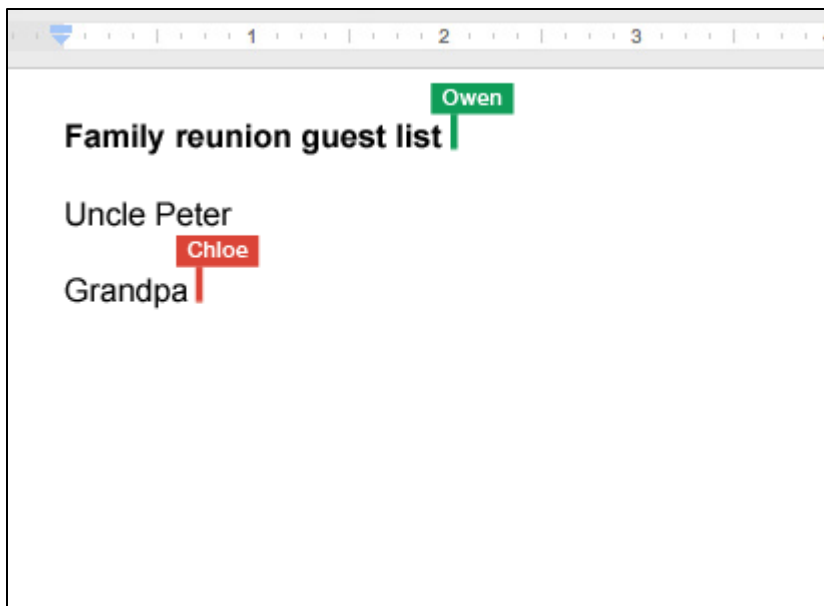
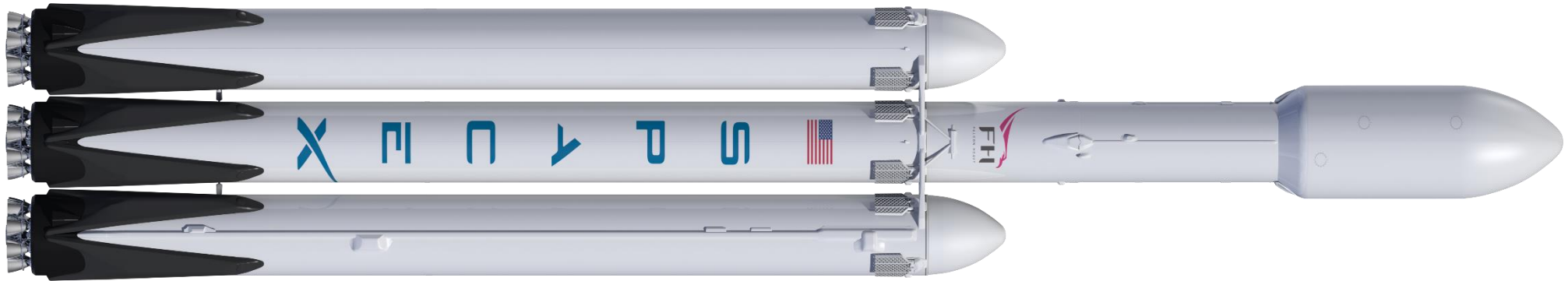
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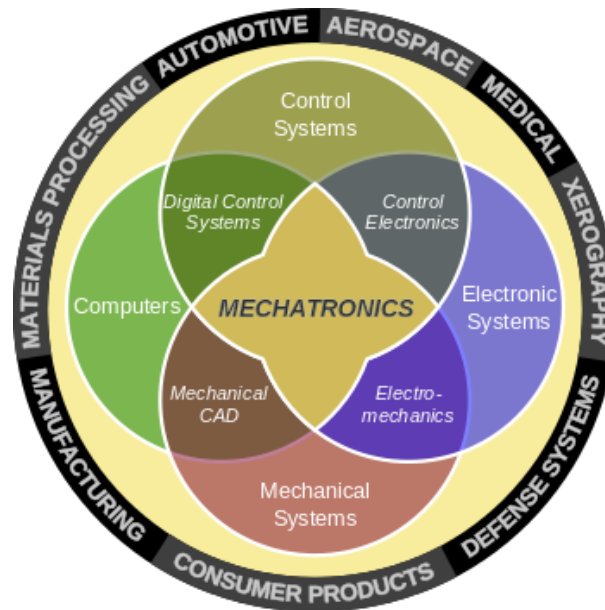
