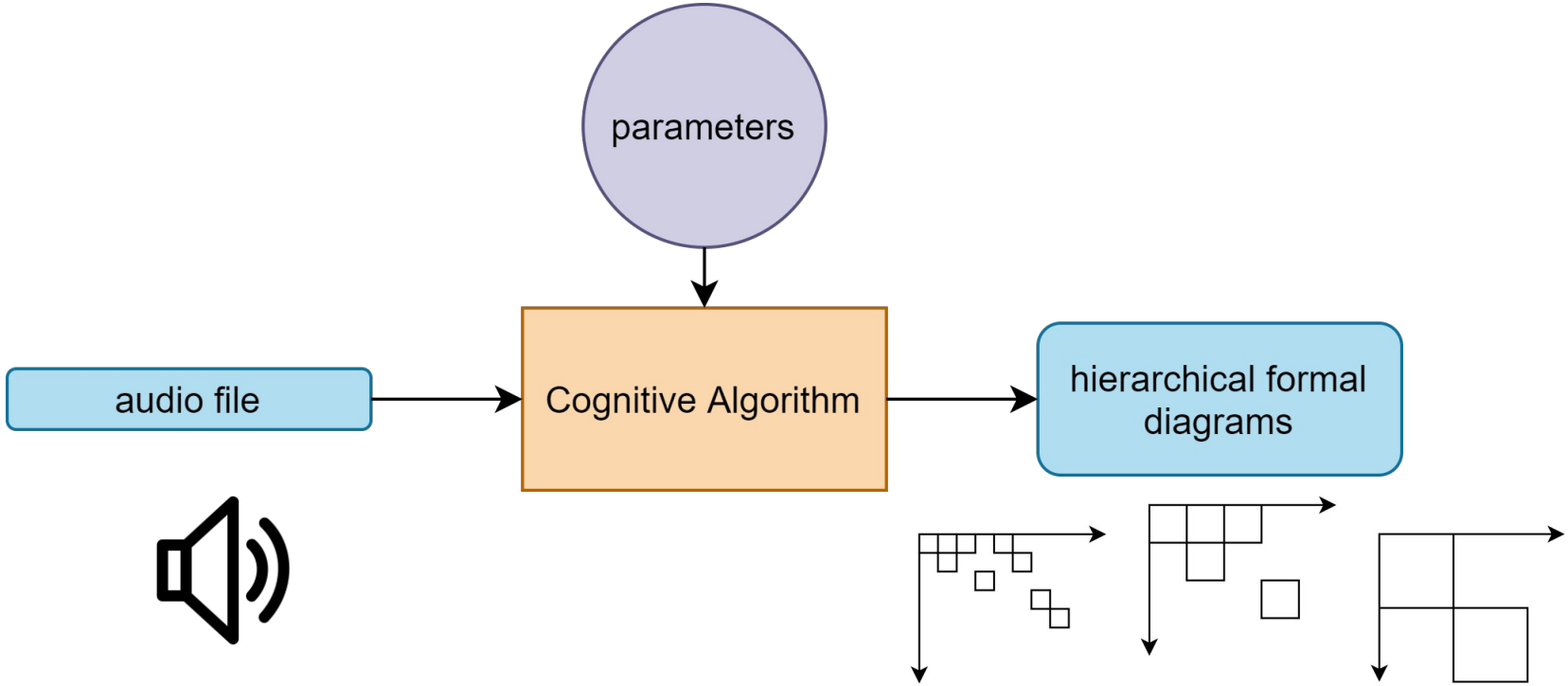
Mutli-Scale Oracle and automated representation of formal diagrams based on the Cognitive Algorithm

TENOR 2021 - May 10th 2021

J. Calandra, J.-M. Chouvel, M. Desainte-Catherine

Cognitive algorithm : main principle



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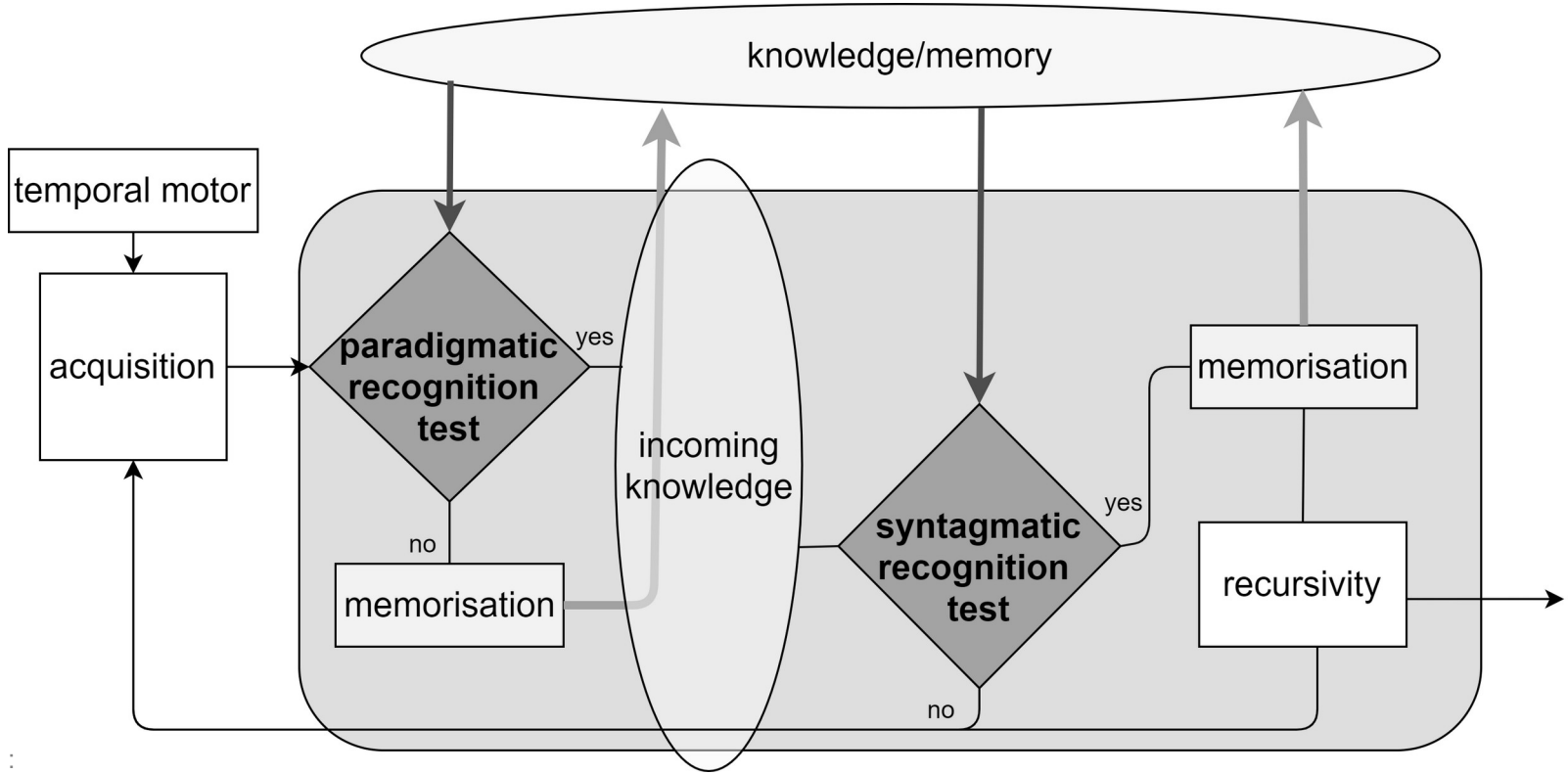

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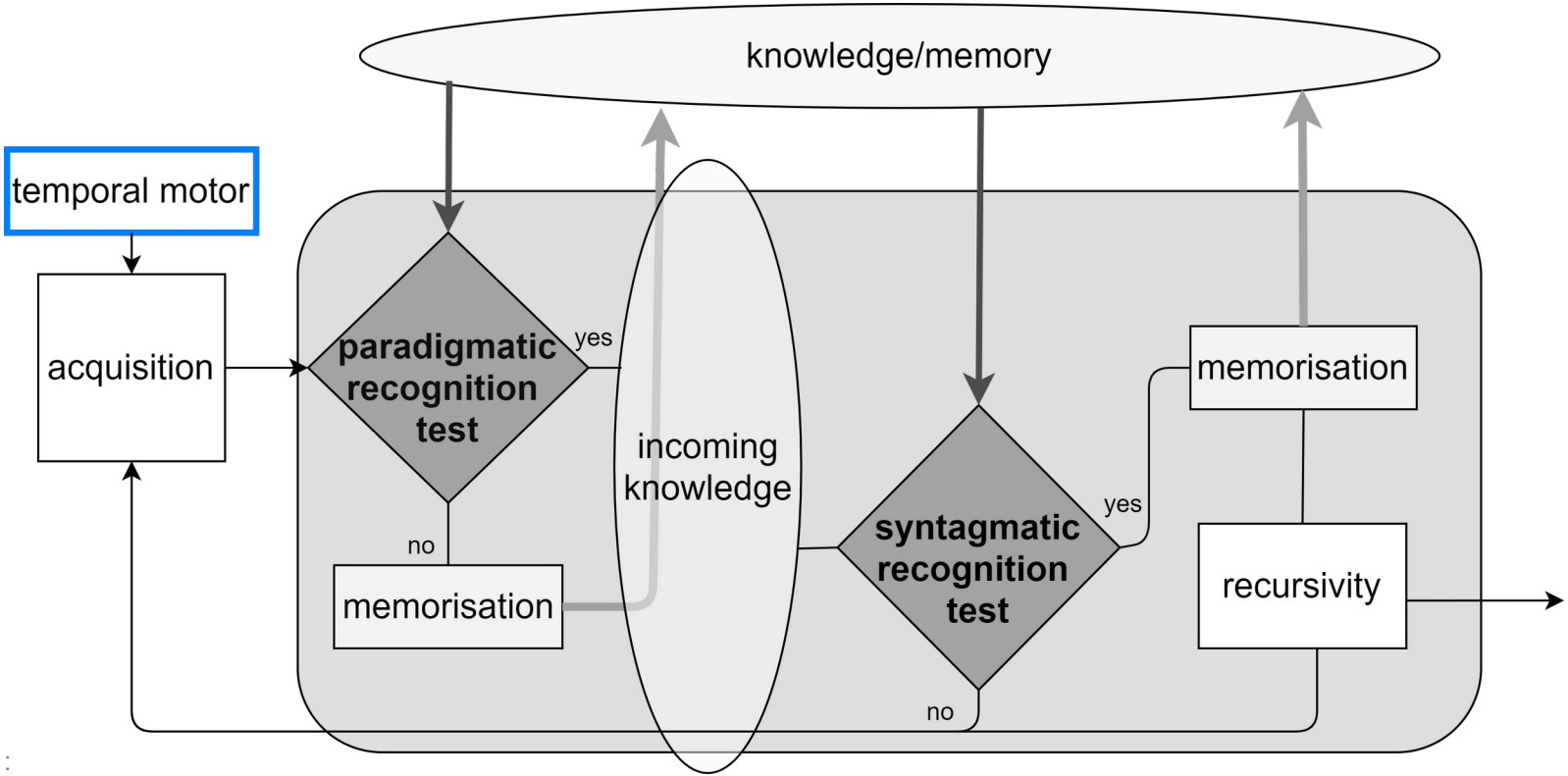

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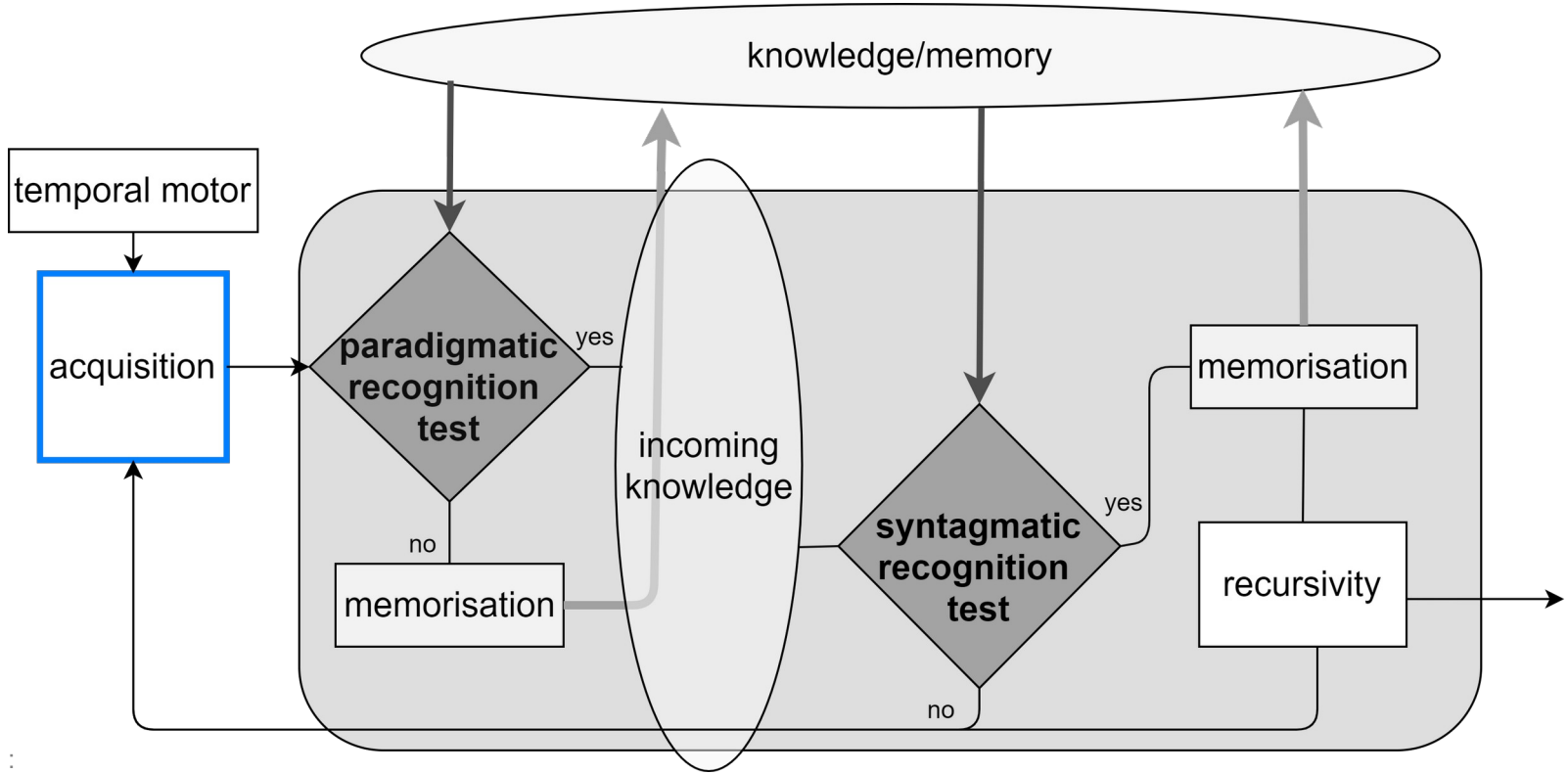

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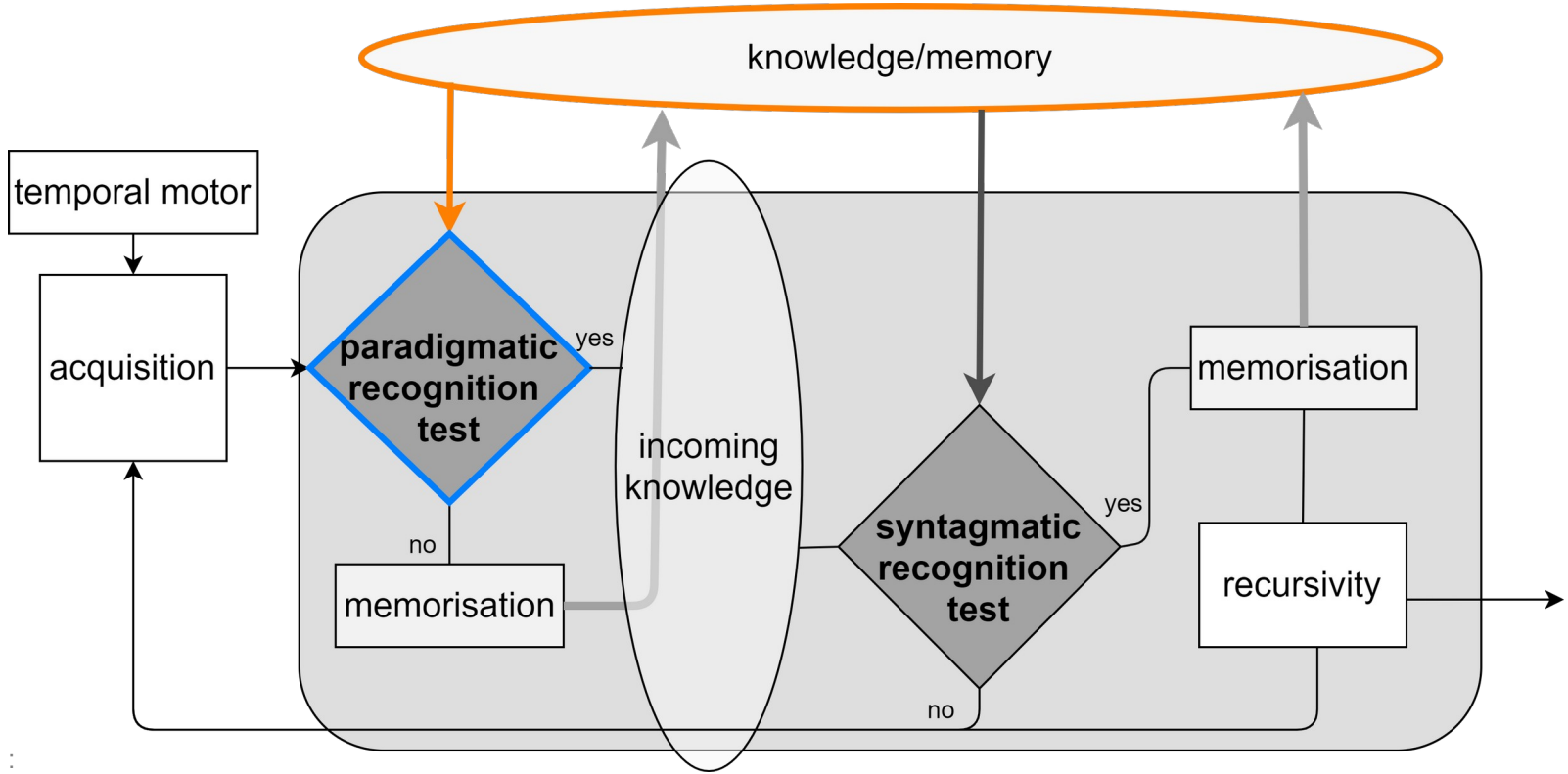

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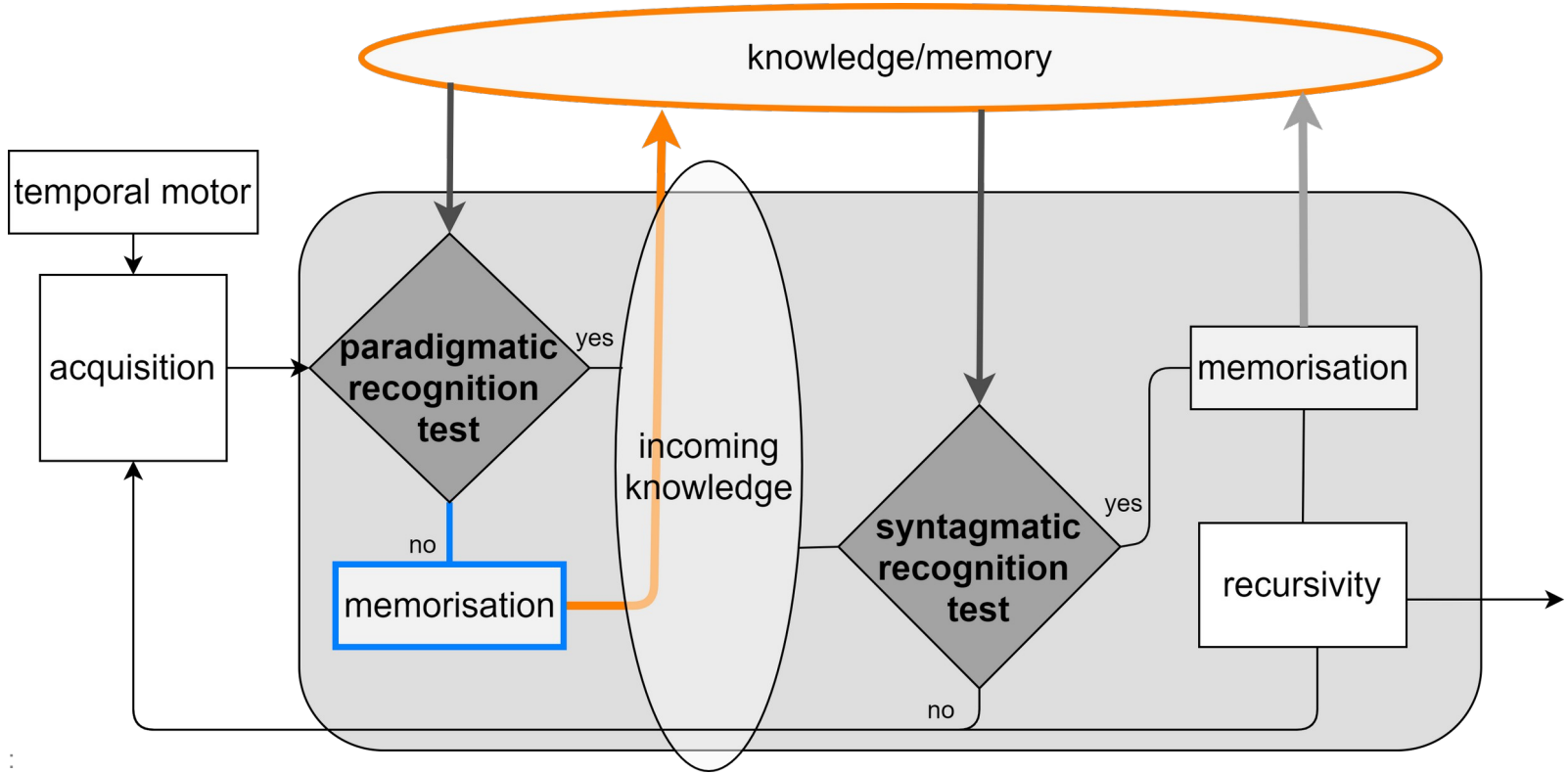