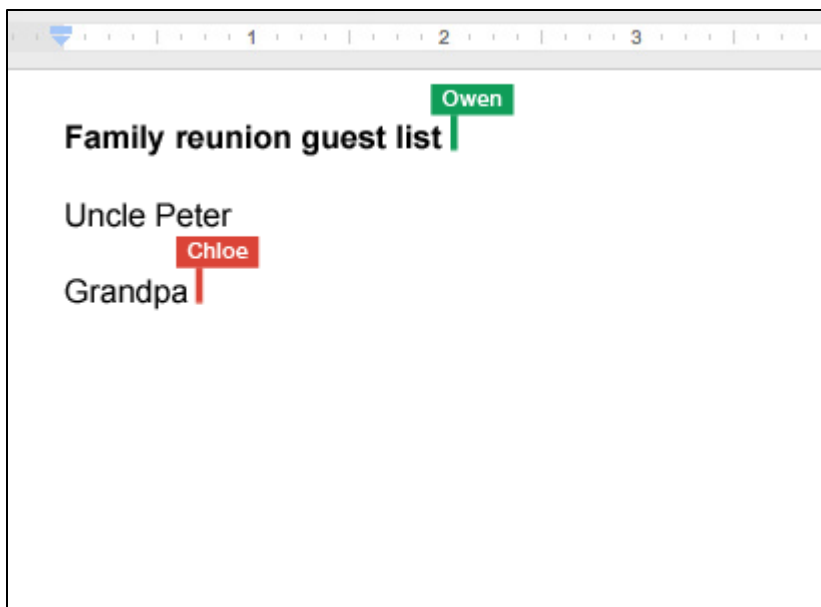
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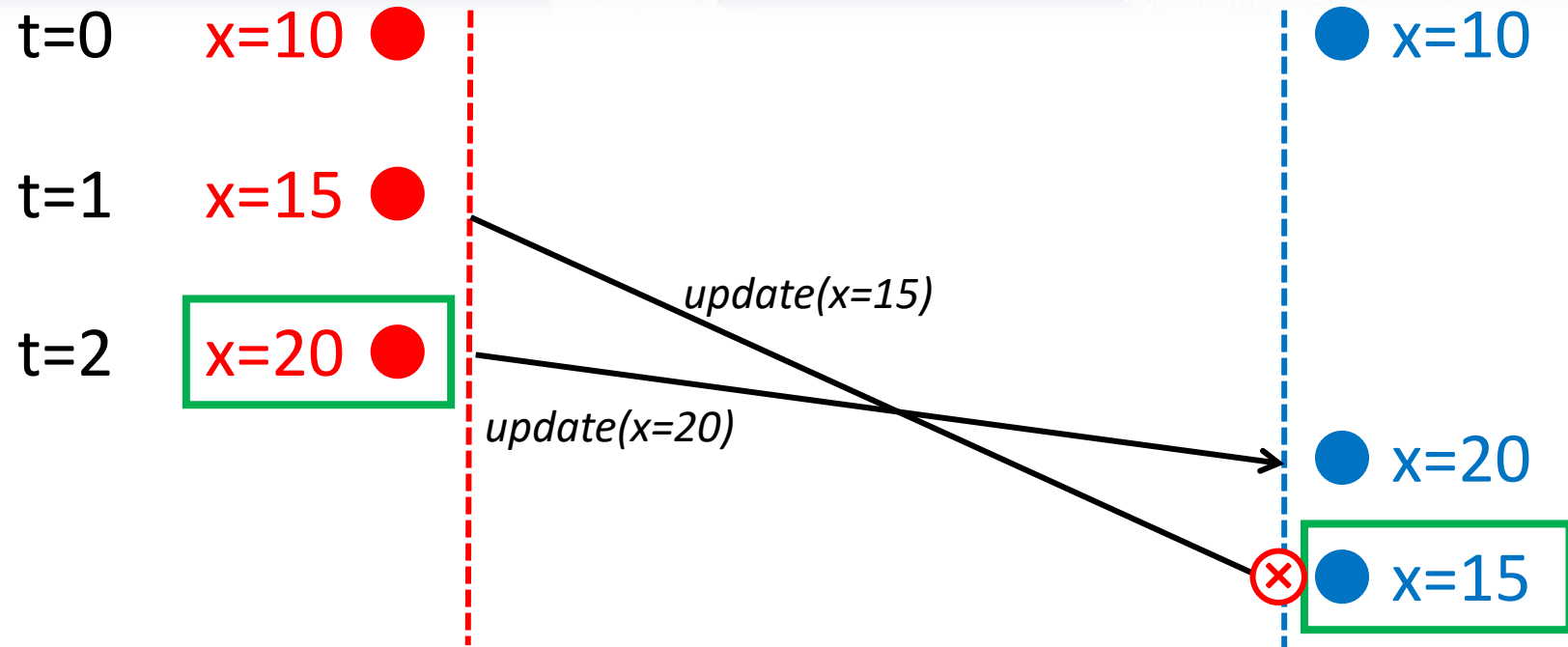


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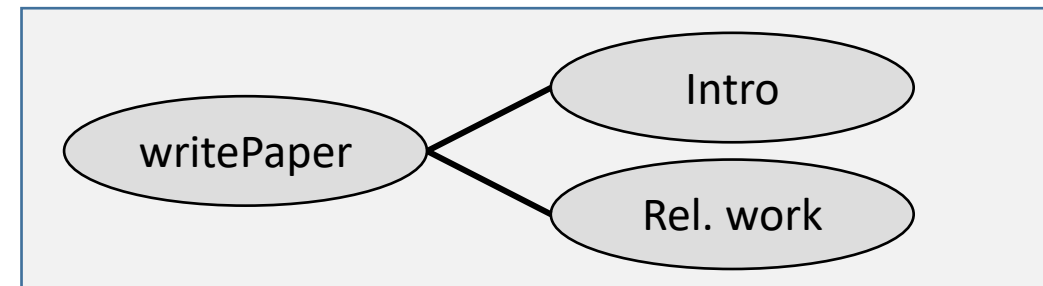
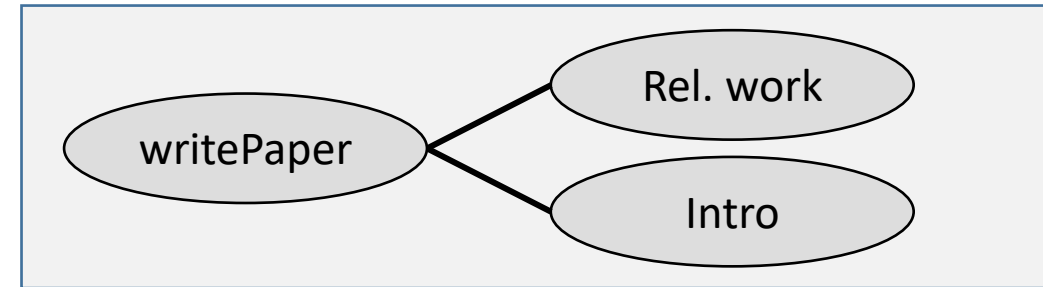
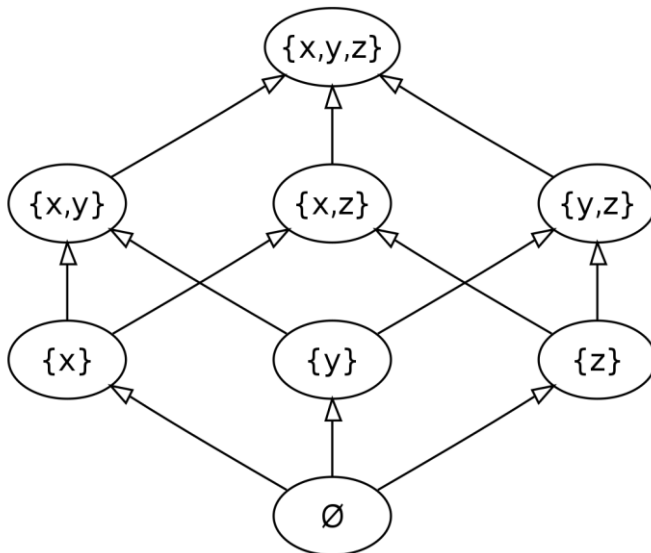
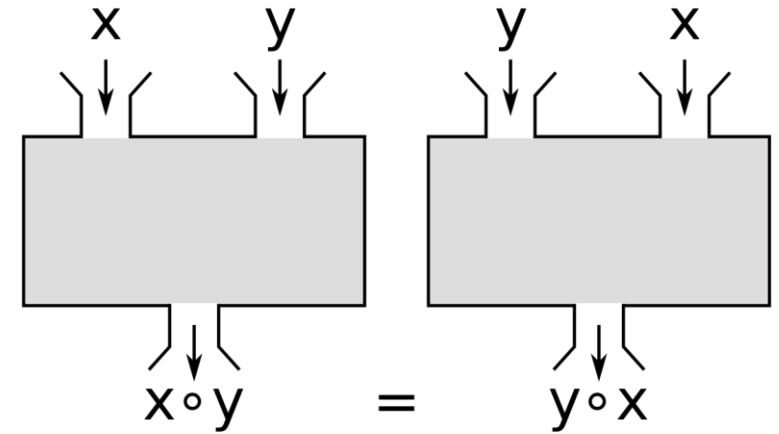
REAL-TIME COLLABORATIVE MODELING BY CONFLICT-FREE REPLICATED DATA TYPES