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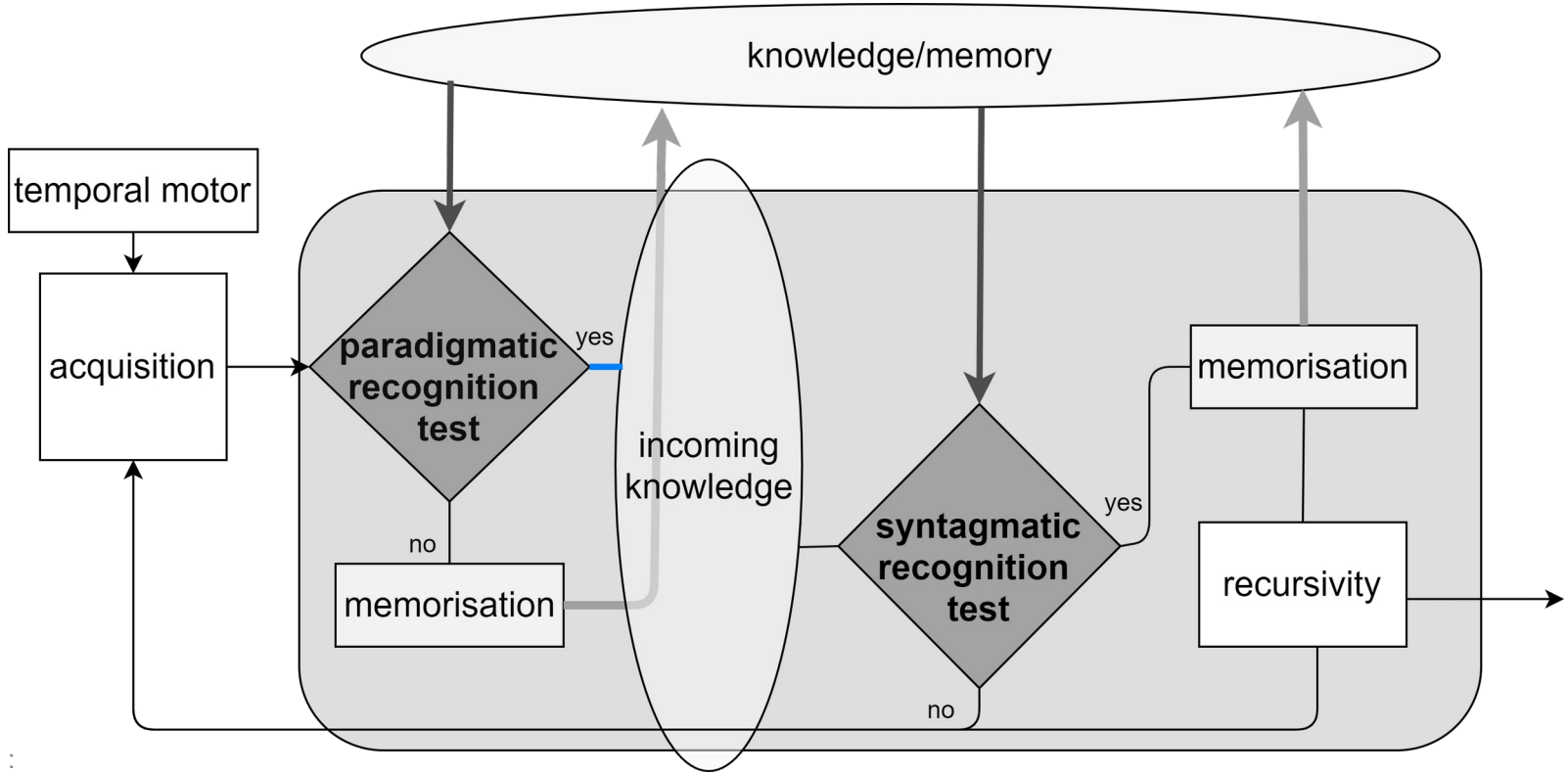

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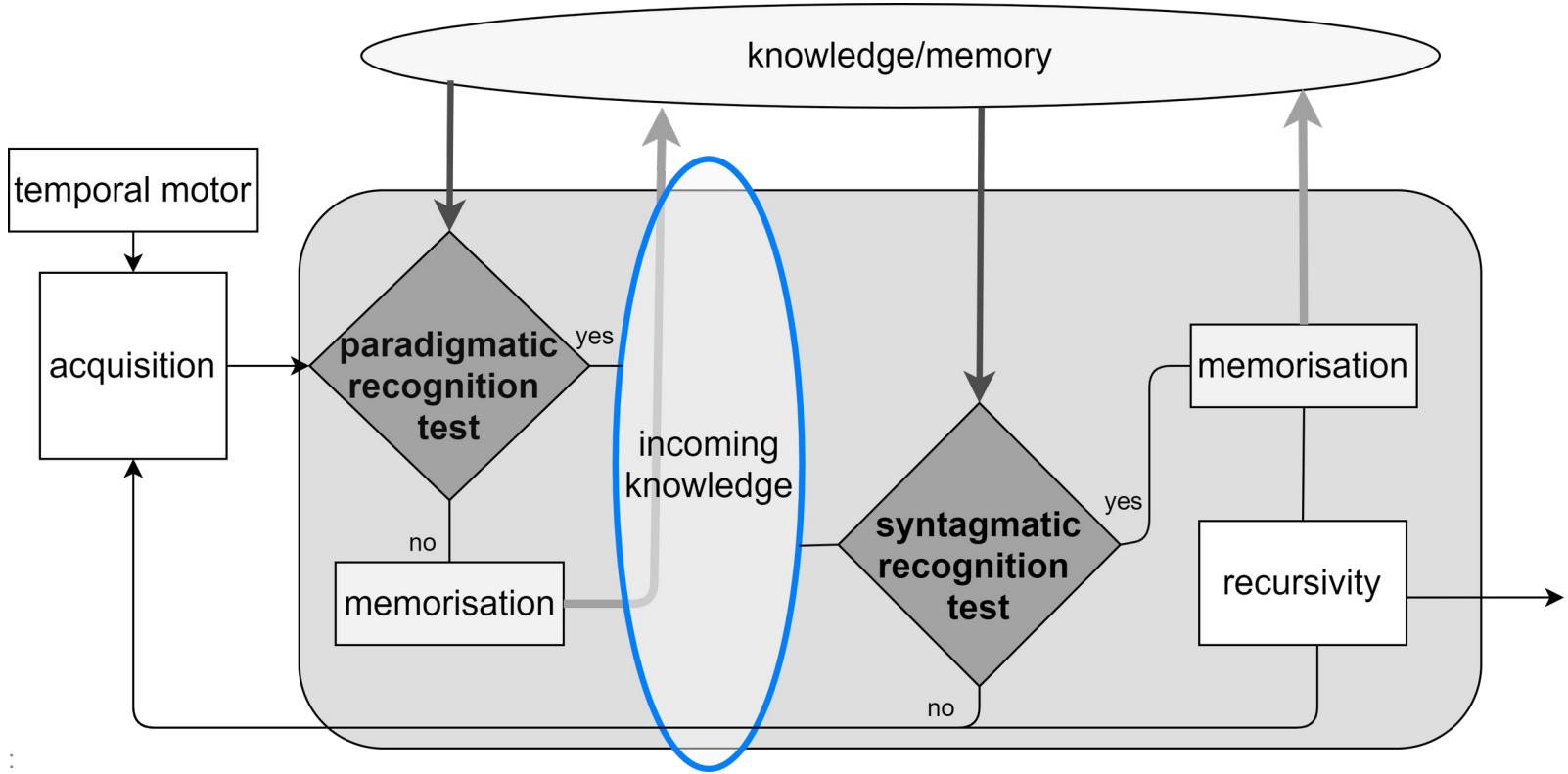

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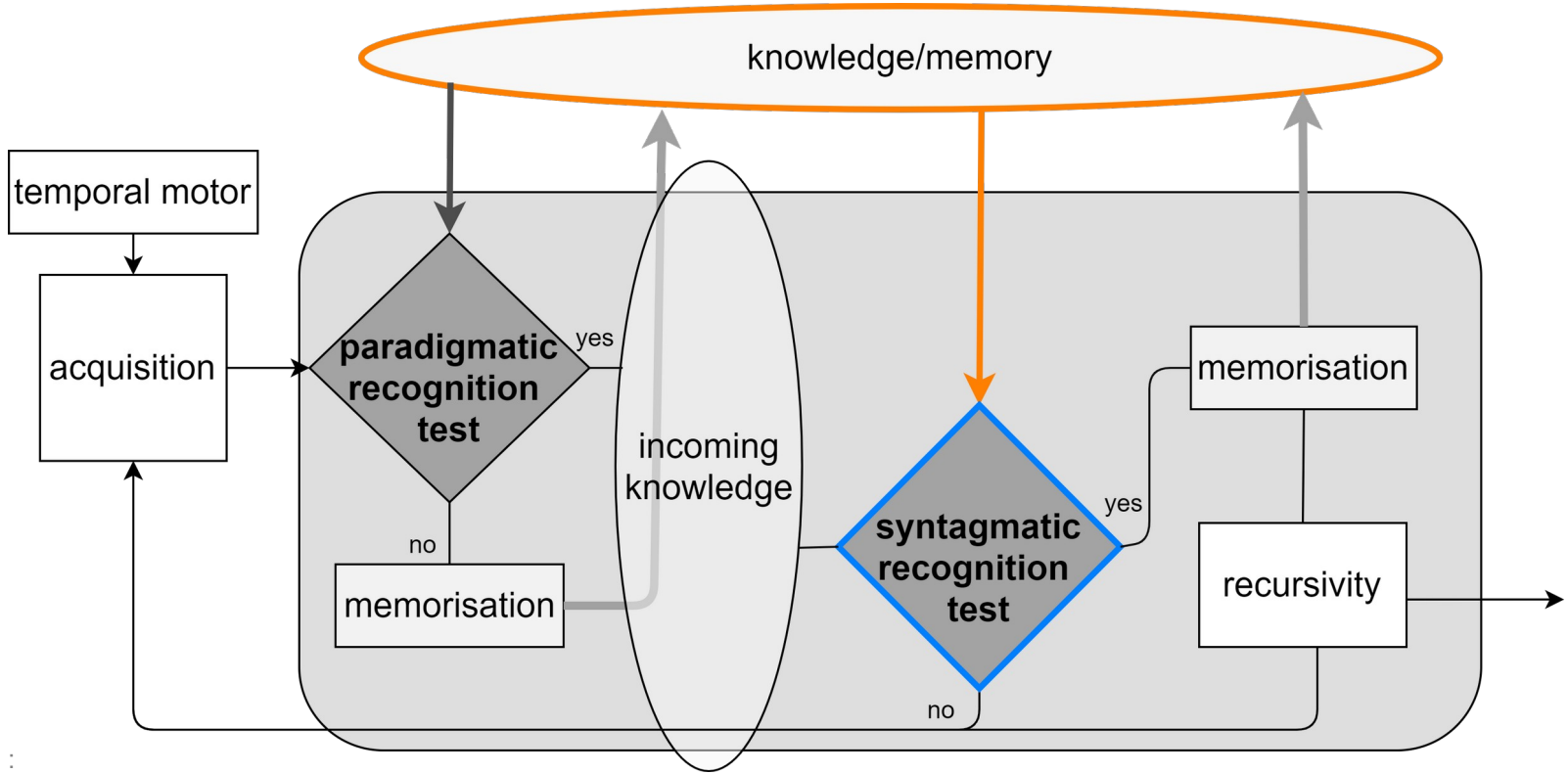

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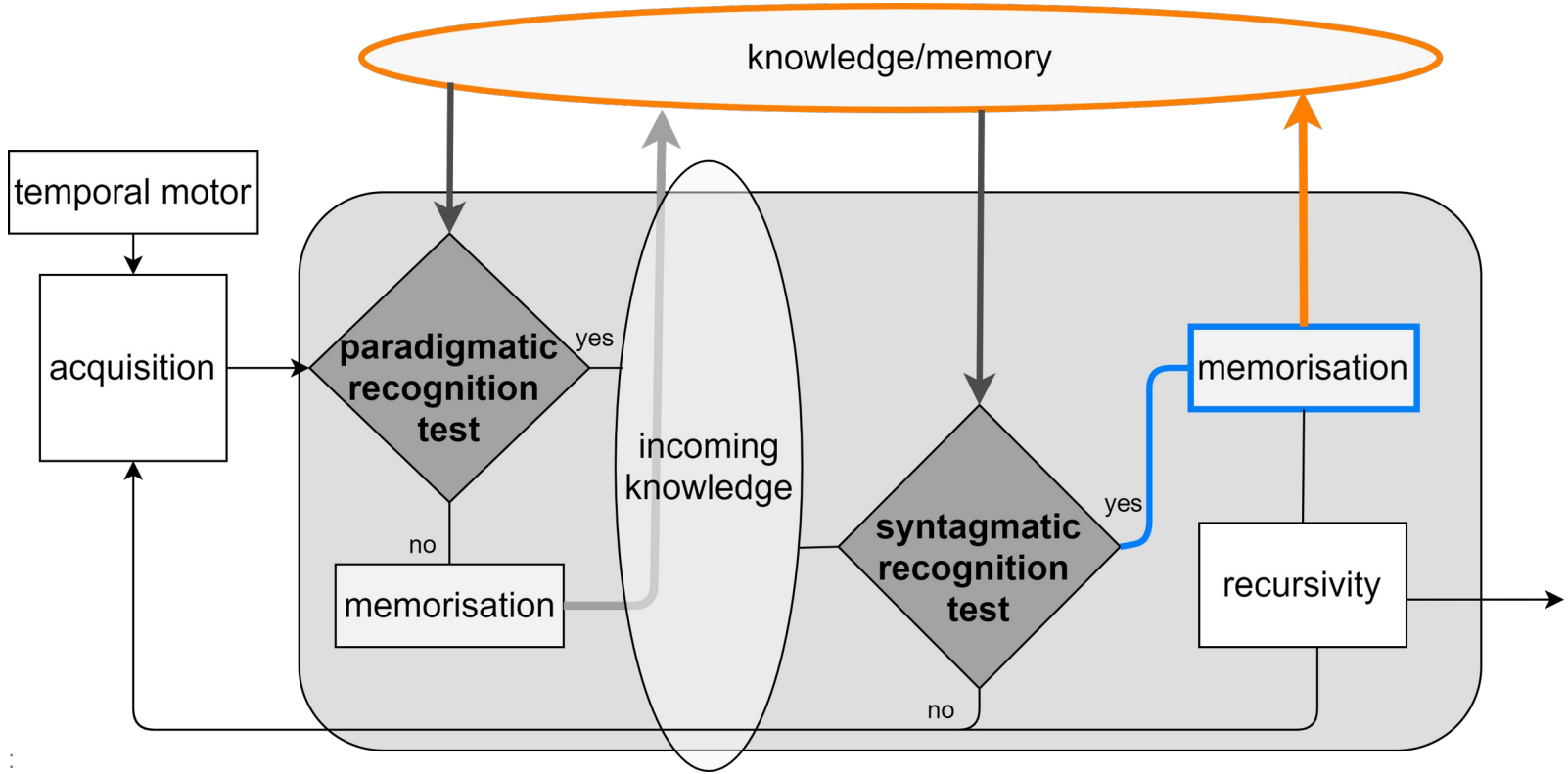

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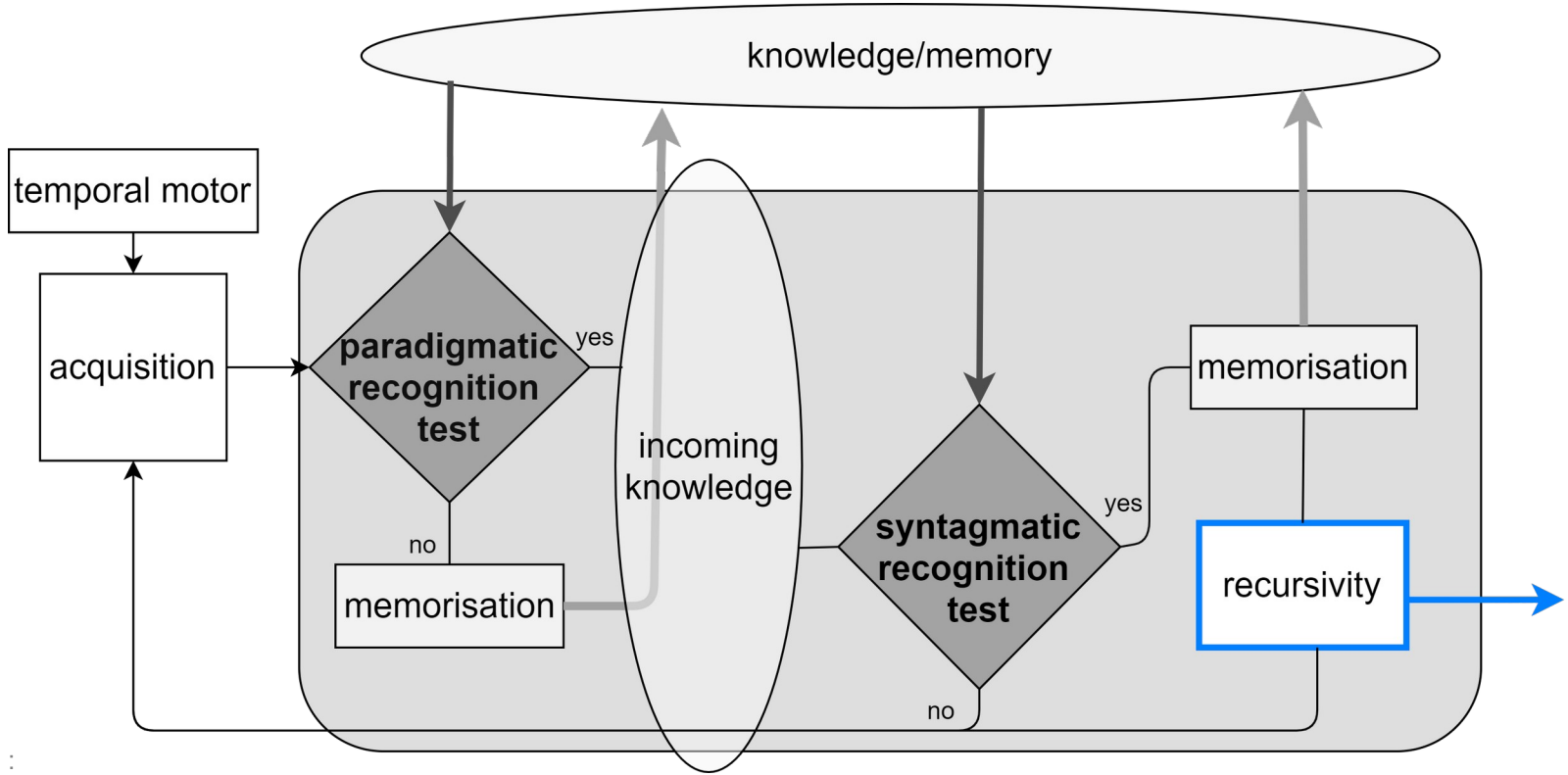

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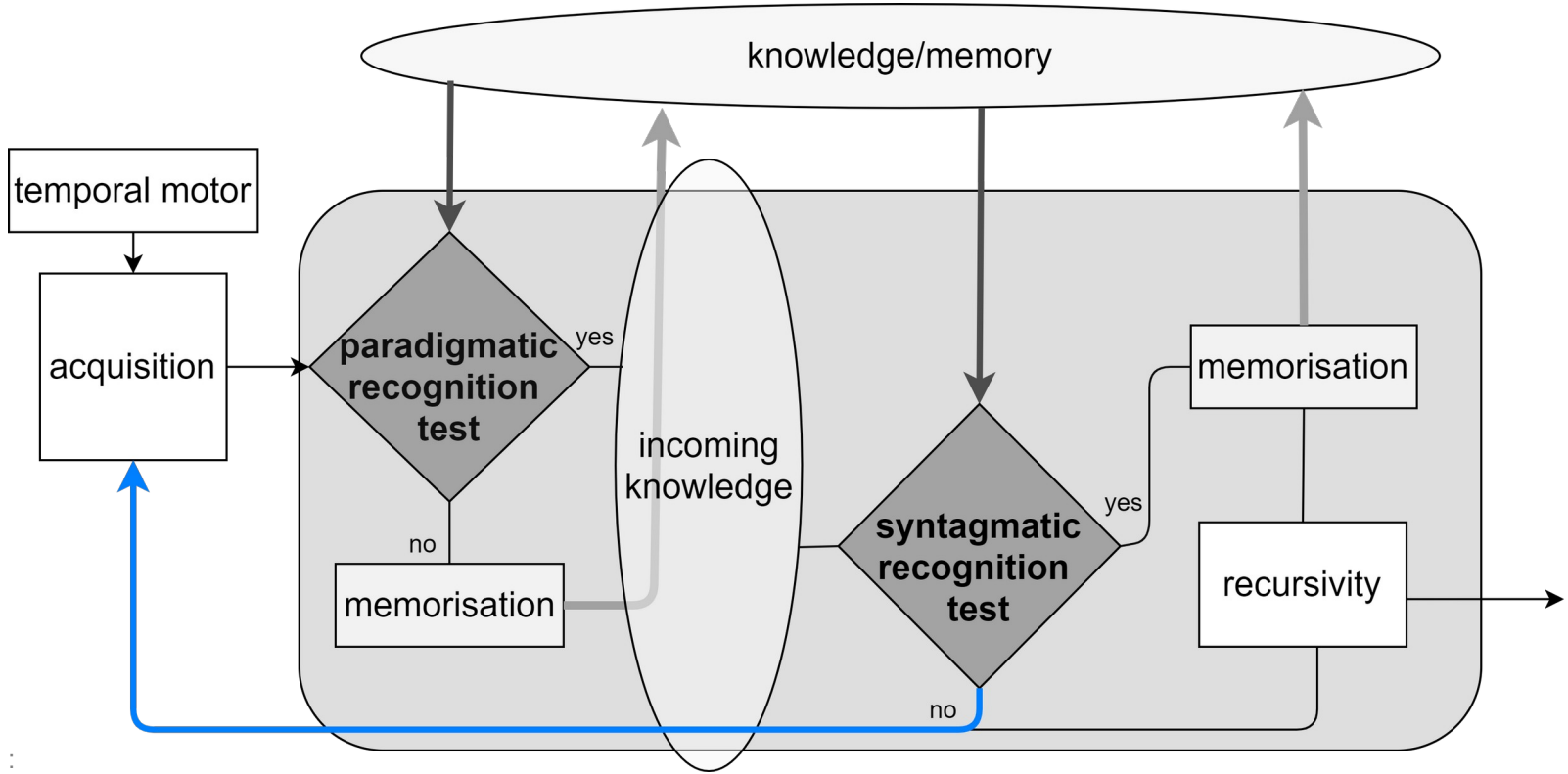

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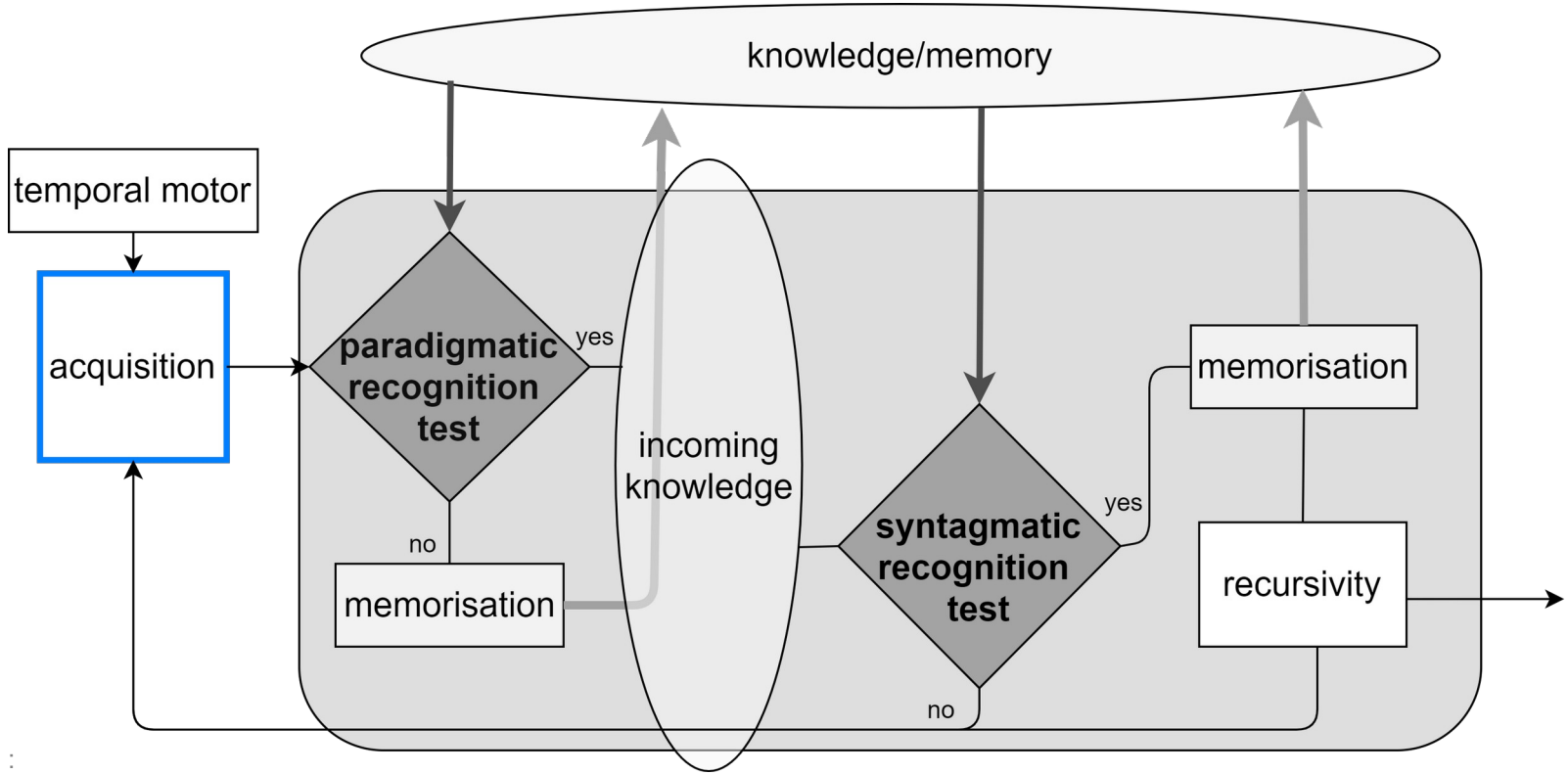

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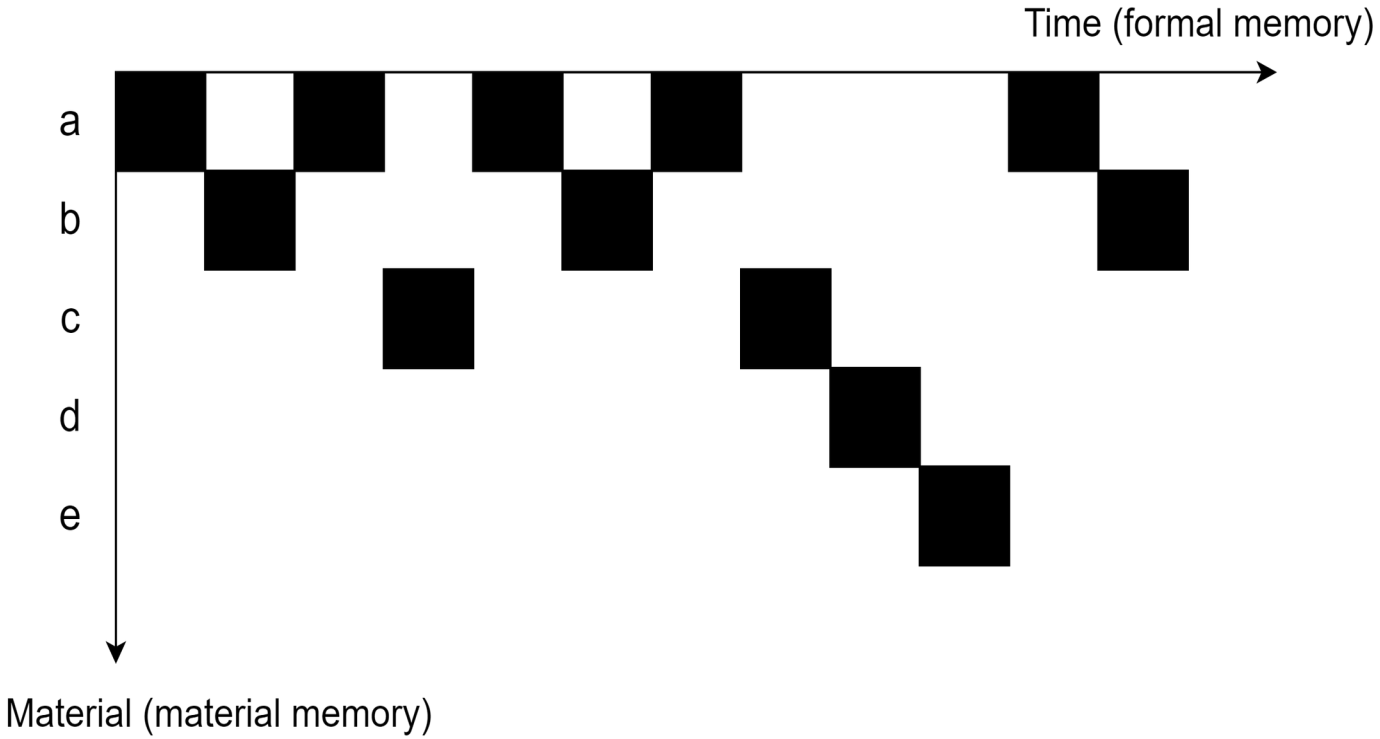
Formal diagram of a piece of music associated with the sequence of encoded materials « abacabacdeab »



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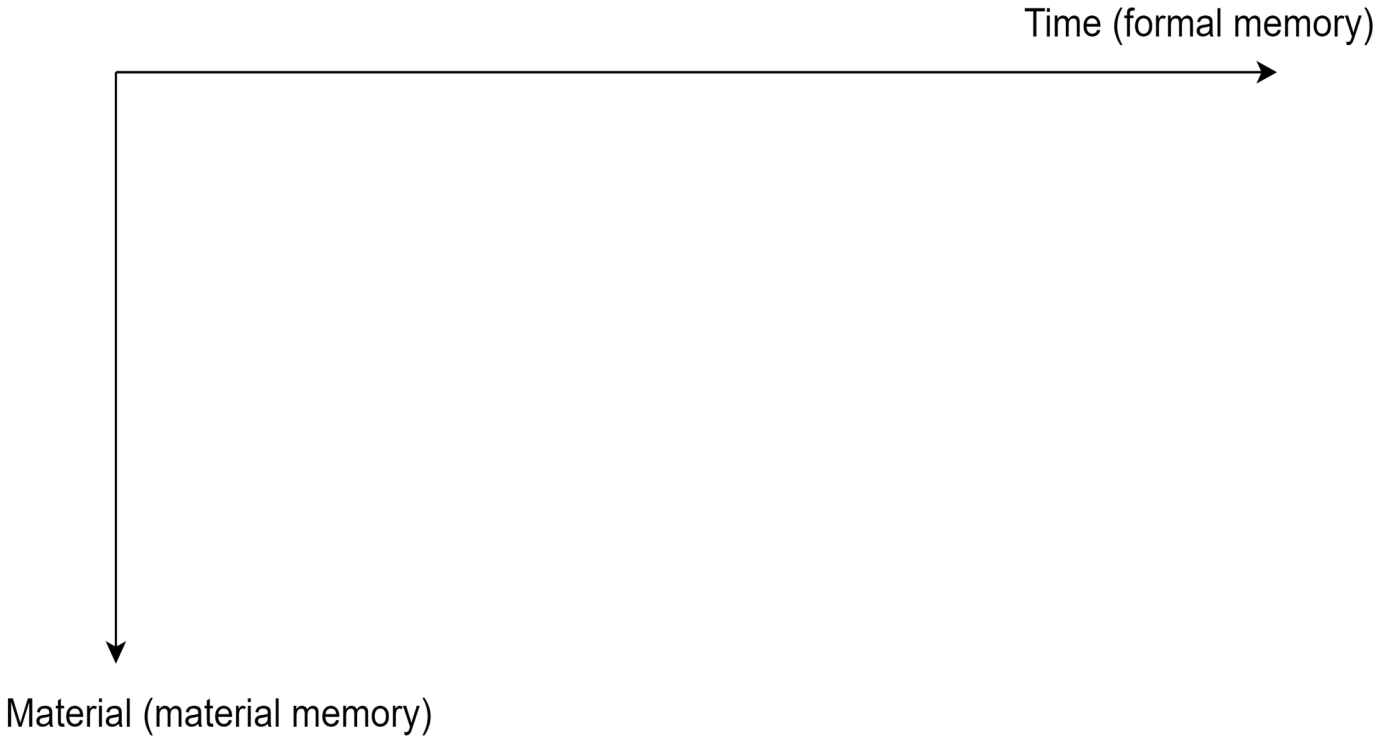

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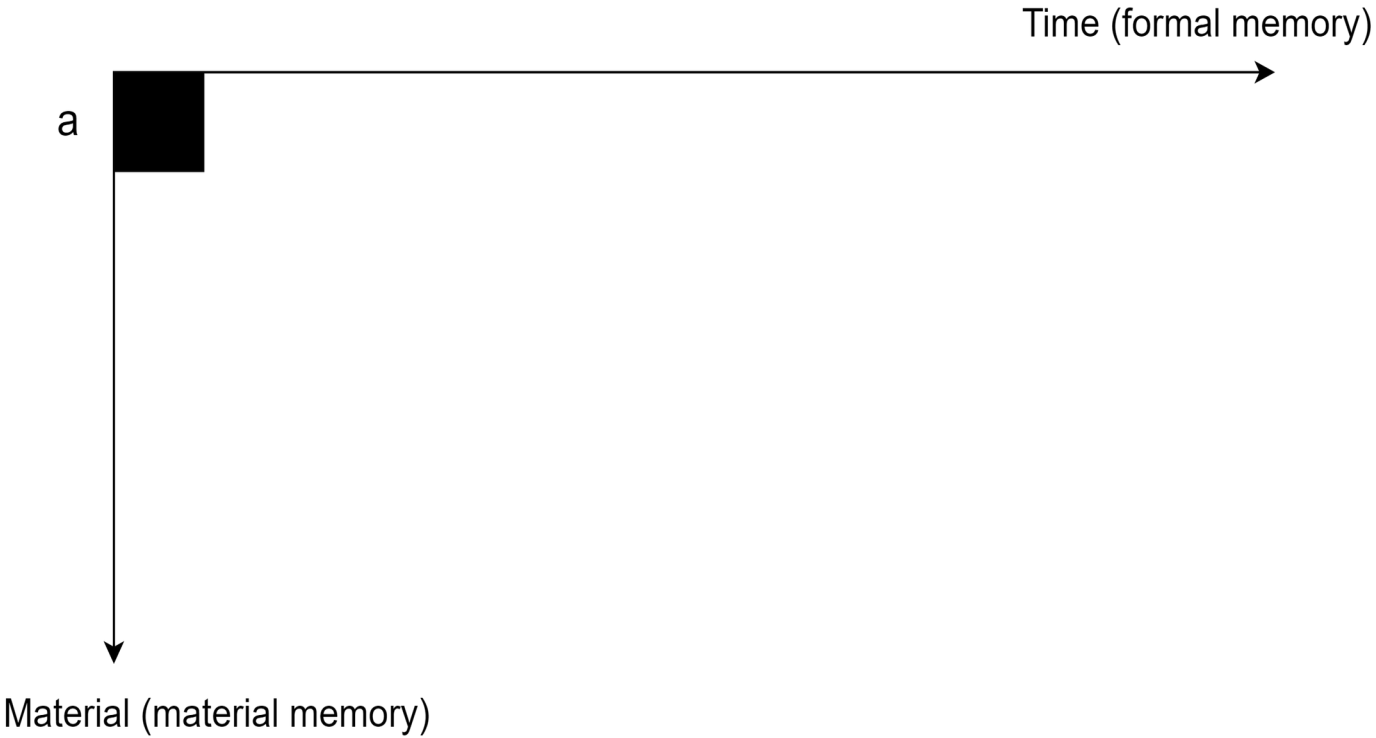

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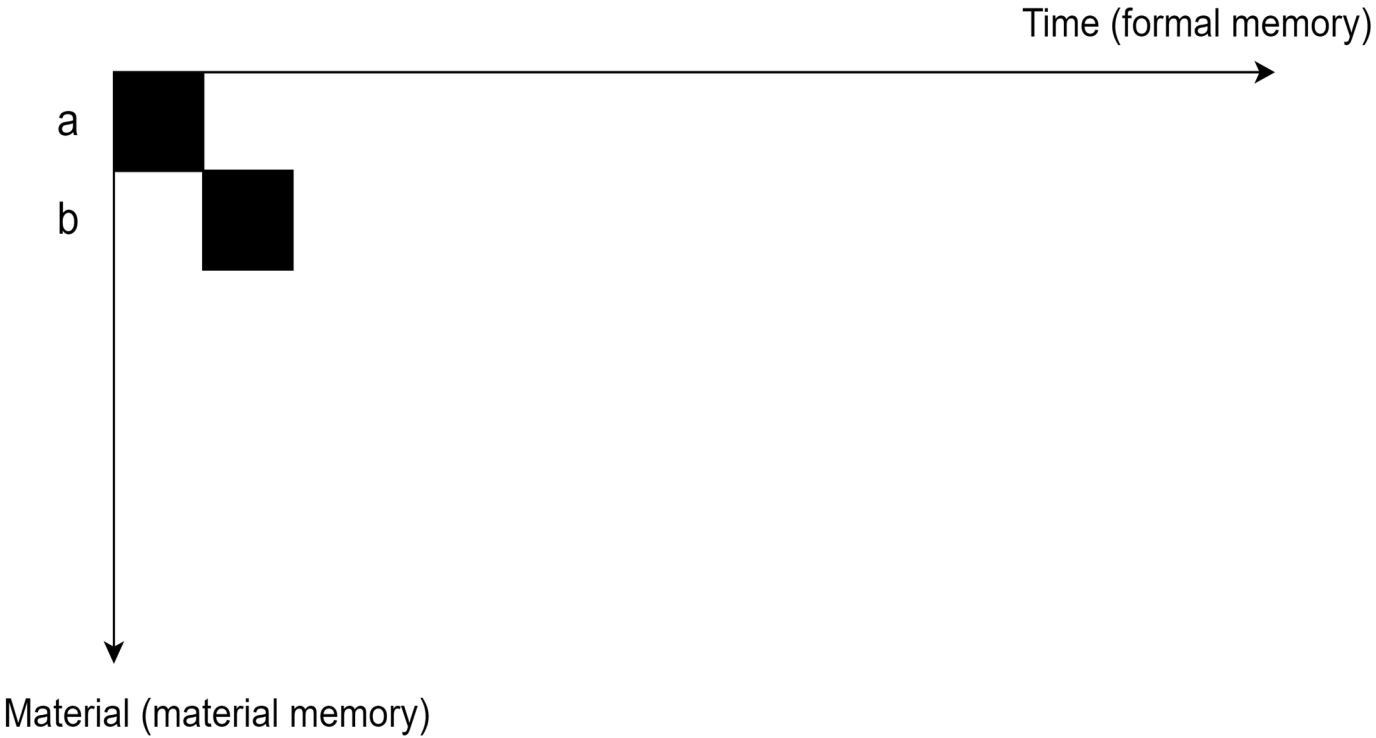

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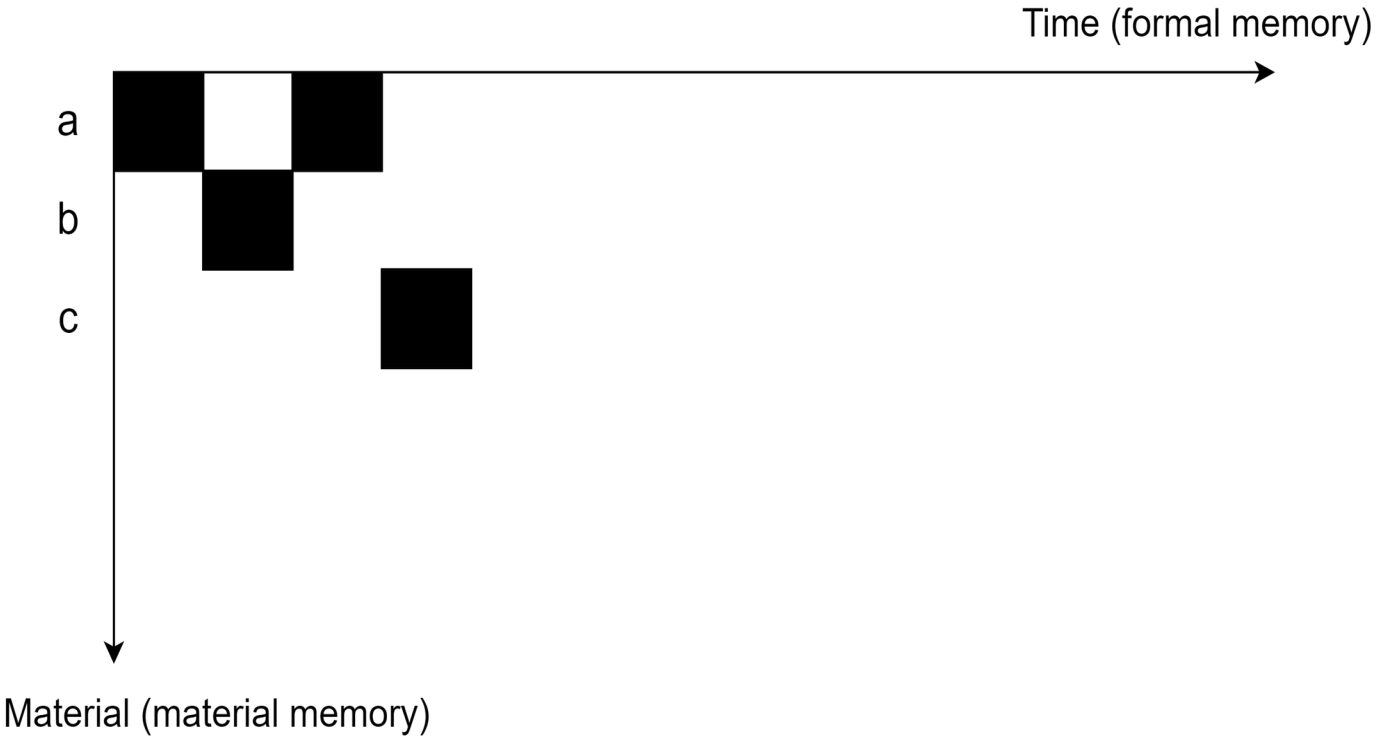

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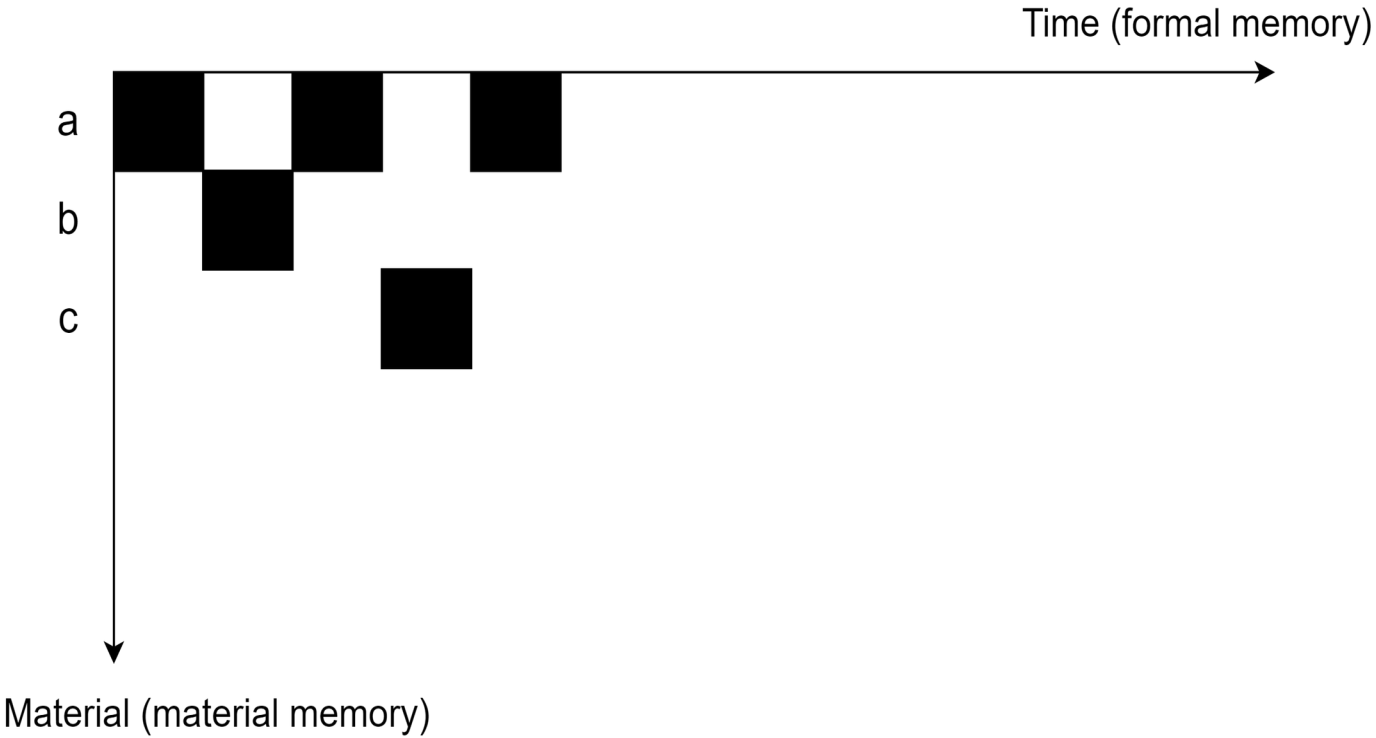