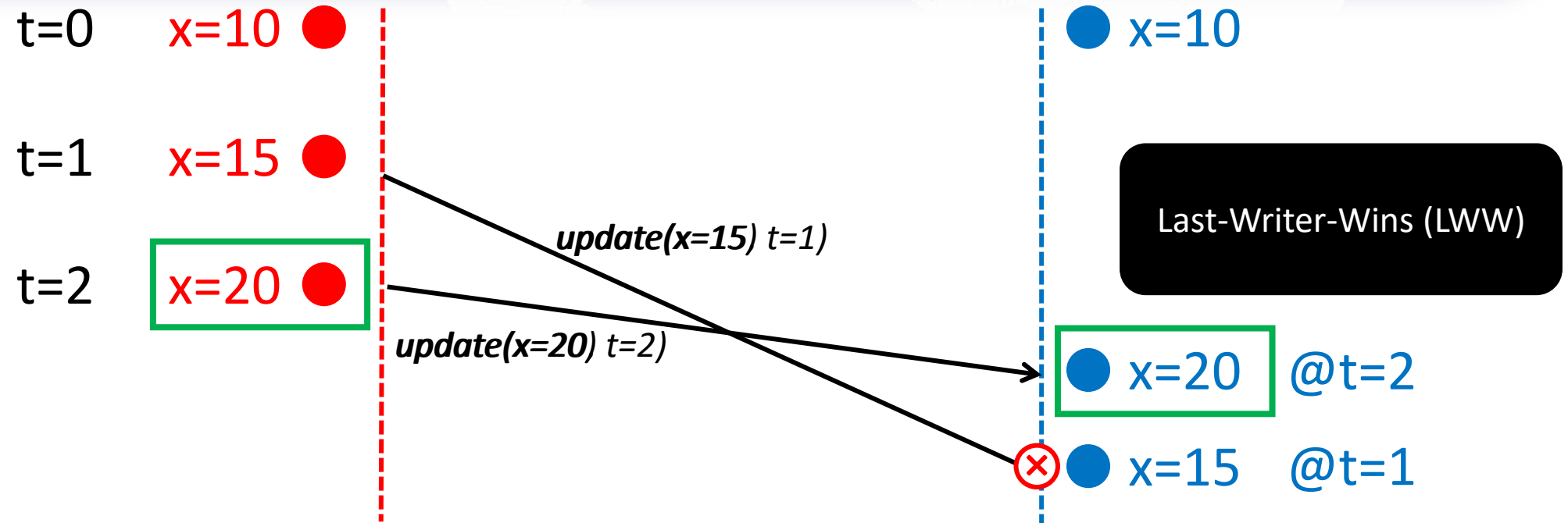




Conflict-free replicated data types (CRDT)