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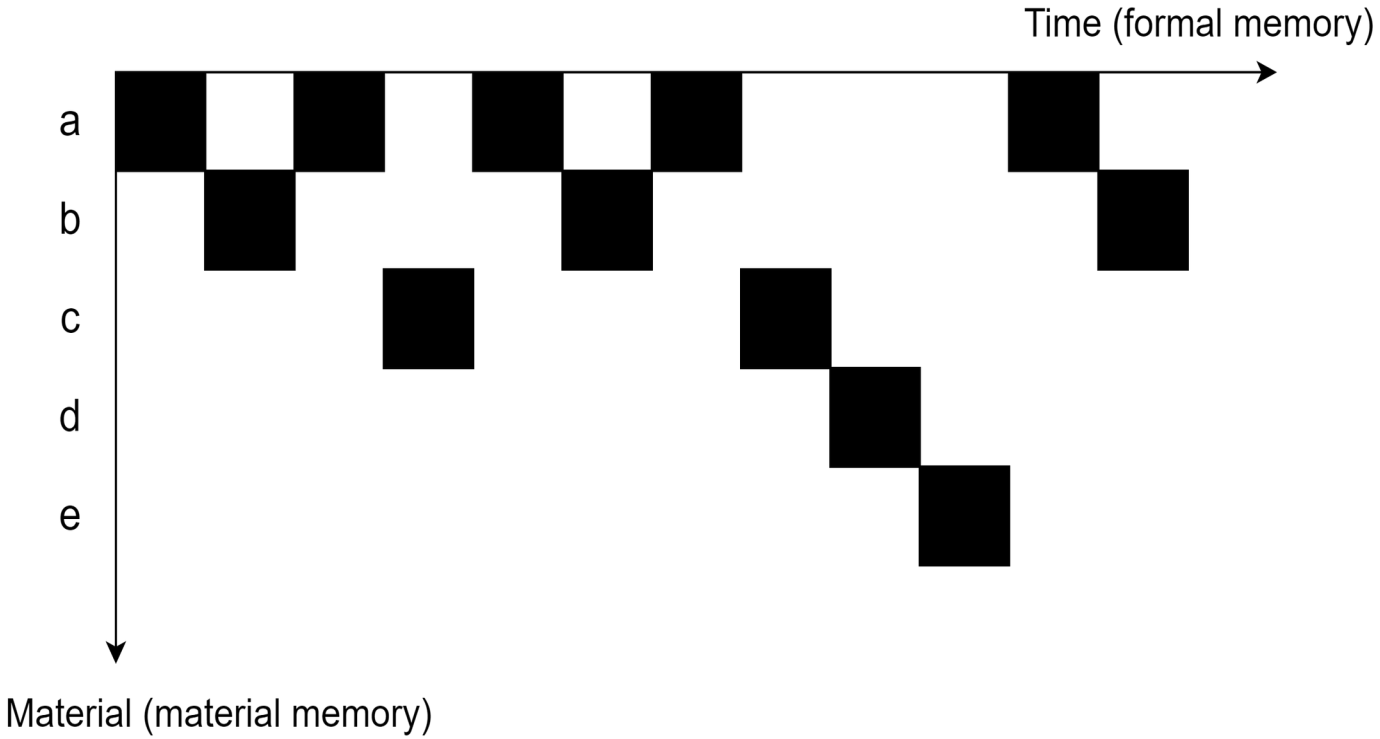

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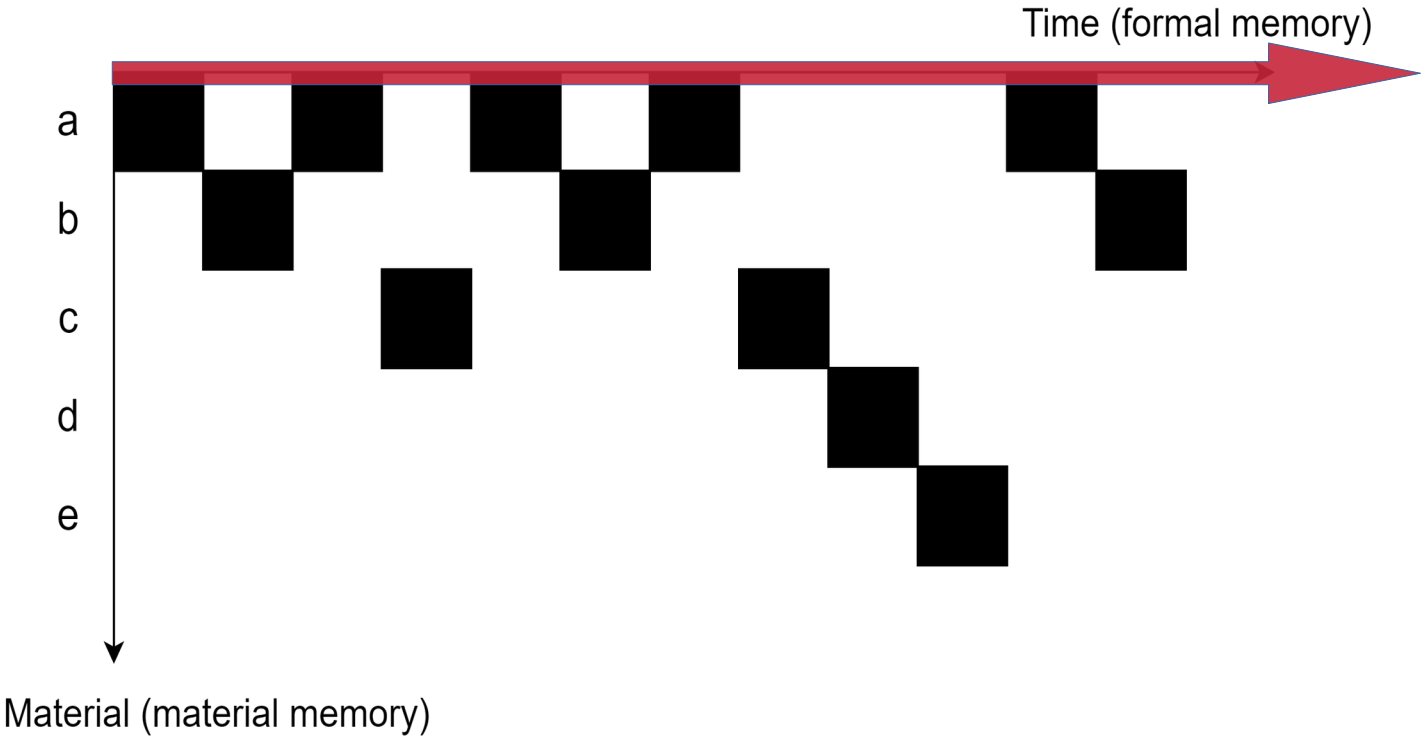

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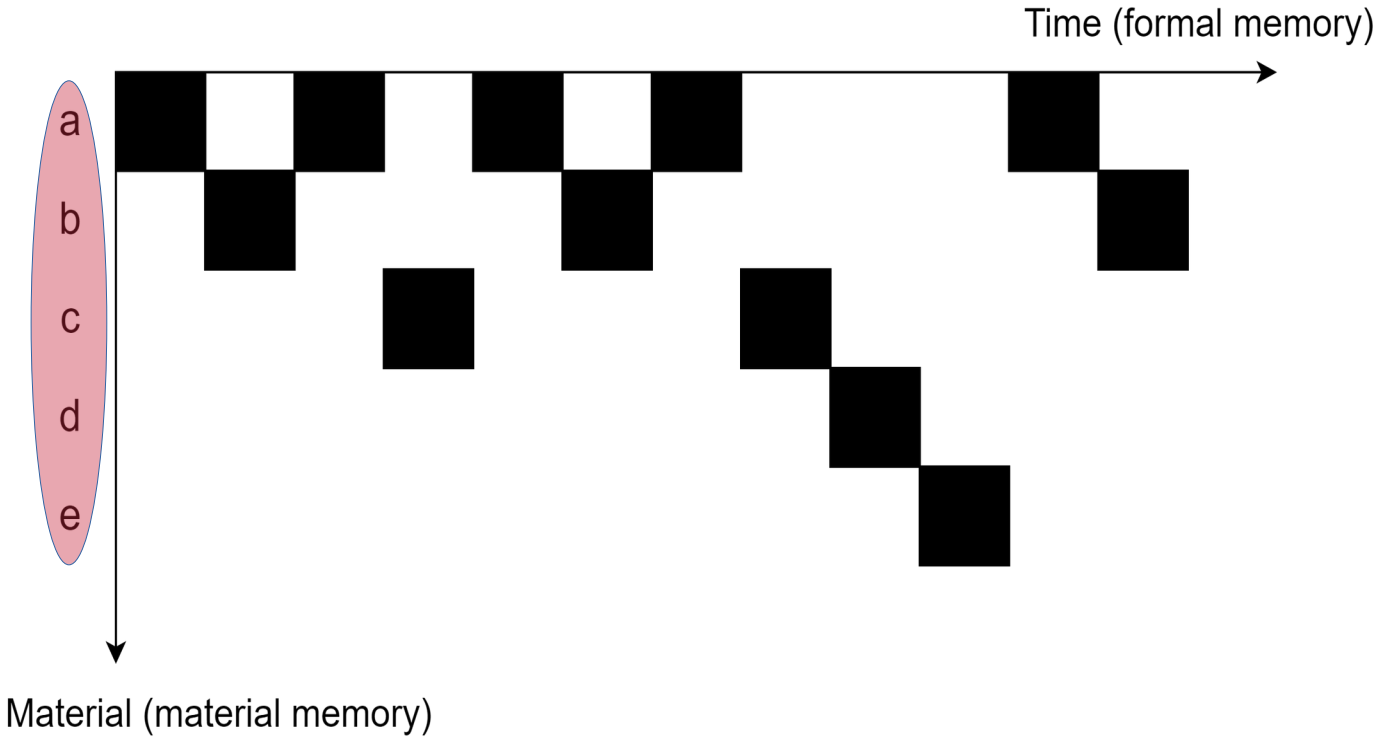

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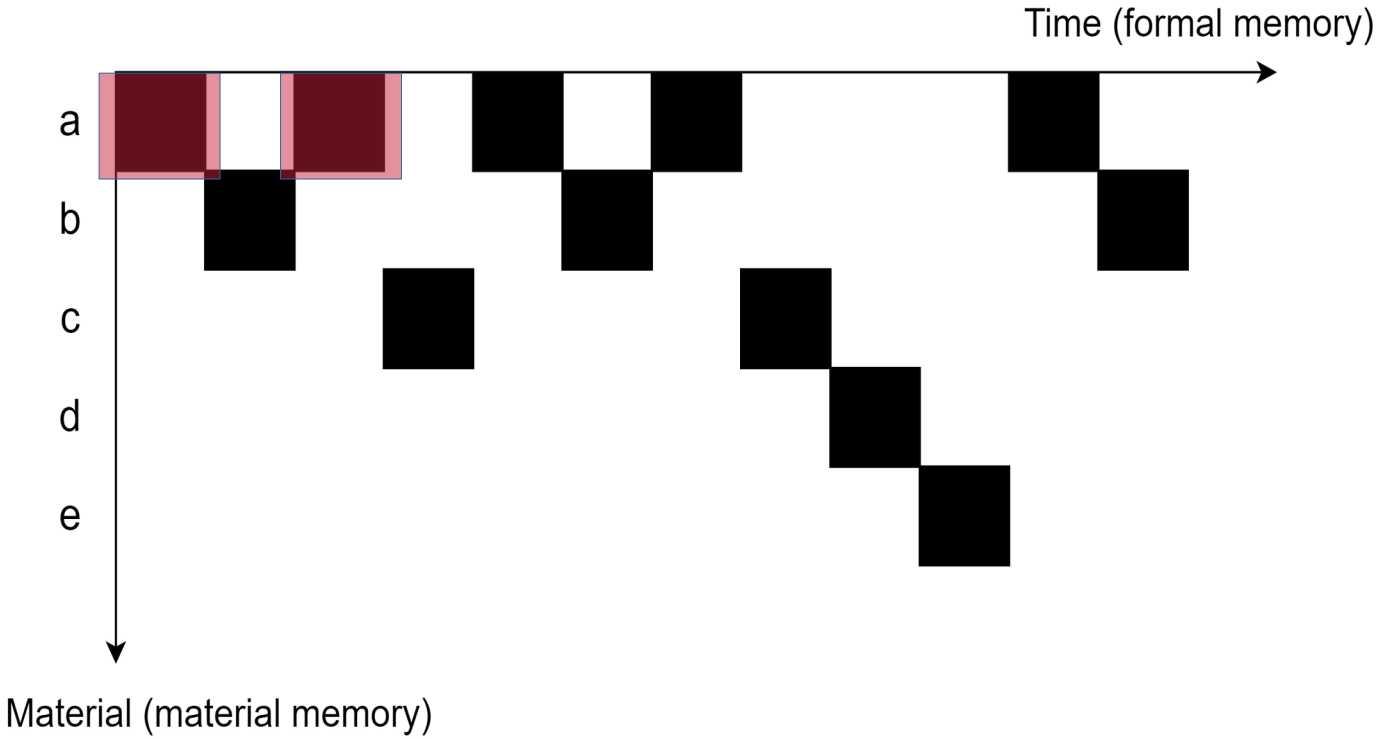

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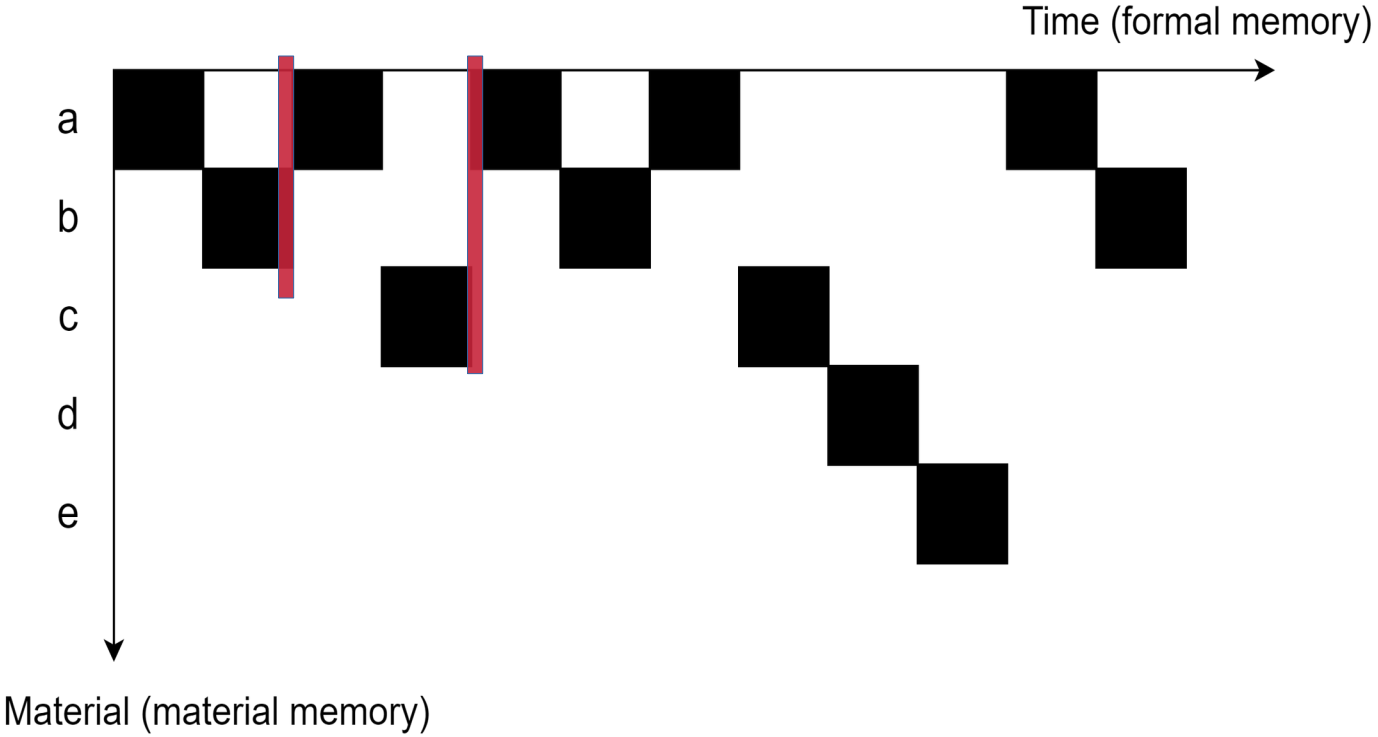

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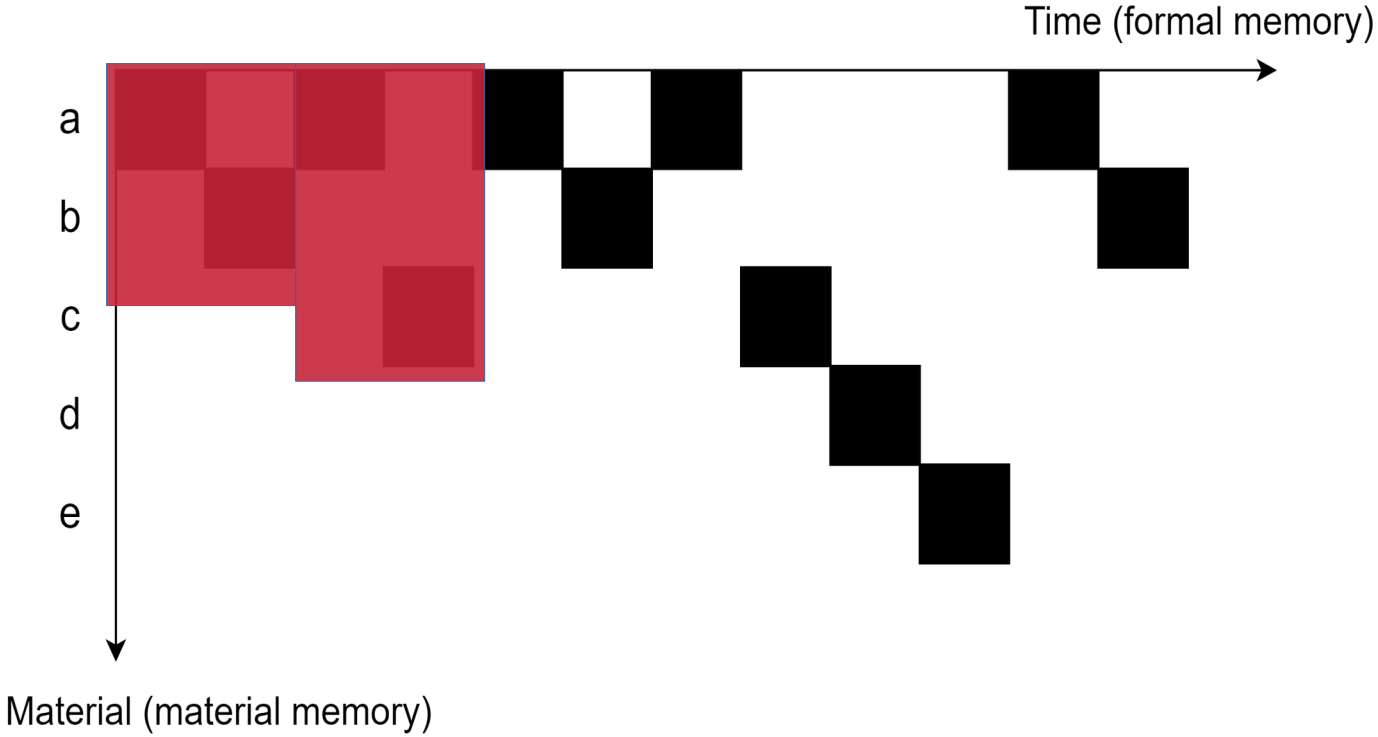
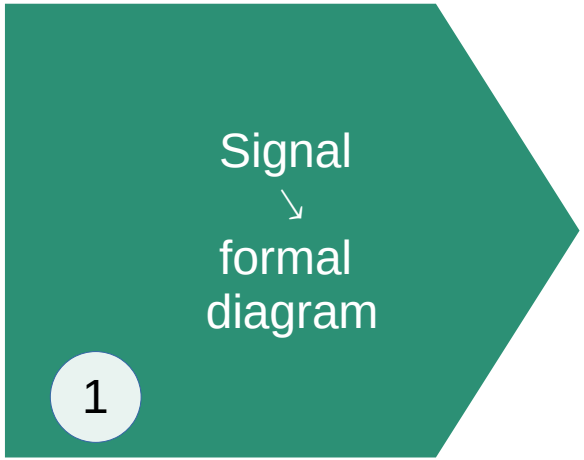


Context and problematic

From signal to hierarchical formal diagrams



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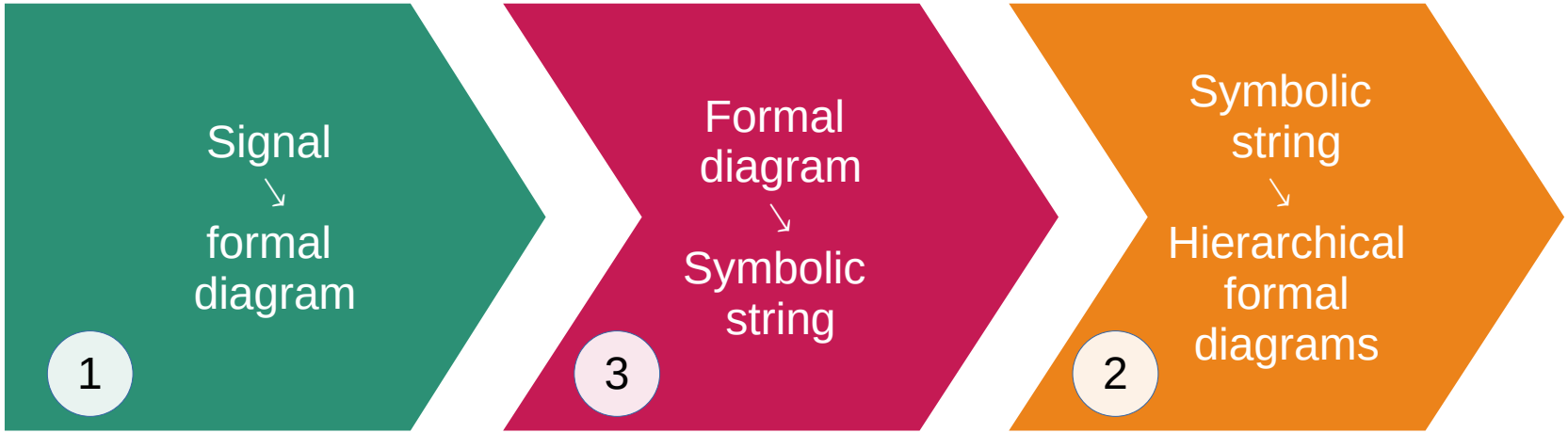
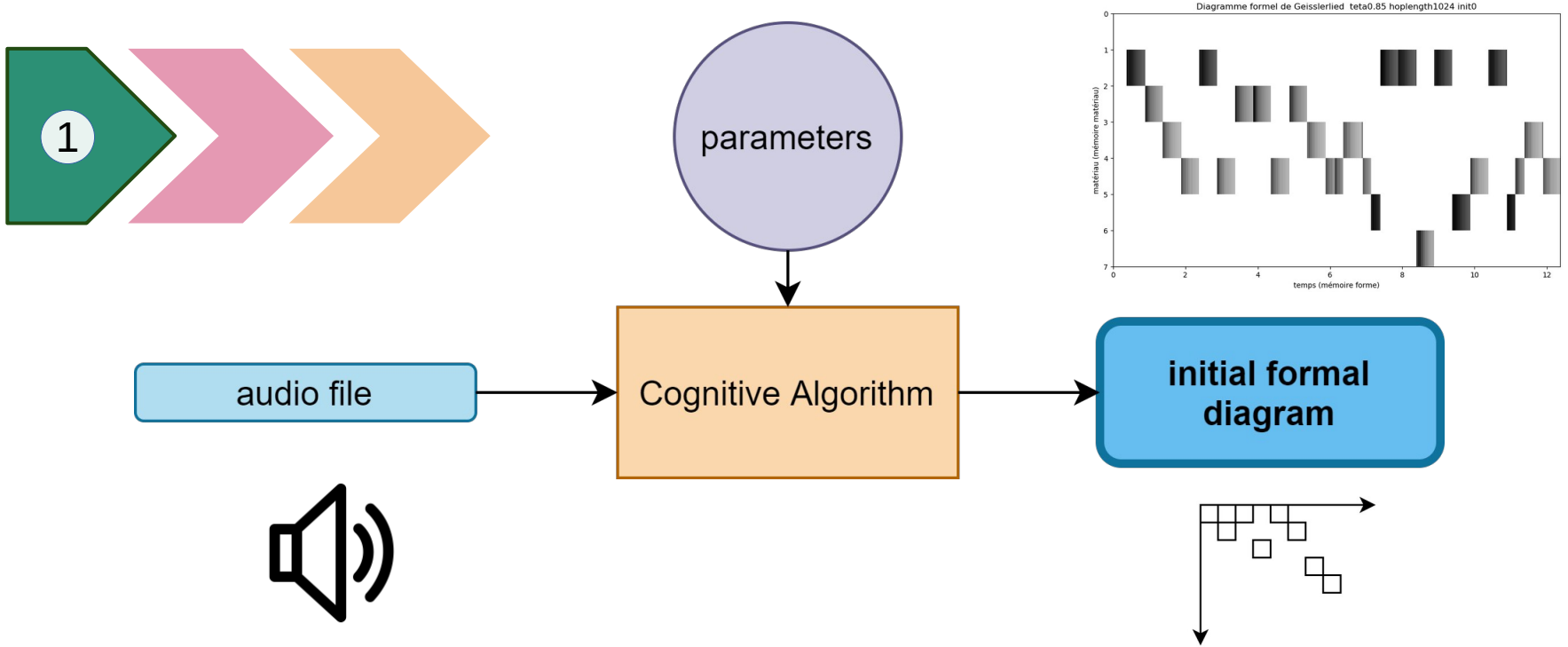
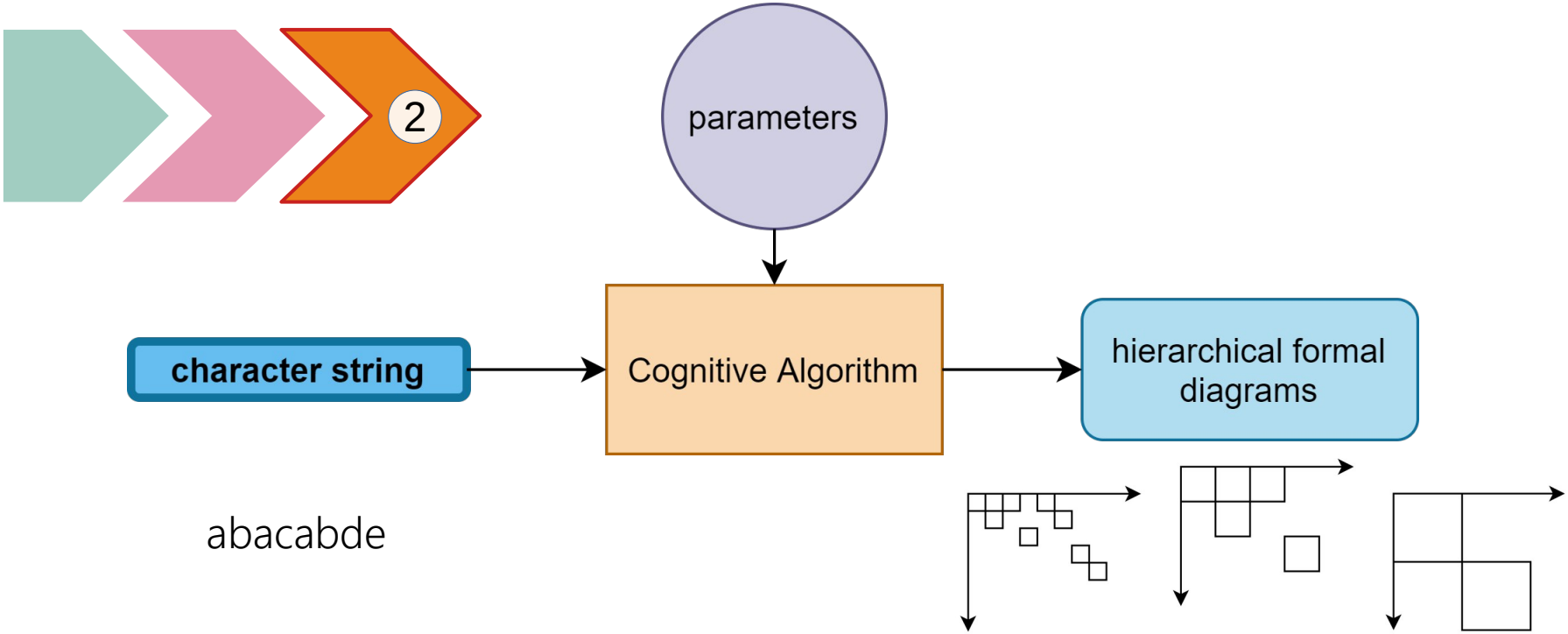


From signal to one intial formal diagram



J. Calandra, J.-M. Chouvel, M. Desainte-Catherine, and al., *Génération automatique de diagrammes formels par un algorithme cognitif modulaire: étude preliminaire*, in Journées d'Informatique Musicales(JIM), Strasbourg, France, 2020.

From symbols to hierarchical formal diagrams



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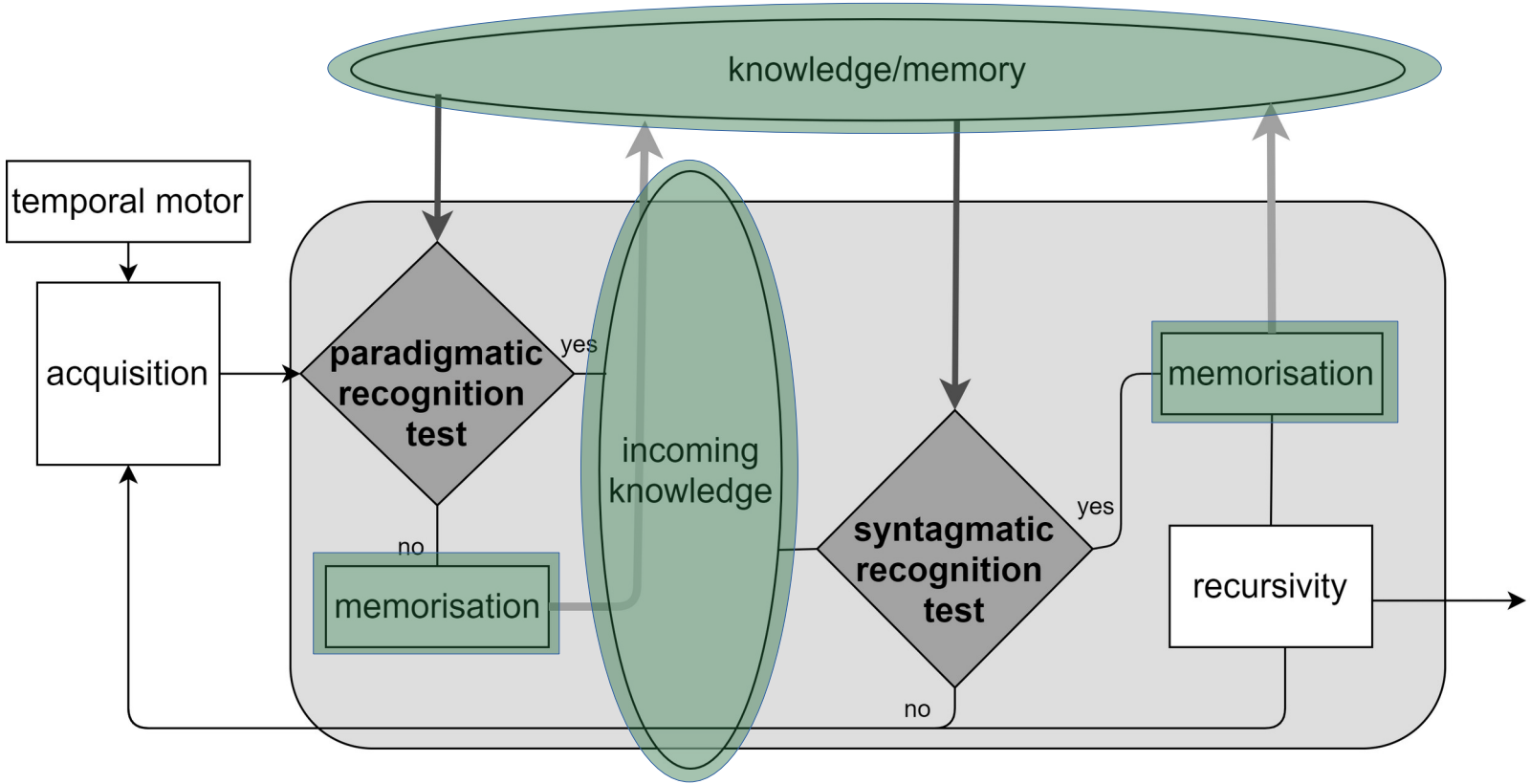
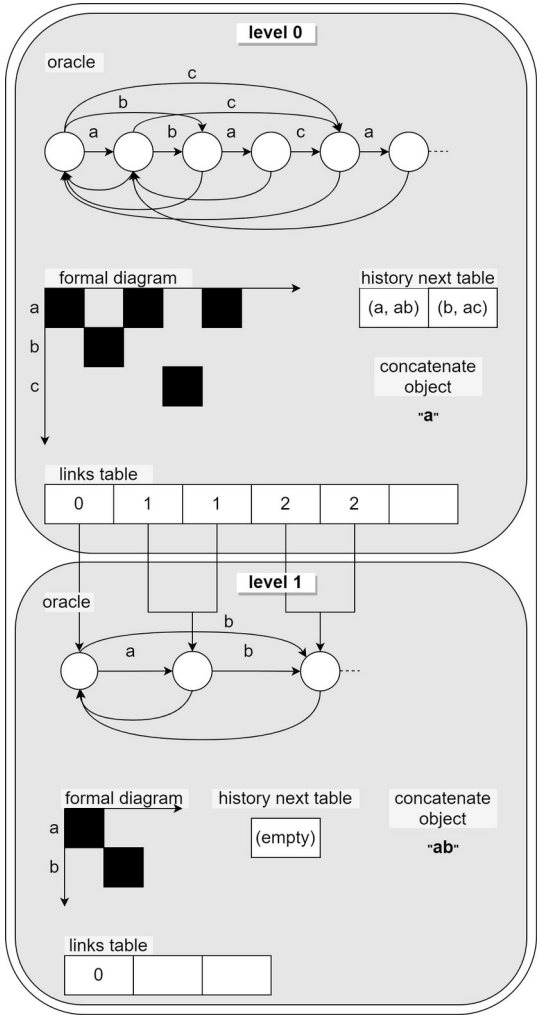


The Multi-Scale Oracle

- For each level, 5 data structures:
  - Factor Oracle
  - Formal Diagram
  - History next table
  - Concatenate object
  - Links table



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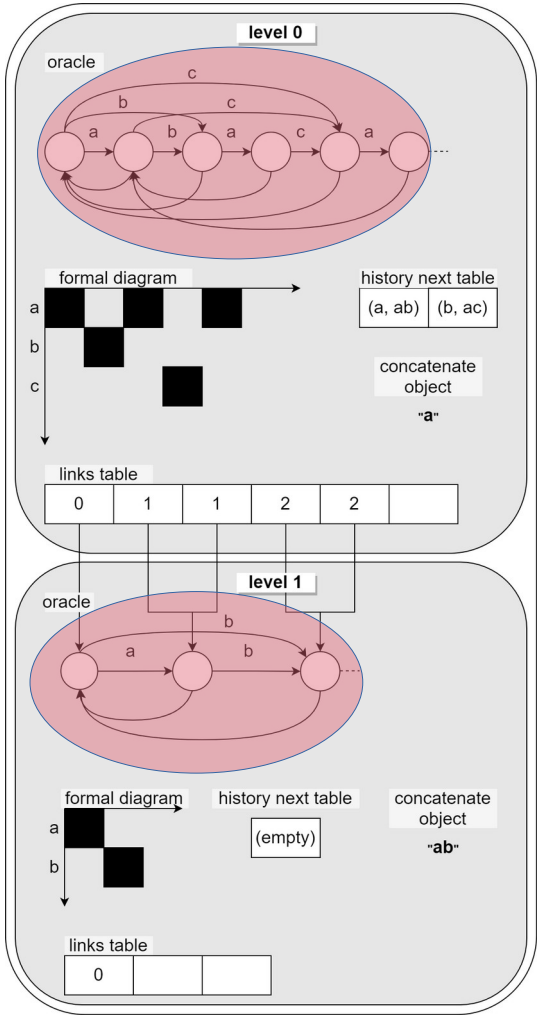

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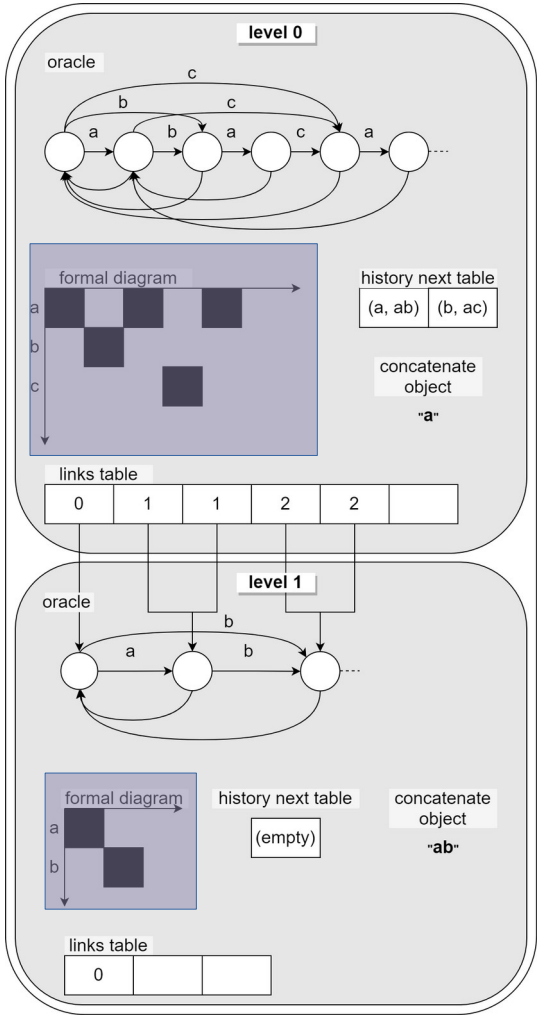

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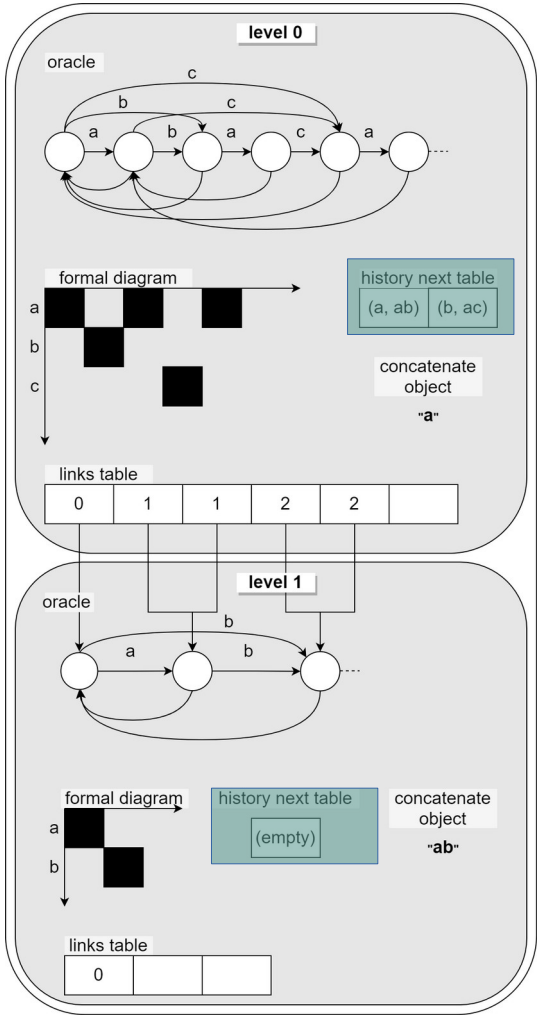

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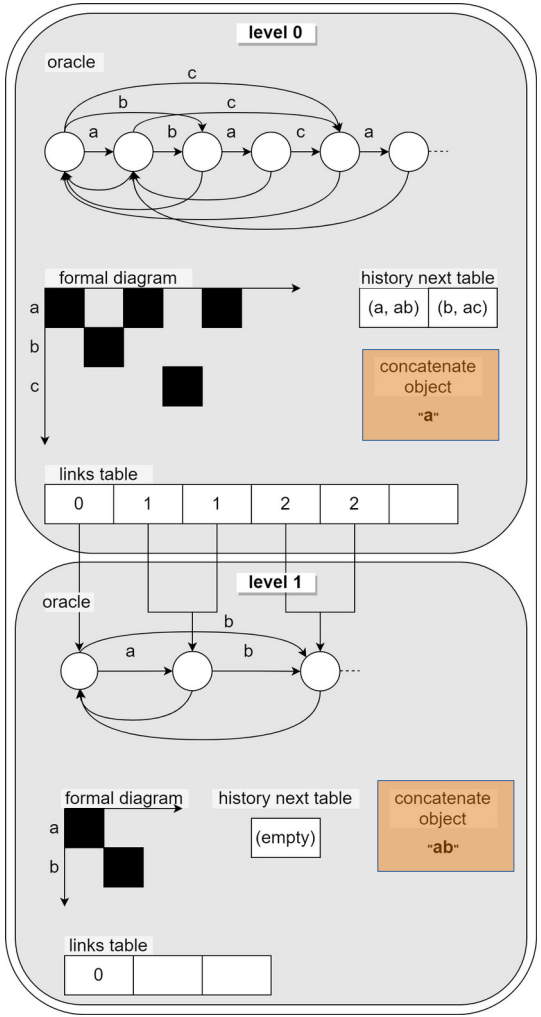

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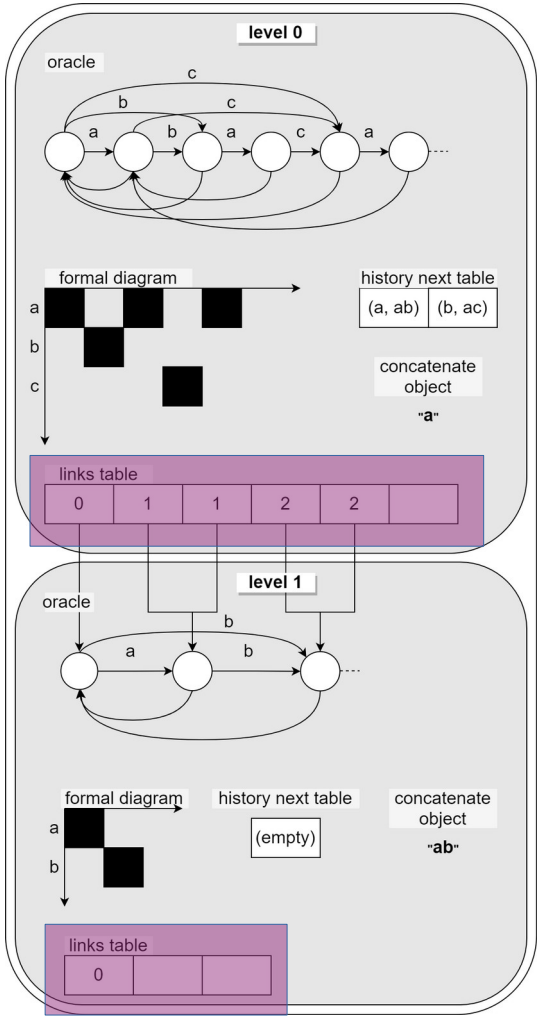