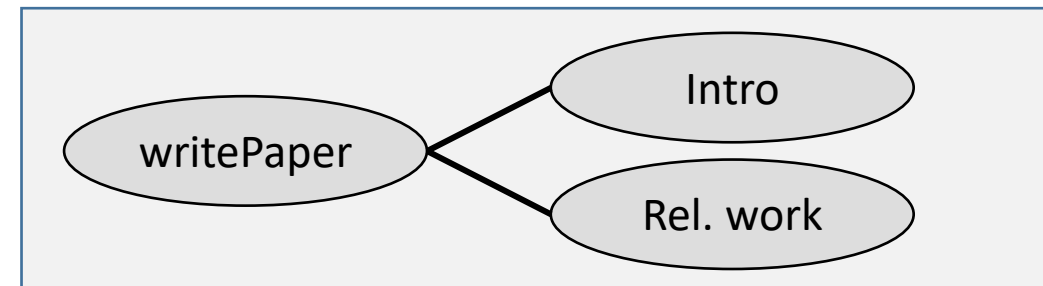
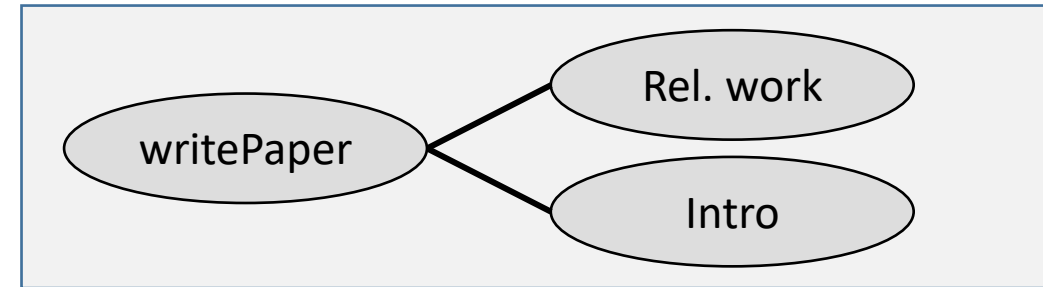
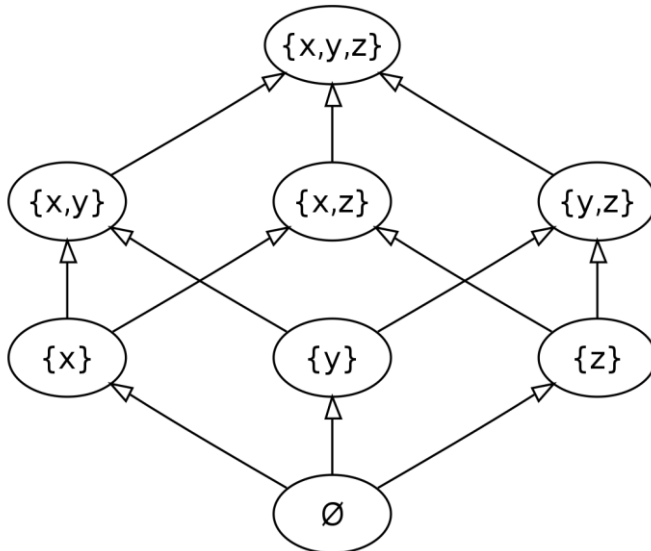
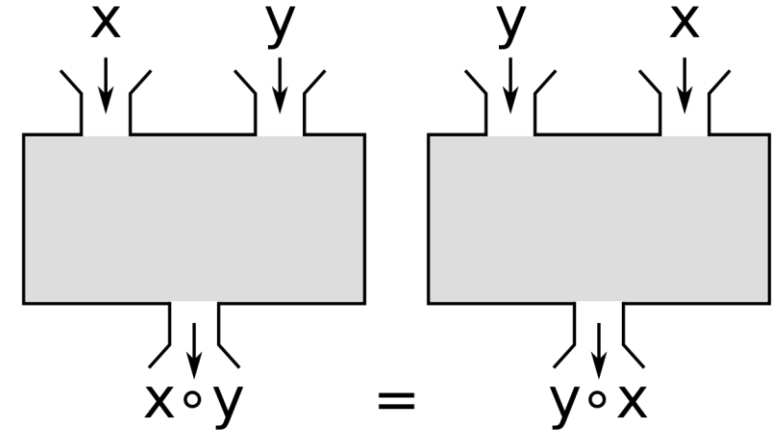
- Sound algebraic framework
- Operation-based CRDT
 - Concurrent operations are commutative
- State-based CRDT
 - Structured in a way that they adhere to a monotonic semi-lattice





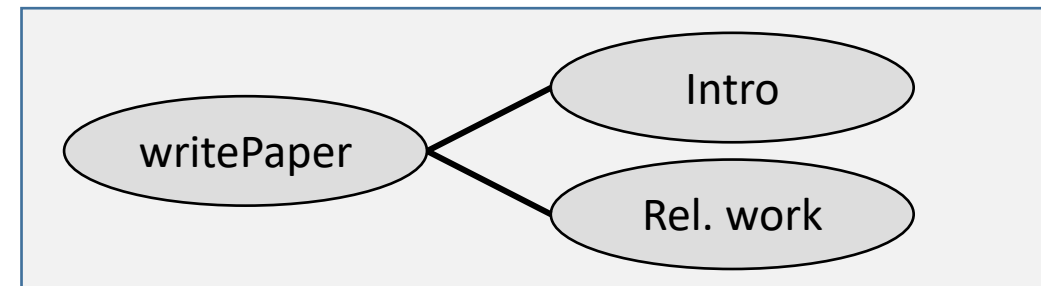
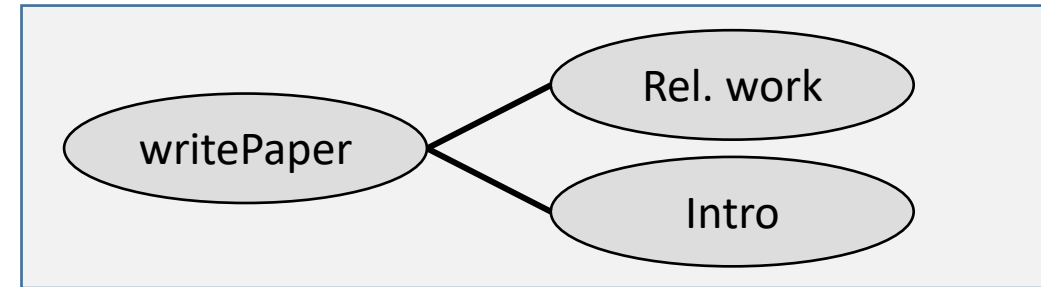
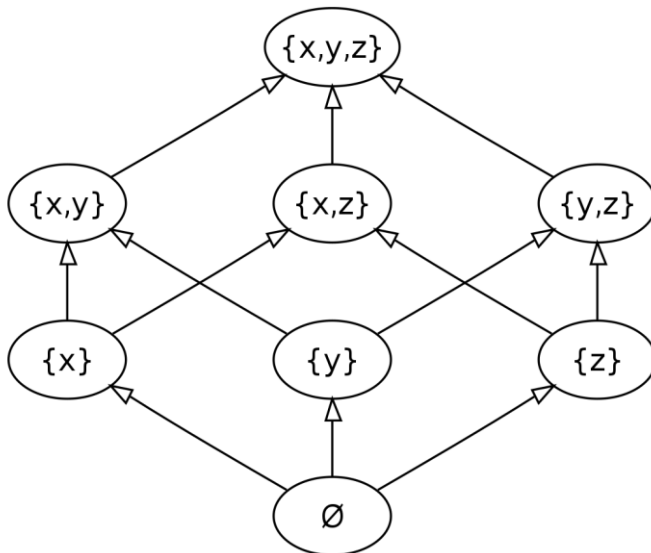
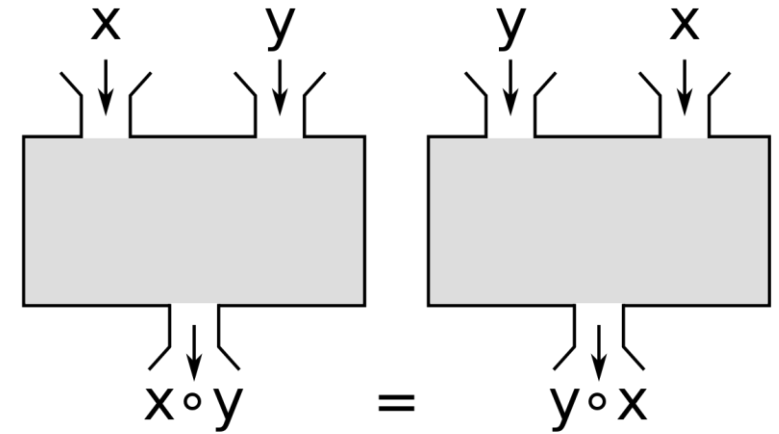
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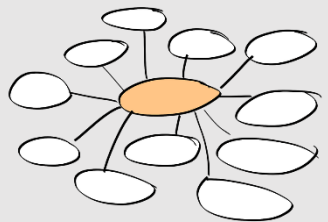