Similarity and segmentation criteria

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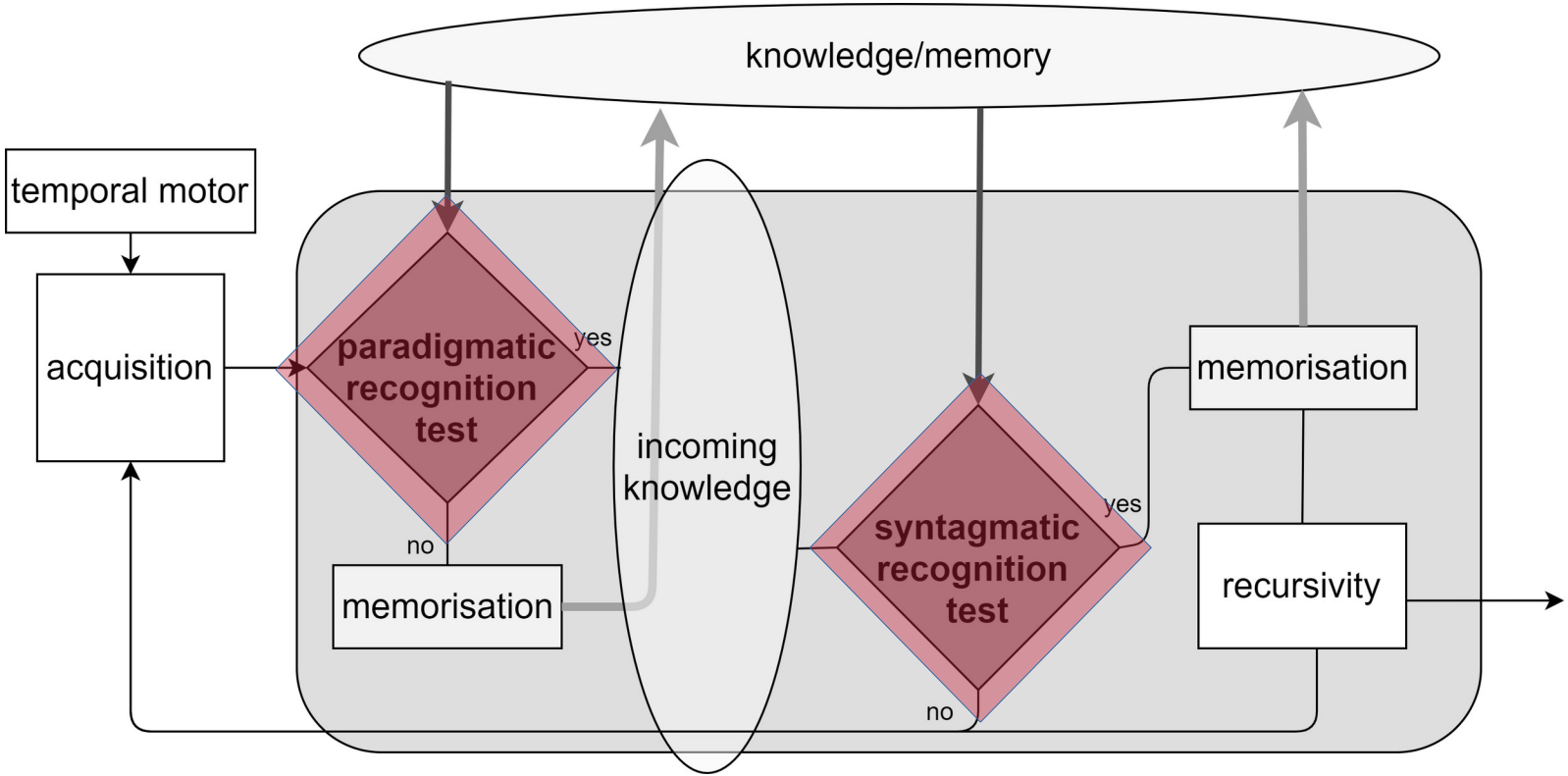
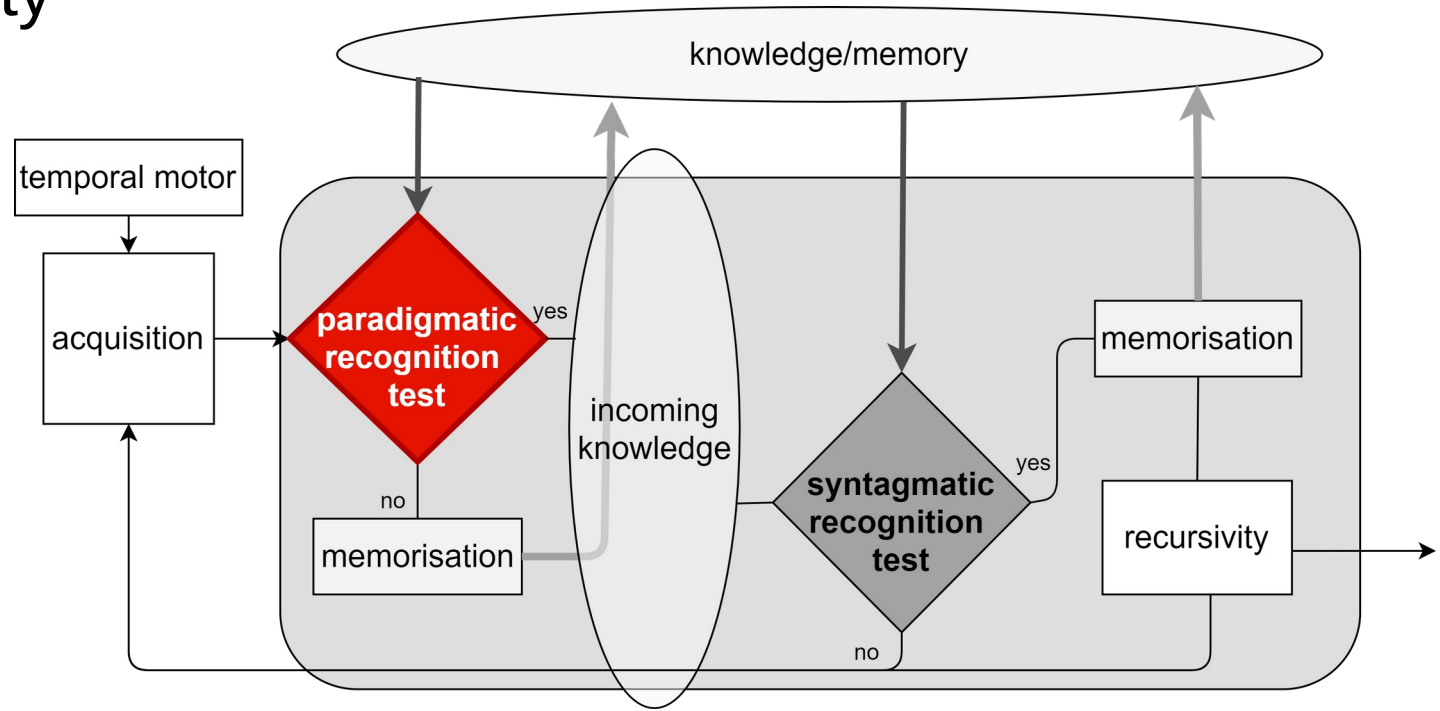


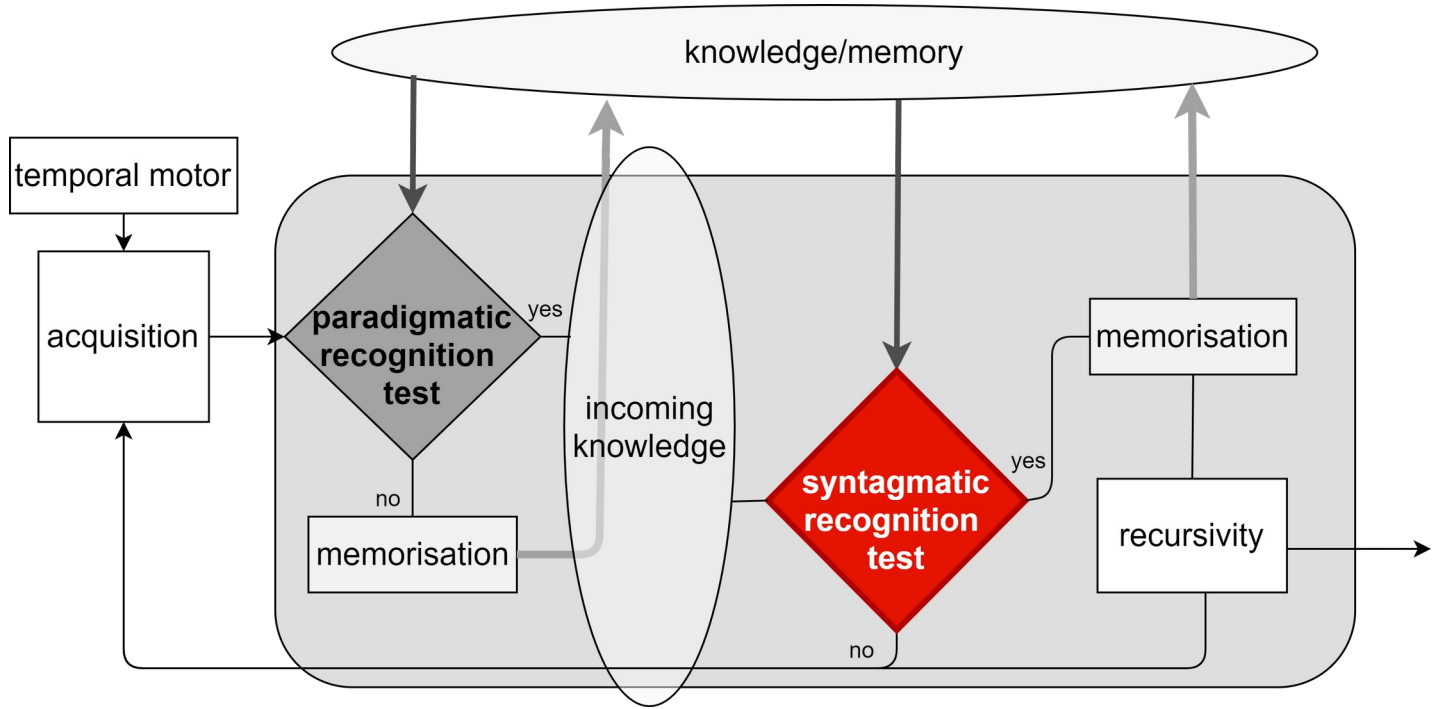
Similarity criteria

- Strict equality



Segmentation criteria

- 5 rules



Segmentation criteria

- 5 rules :

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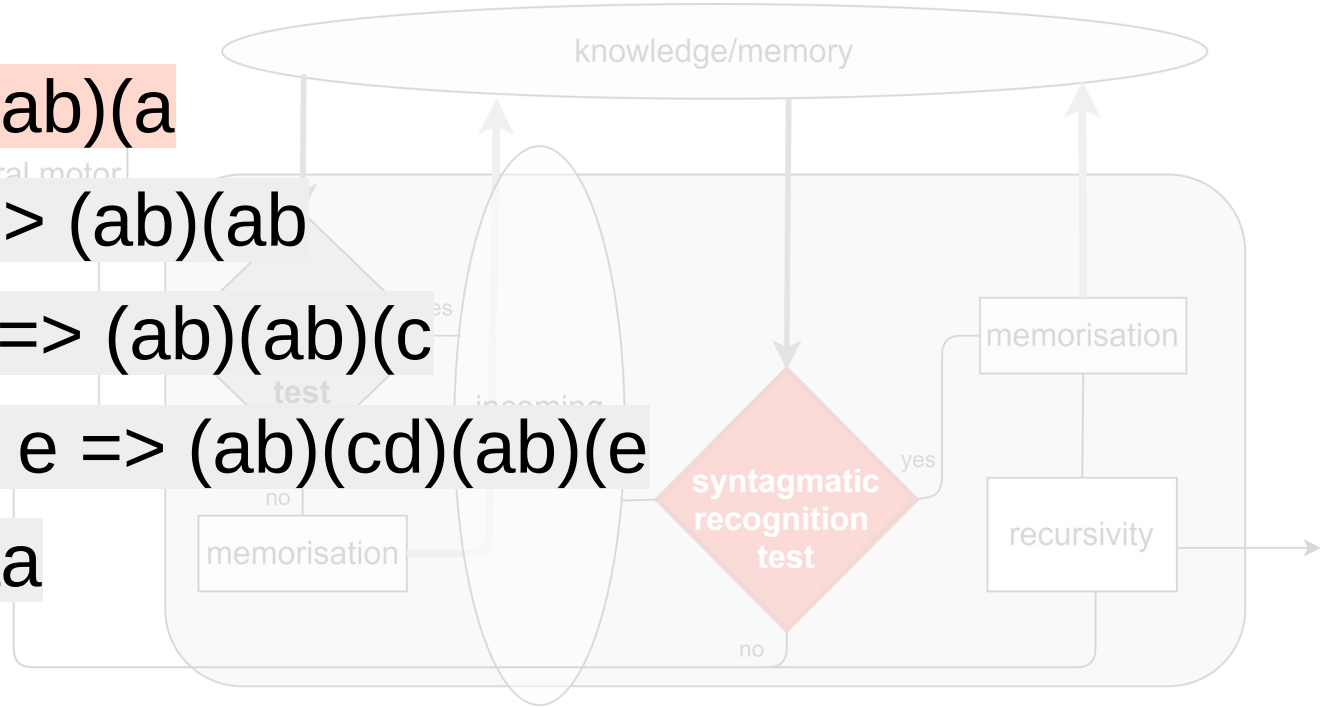

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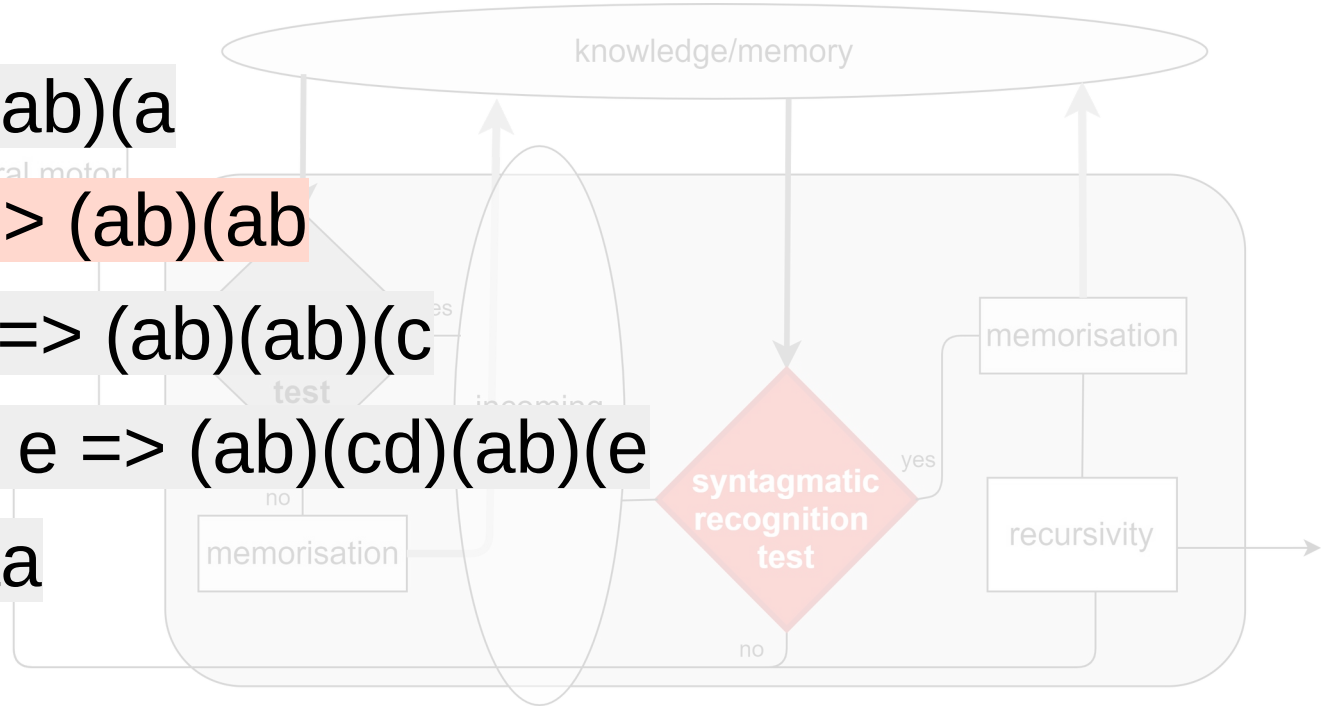

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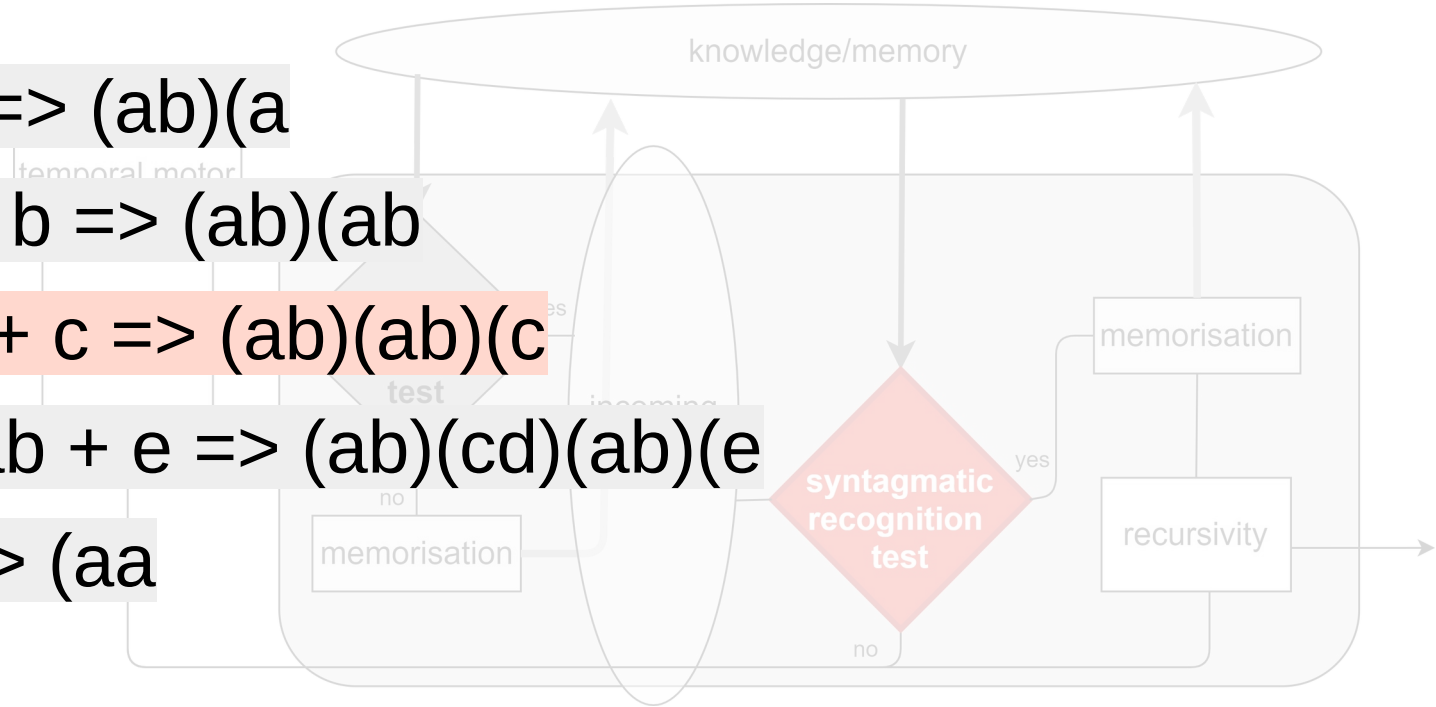

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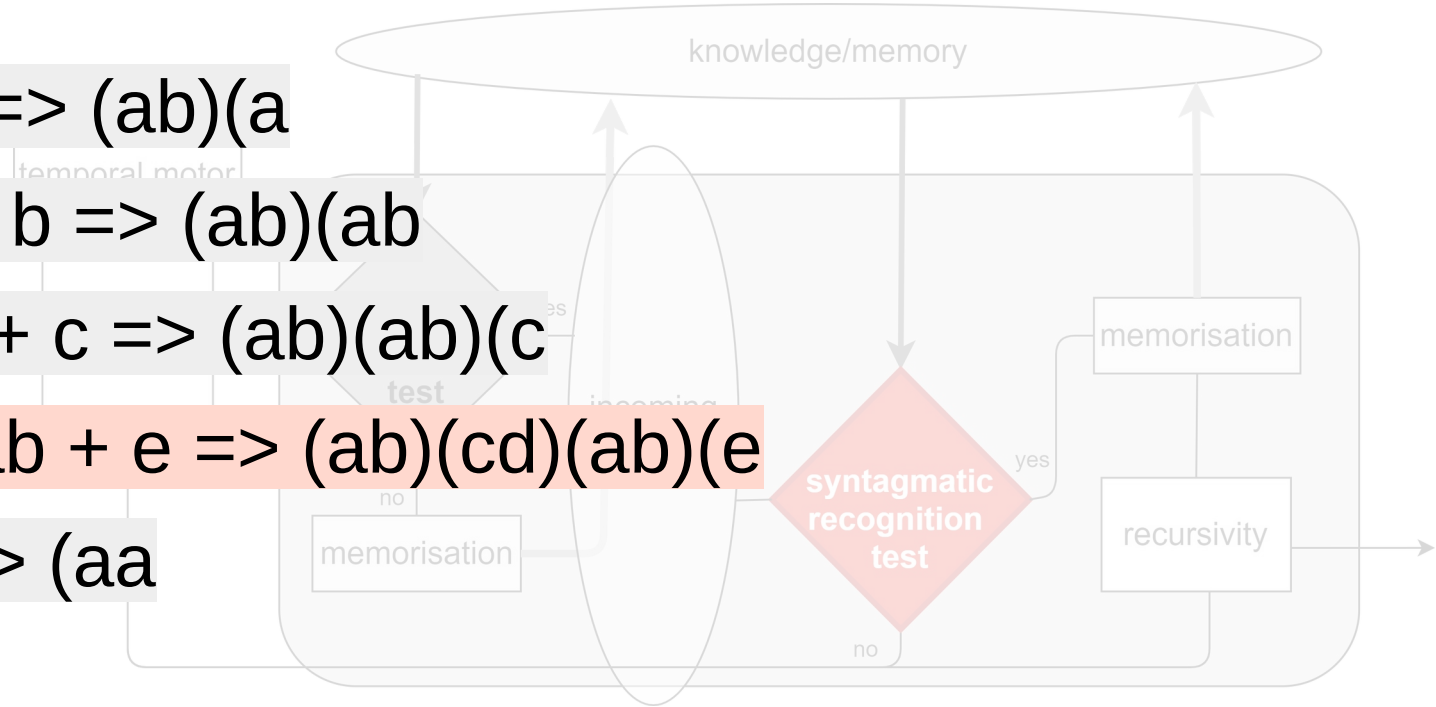

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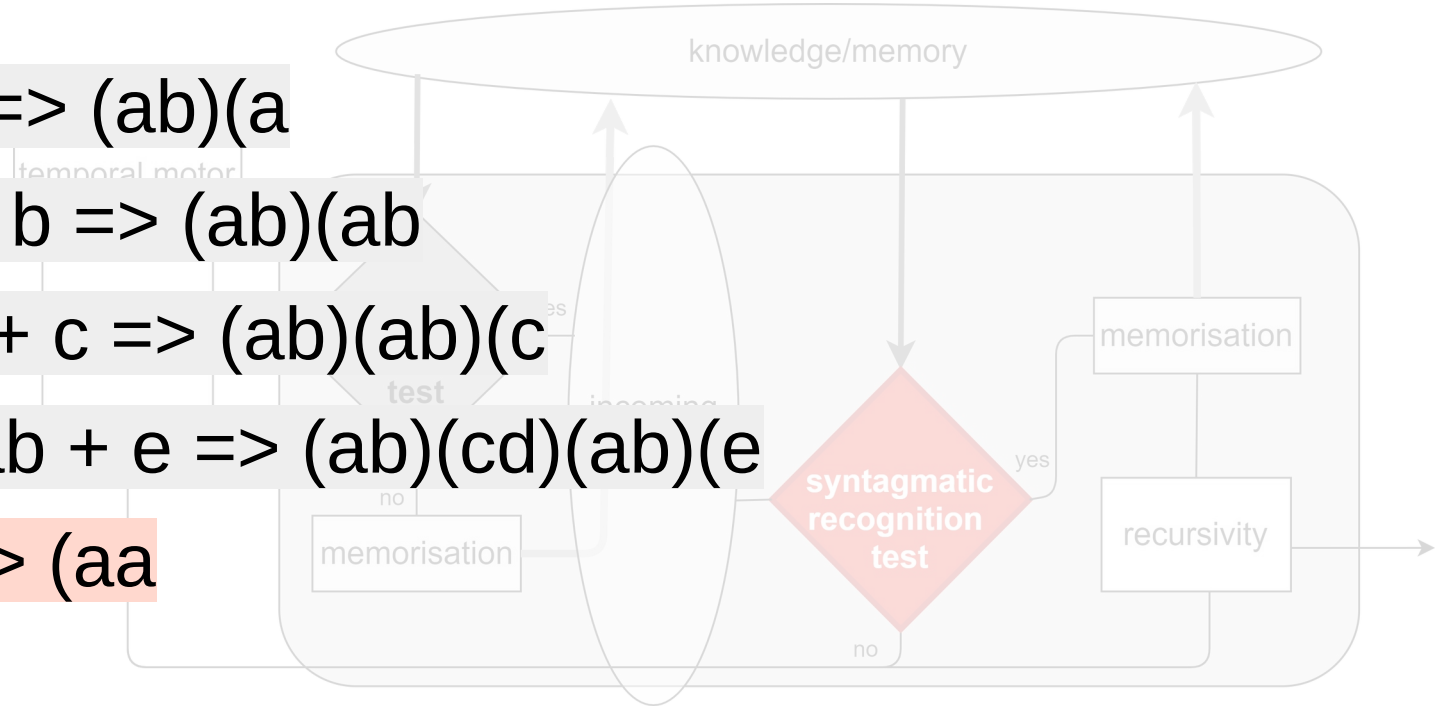
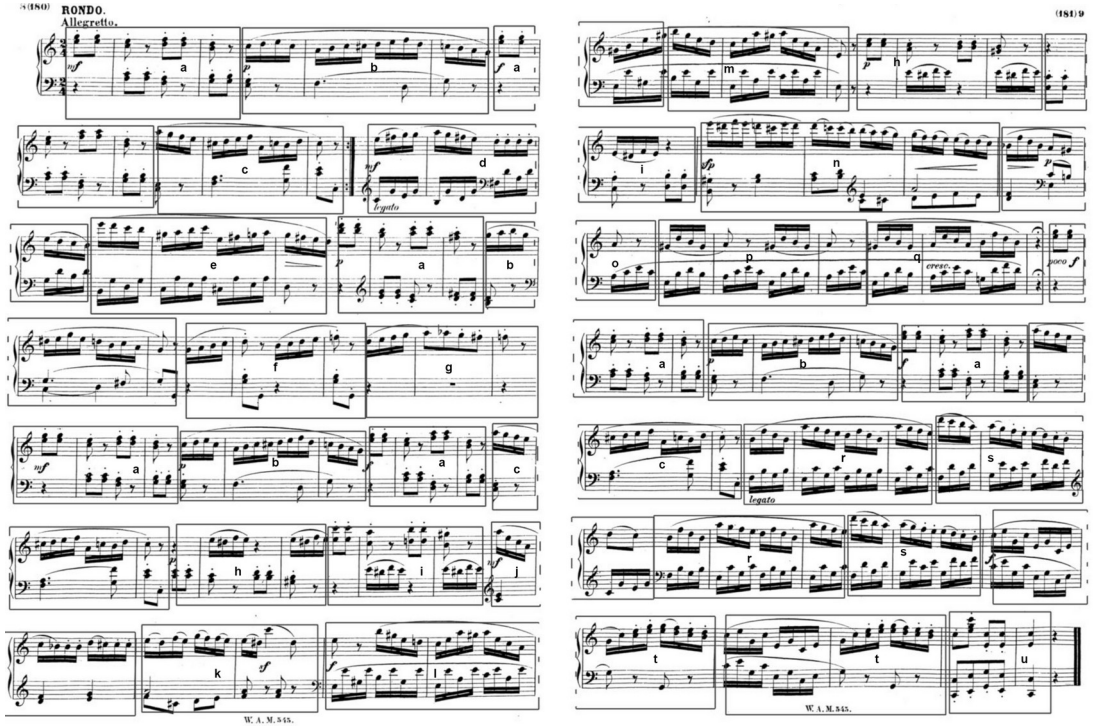
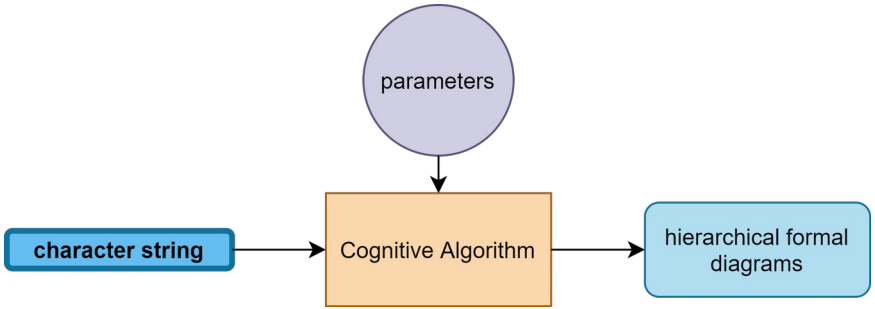