- A low-level and transparent framework for collaborative modeling
- <https://github.com/geodes-sms/lowkey>

Lowkey

1) Secretly or discretely

2) Slightly or kinda



```
Mindmap myTasks
Task publishPaper
  Subtask drawFigures
Task organizeResearchDay
  Subtask nagPeople
```

Collab. type system

Collab. type system

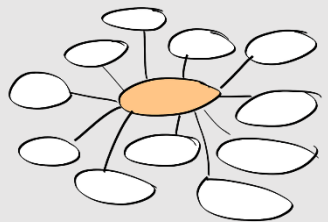
OMQ

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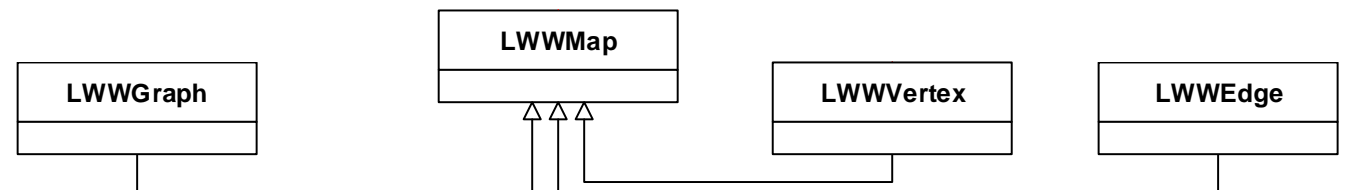
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CRDT

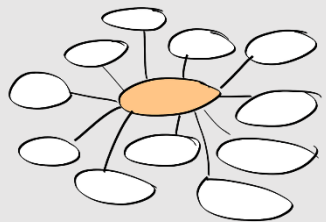


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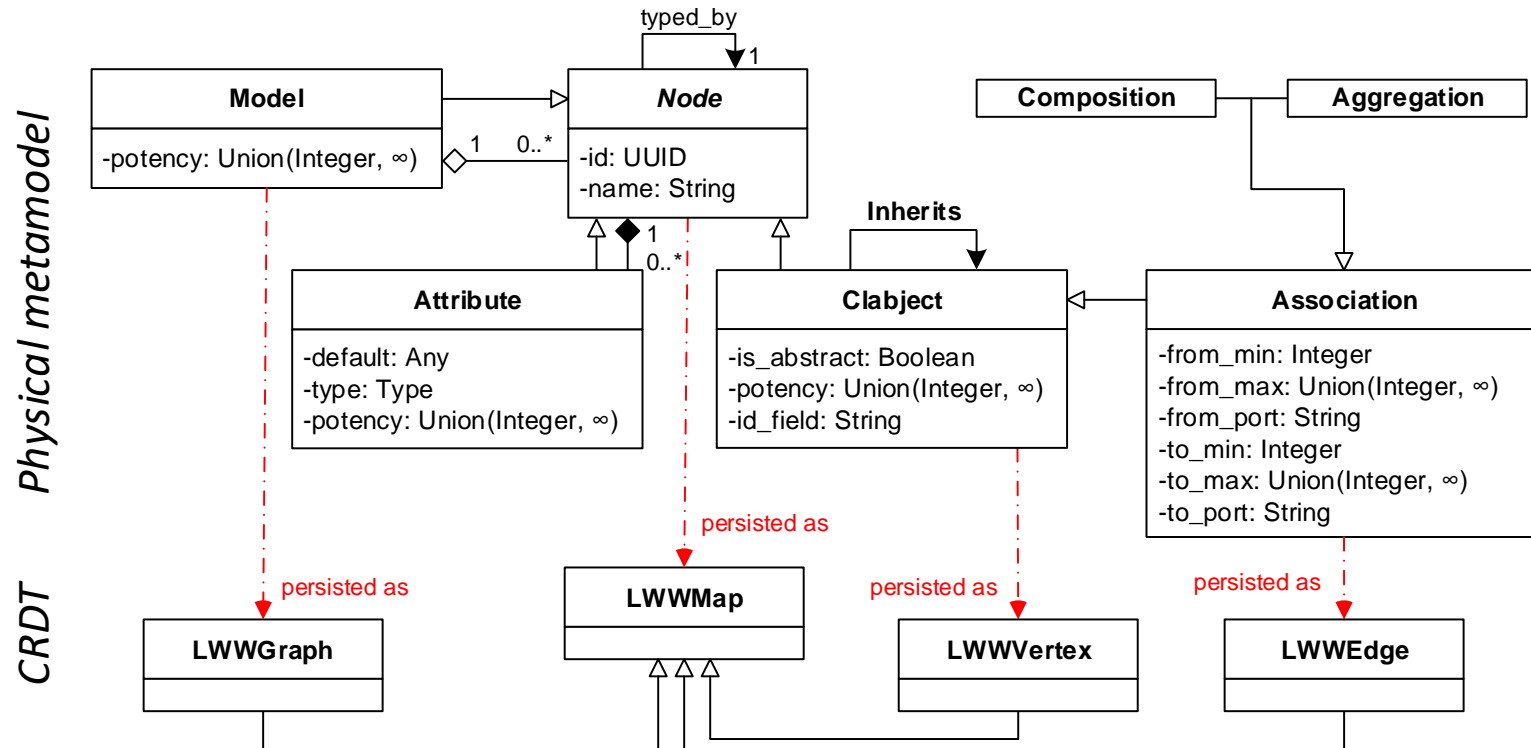
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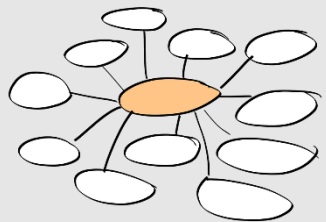
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