Applications

Mozart K545, Rondo



Rules 1, 2, 3, 4, and 5



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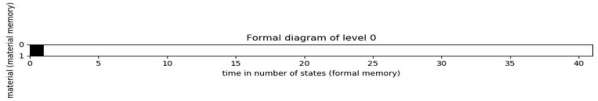
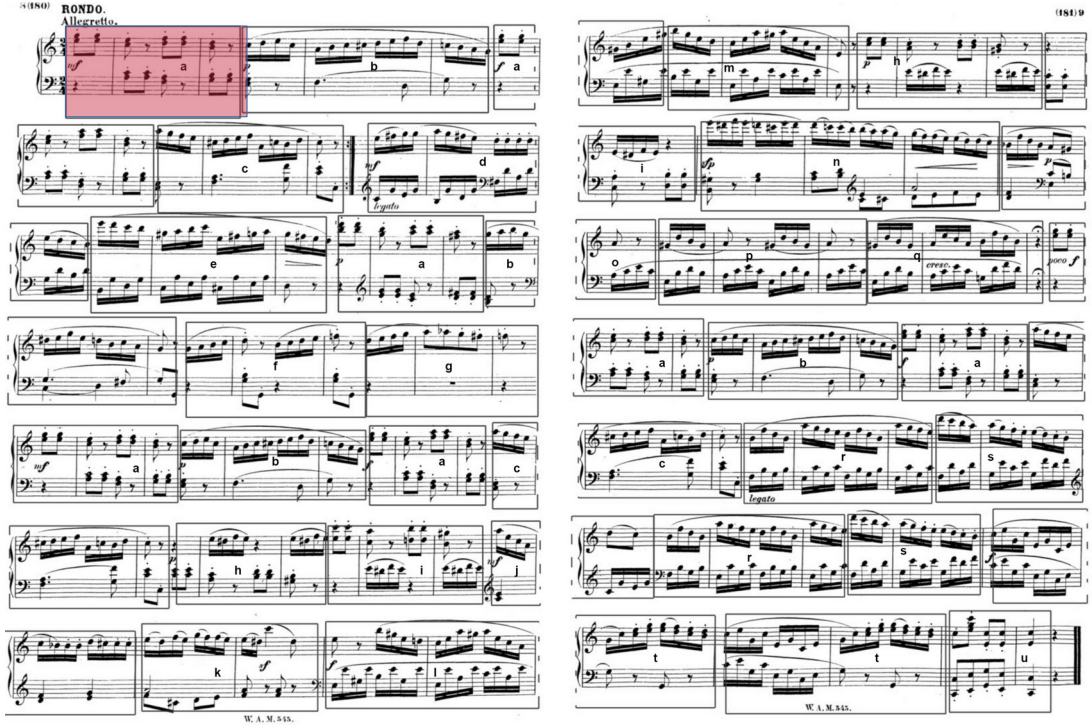
Mozart K545, Rondo





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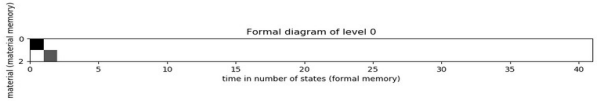
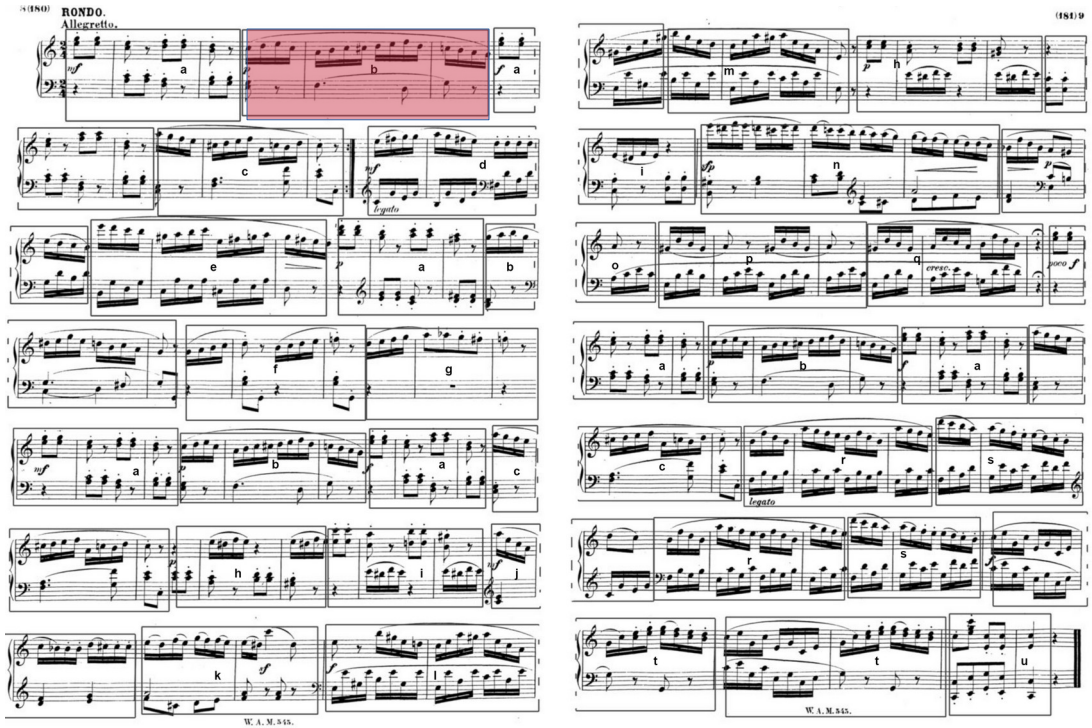
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo





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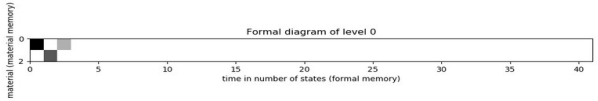
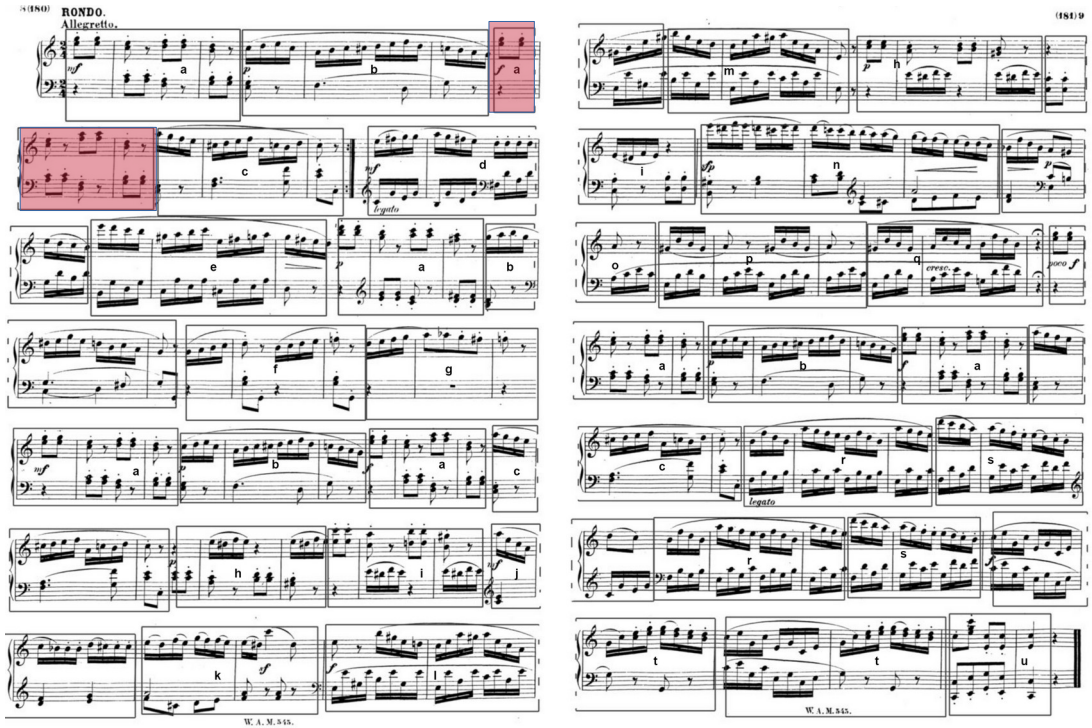
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo





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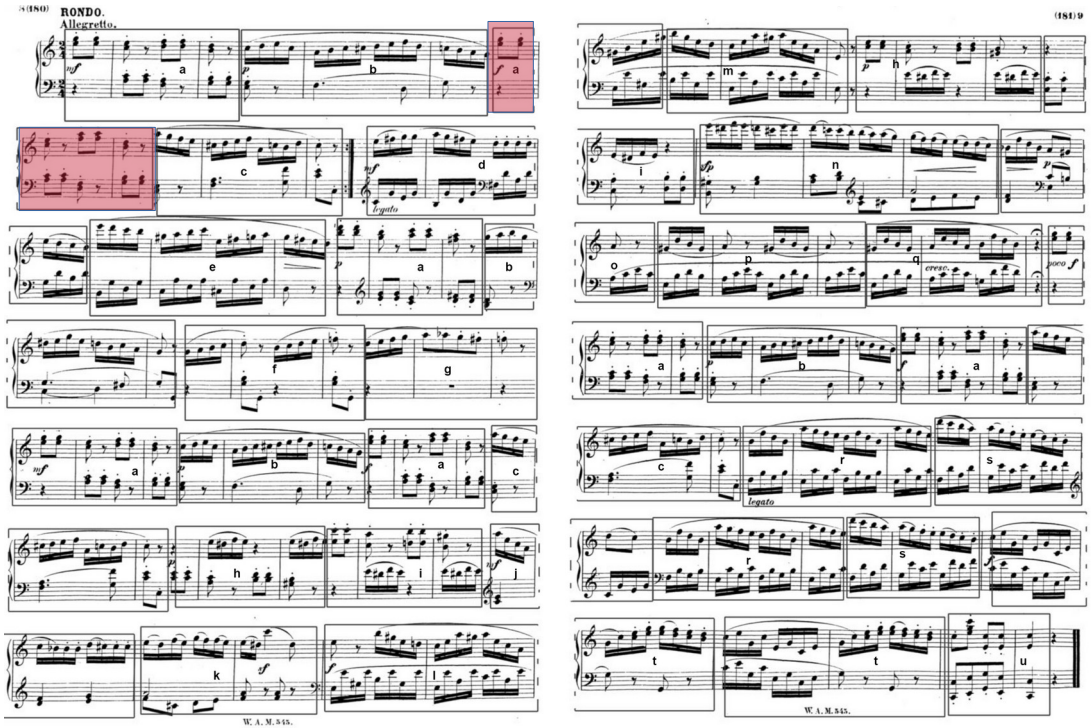
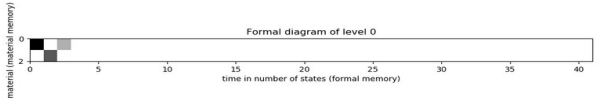
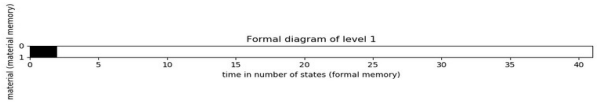
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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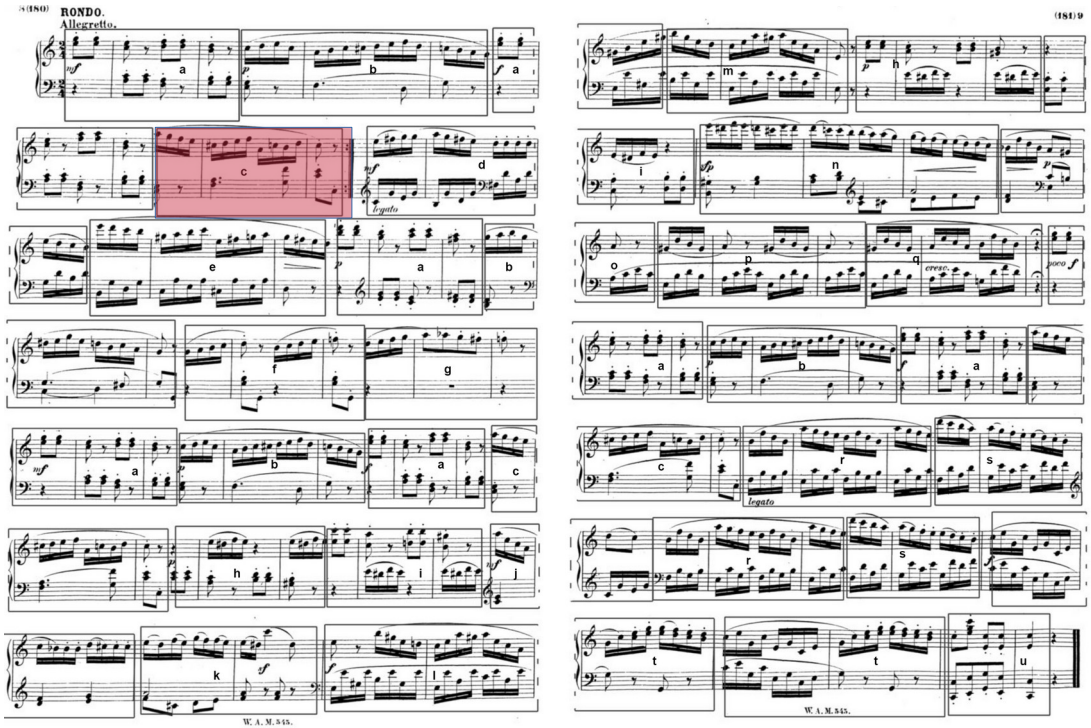
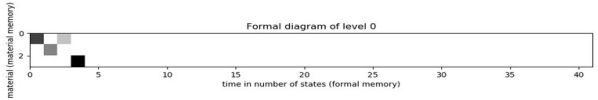
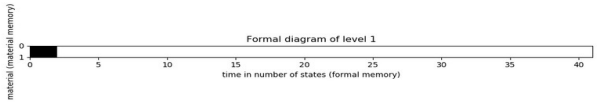
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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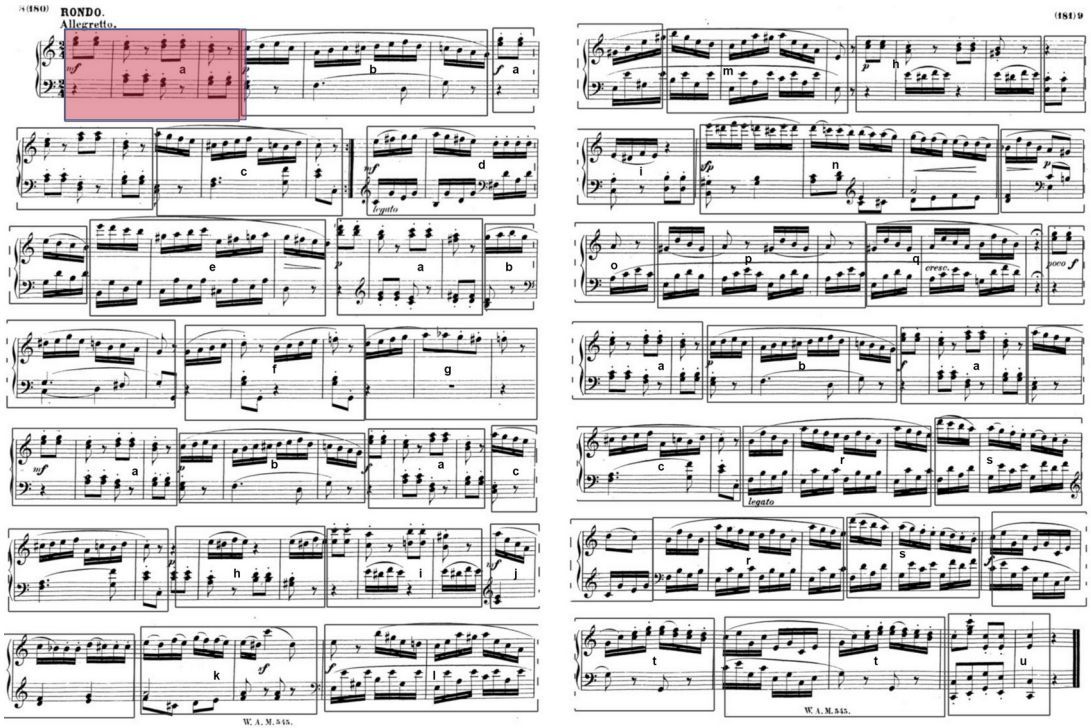
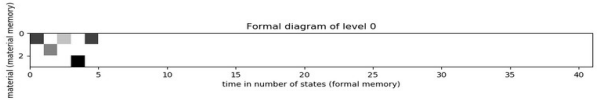
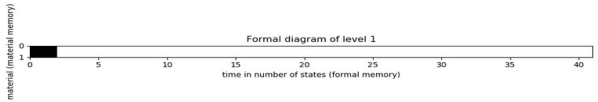
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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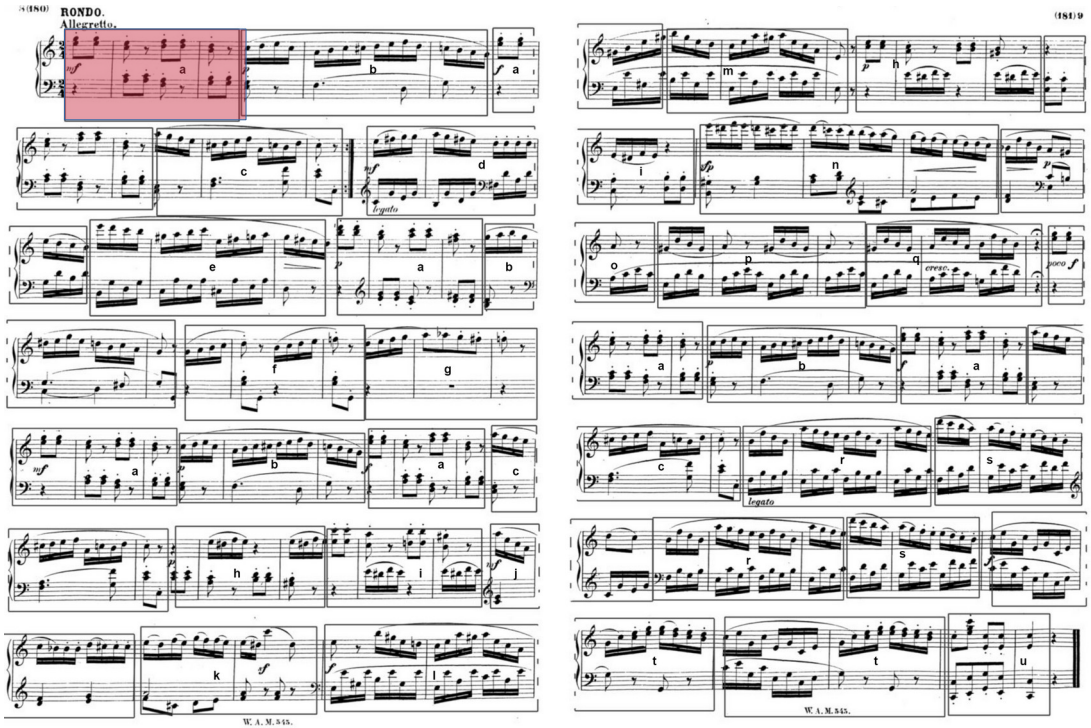
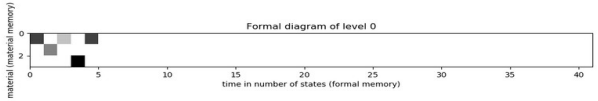
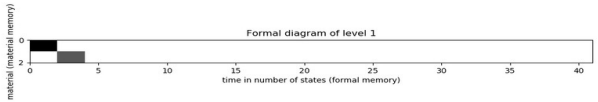
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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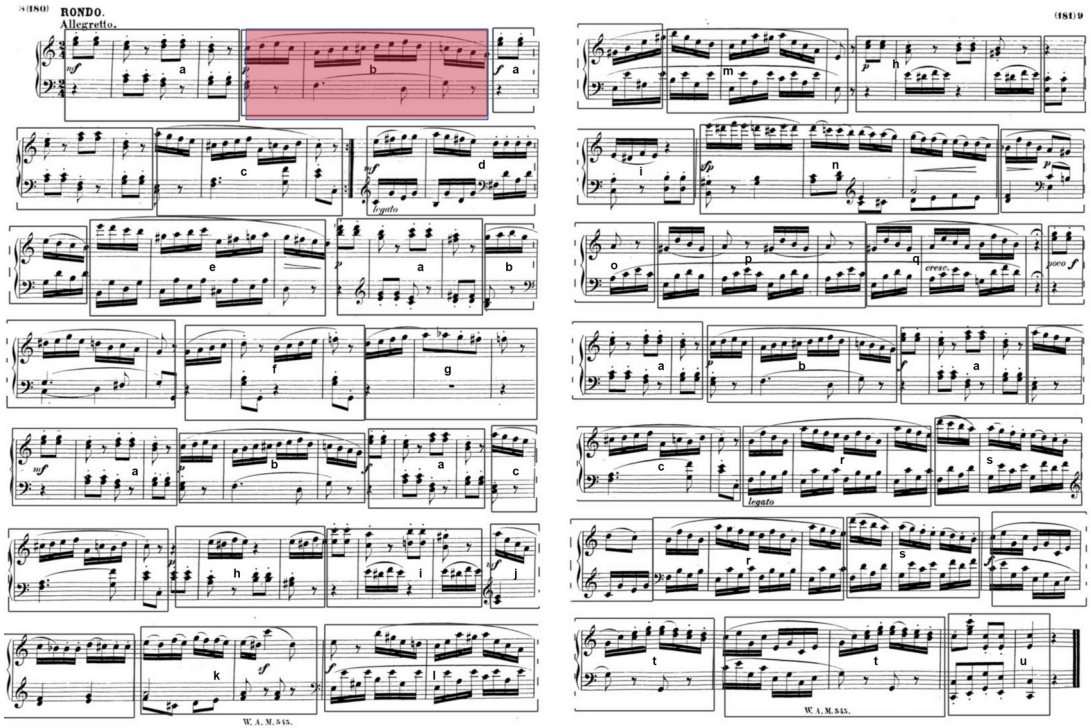
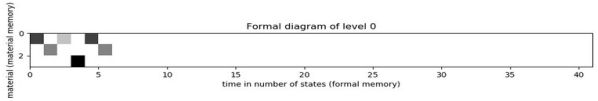
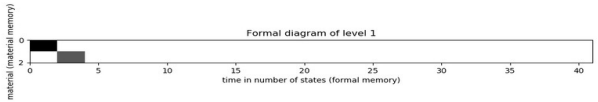
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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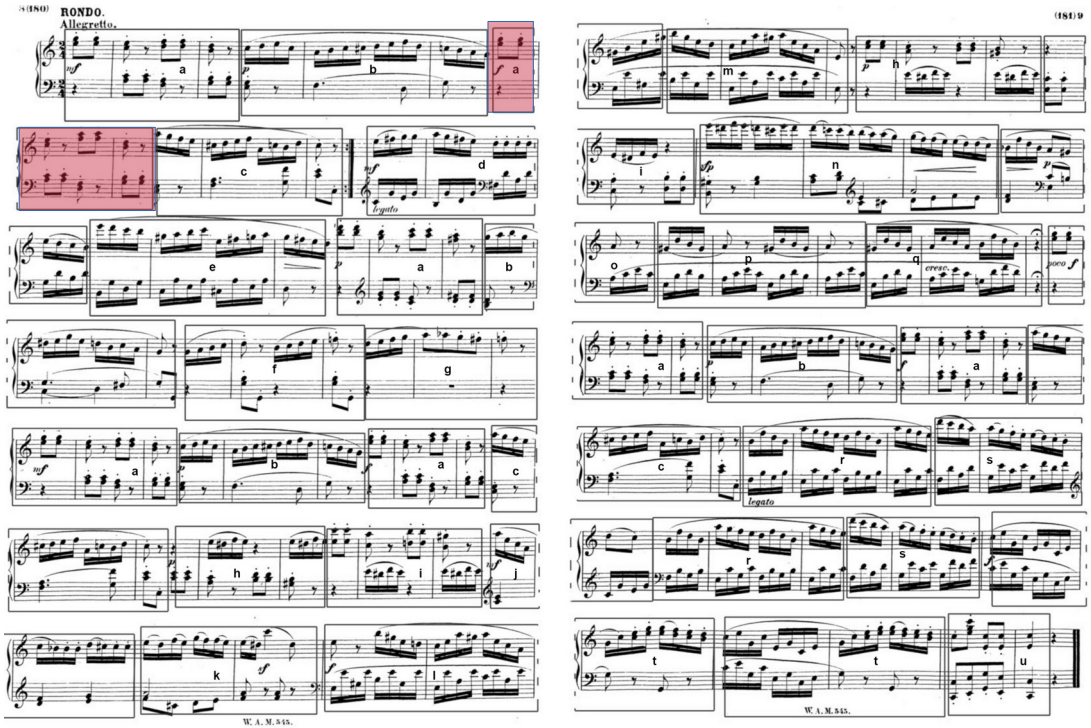
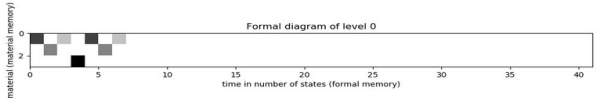
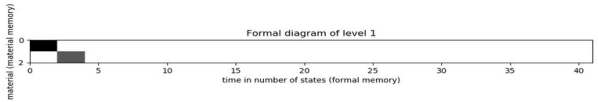
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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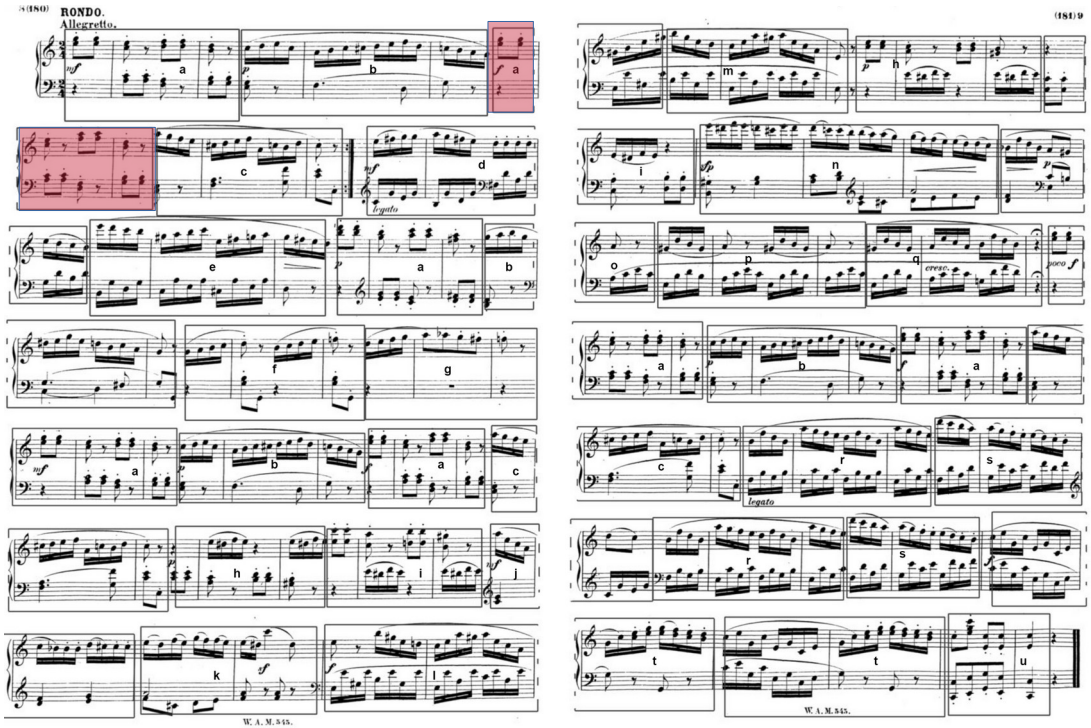
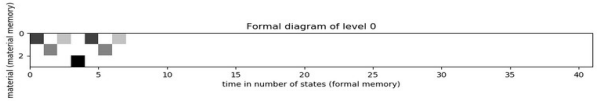
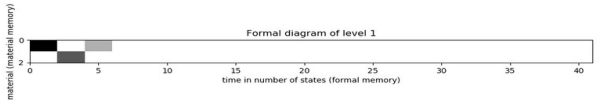
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo