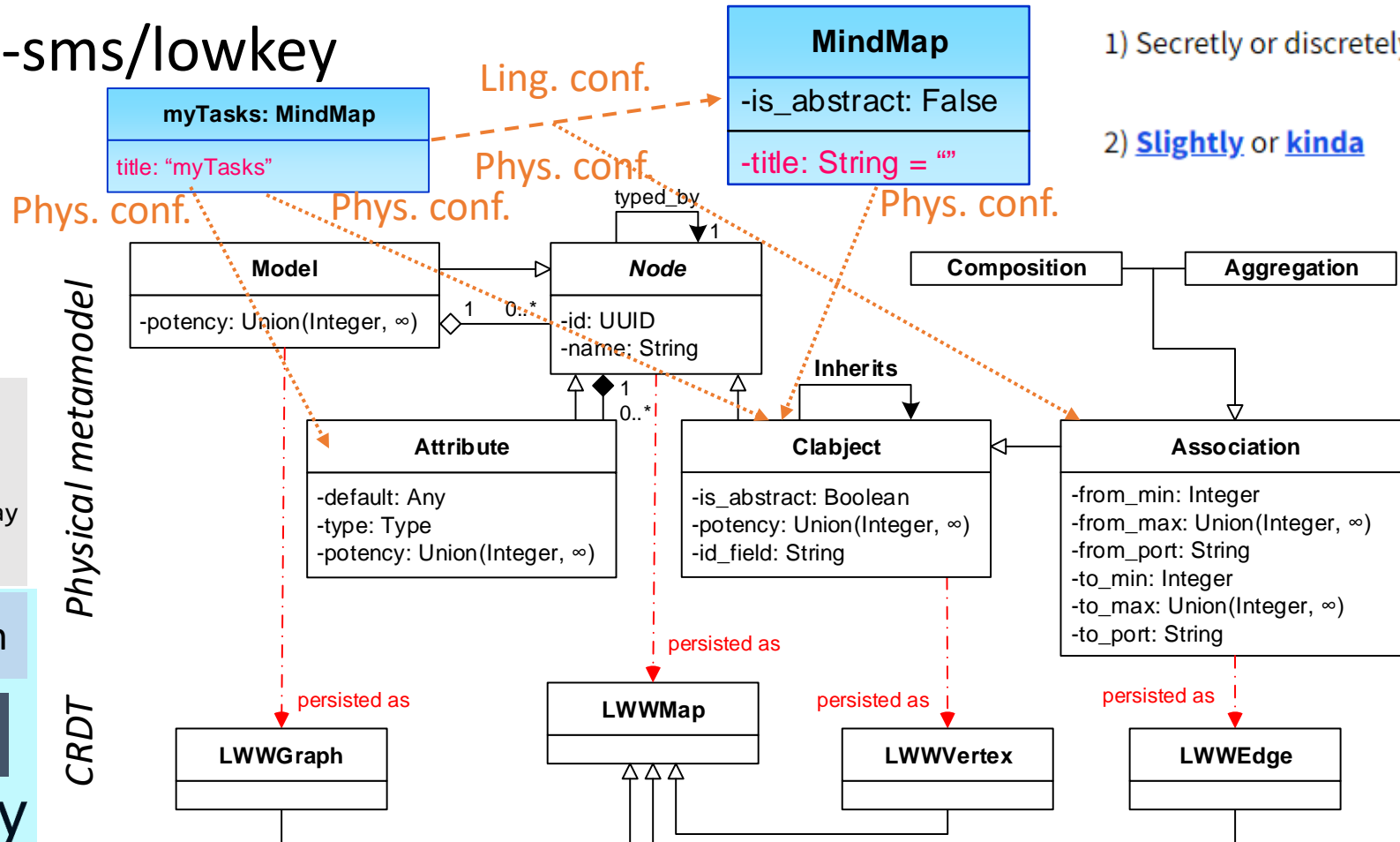
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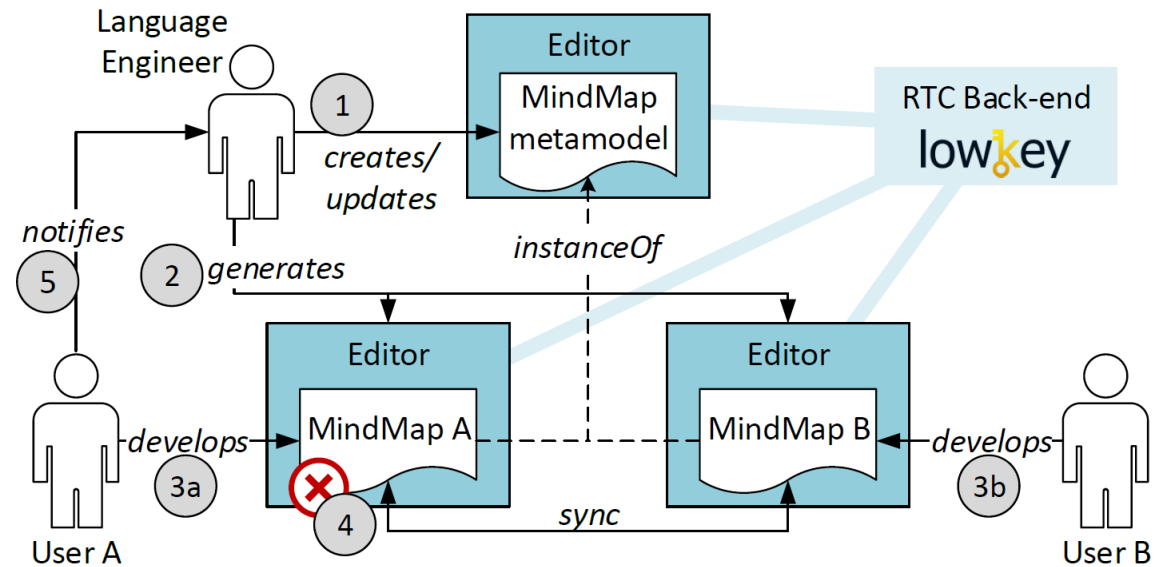
lowkey



Ongoing/future work



Human-machine collaboration



Model-Language Co-evolution
by Multi-level Real-time Collaboration