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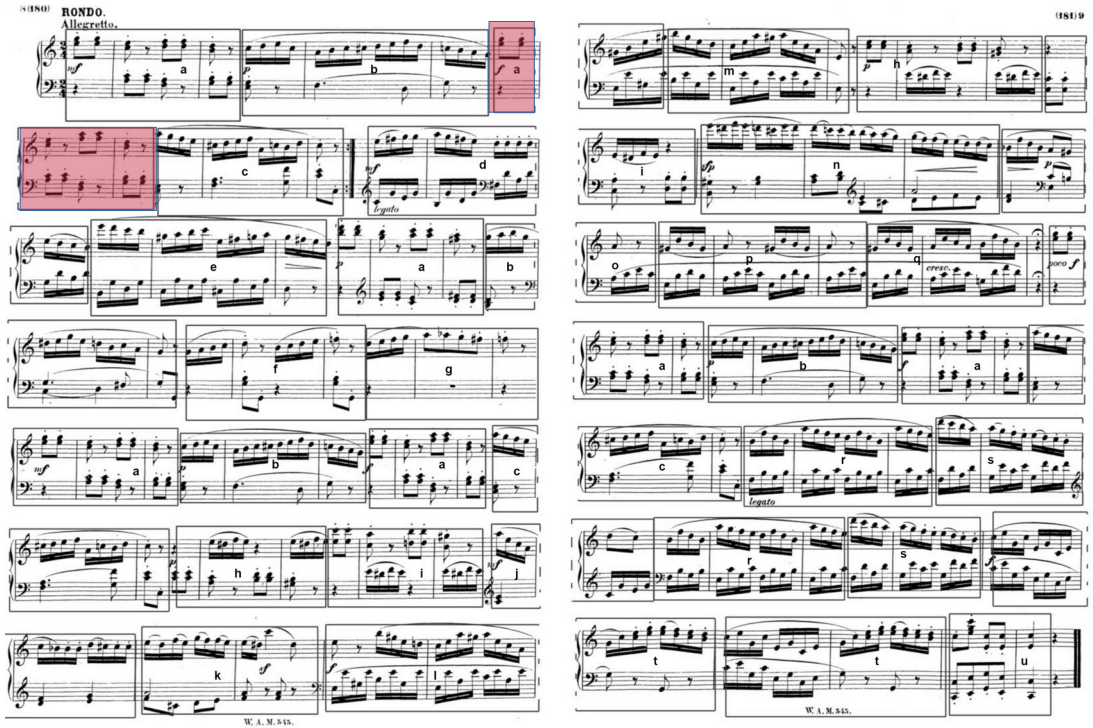
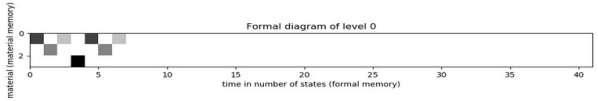
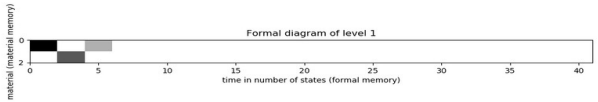
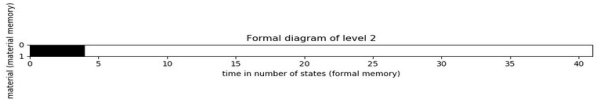
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo









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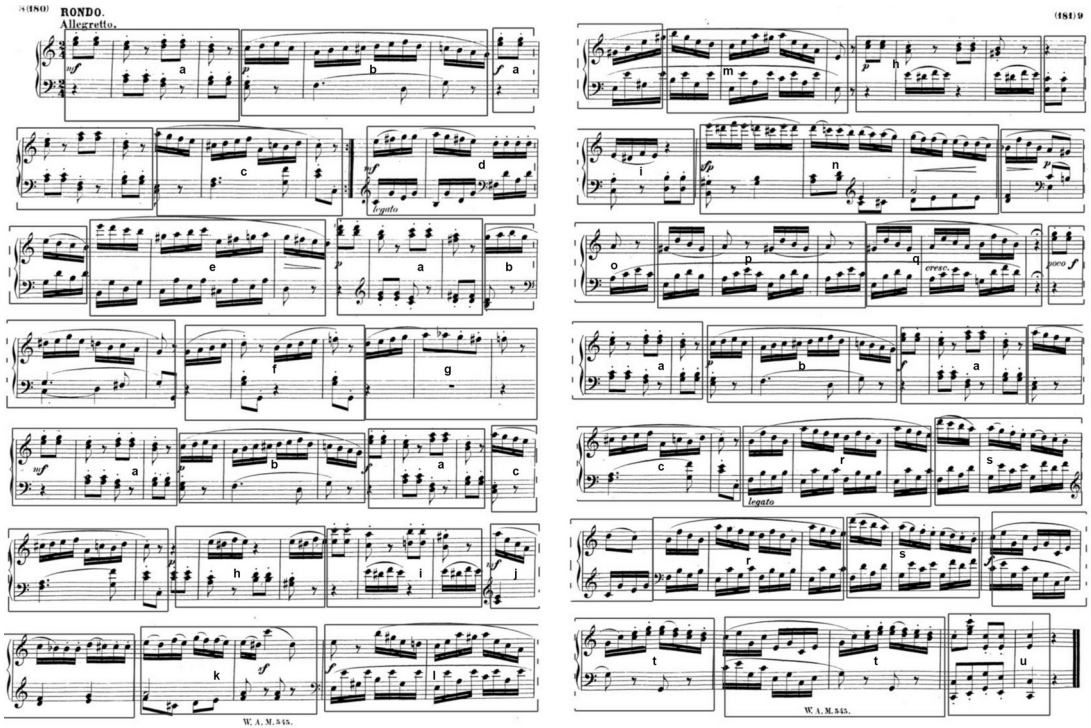
Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo



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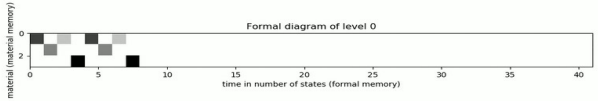
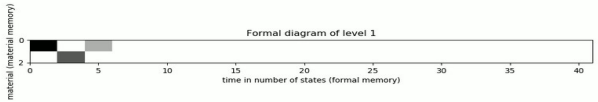
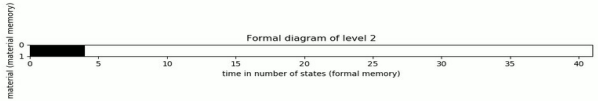
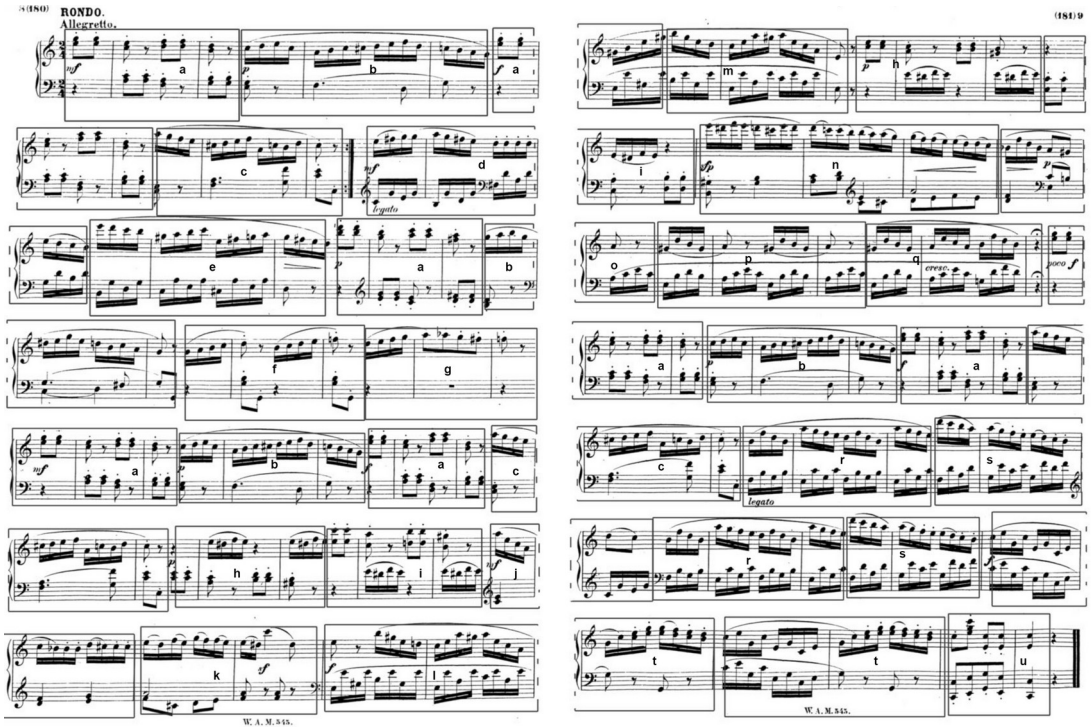






Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo



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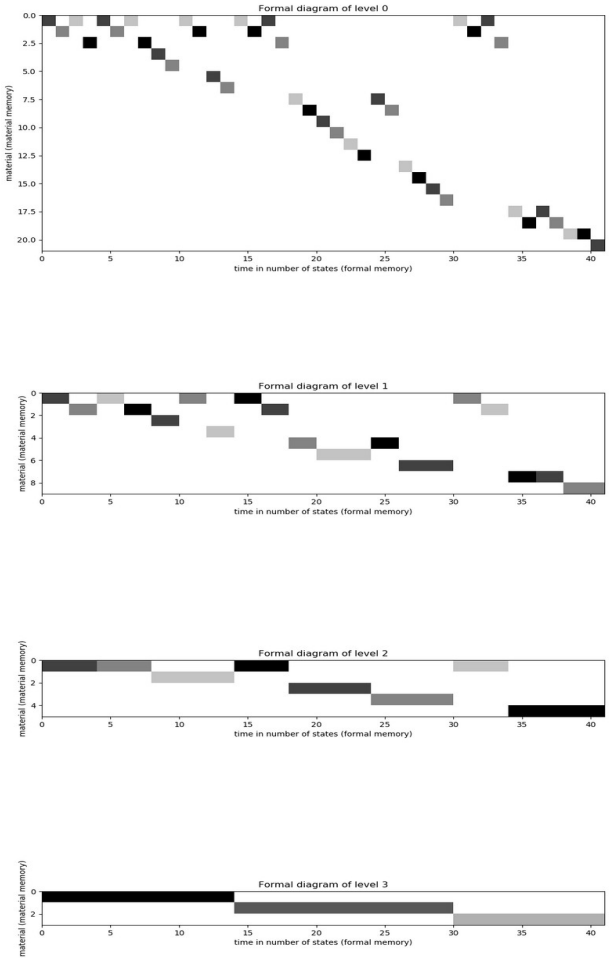
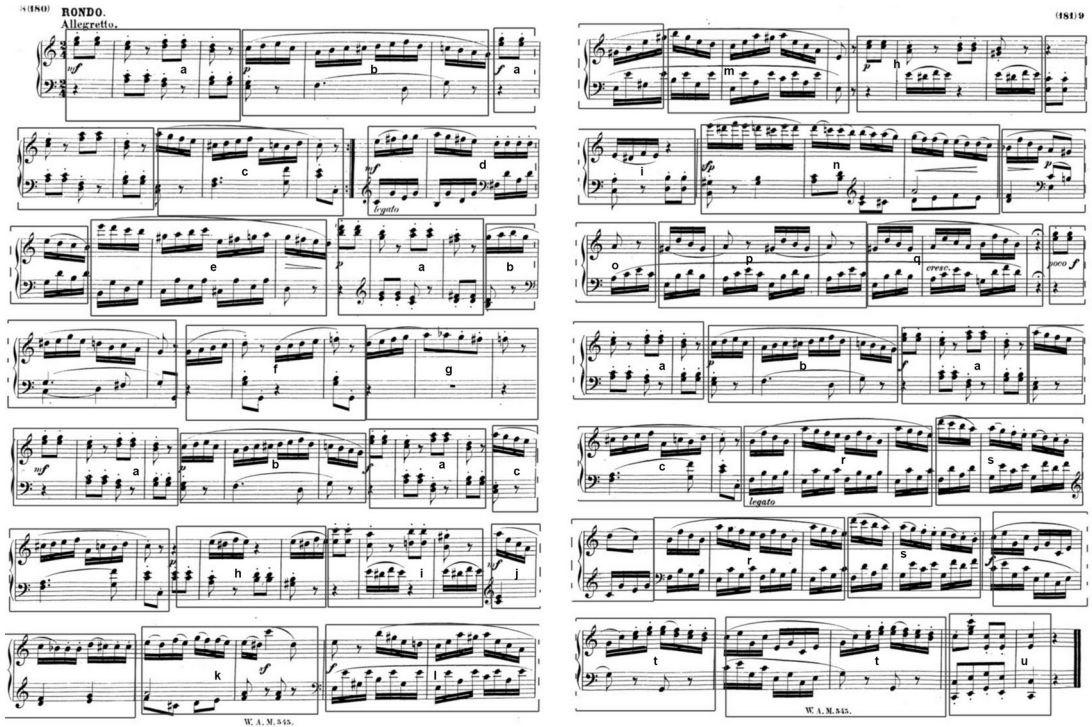


Rules 1, 2, 3, 4, and 5

Mozart K545, Rondo



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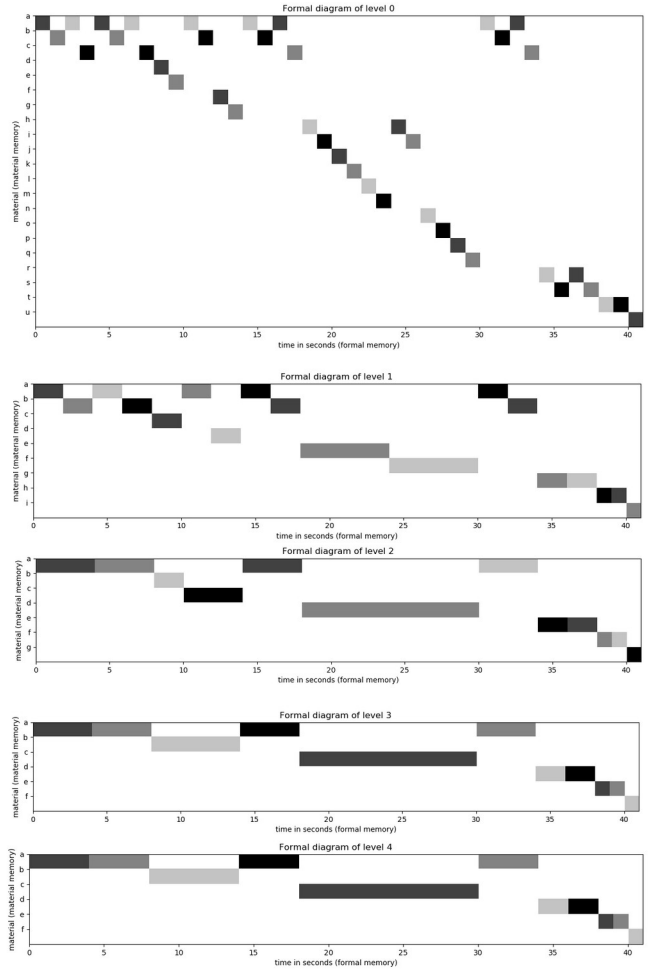

Rules 1, 2, and 3

Debussy's *Hommage à Rameau*

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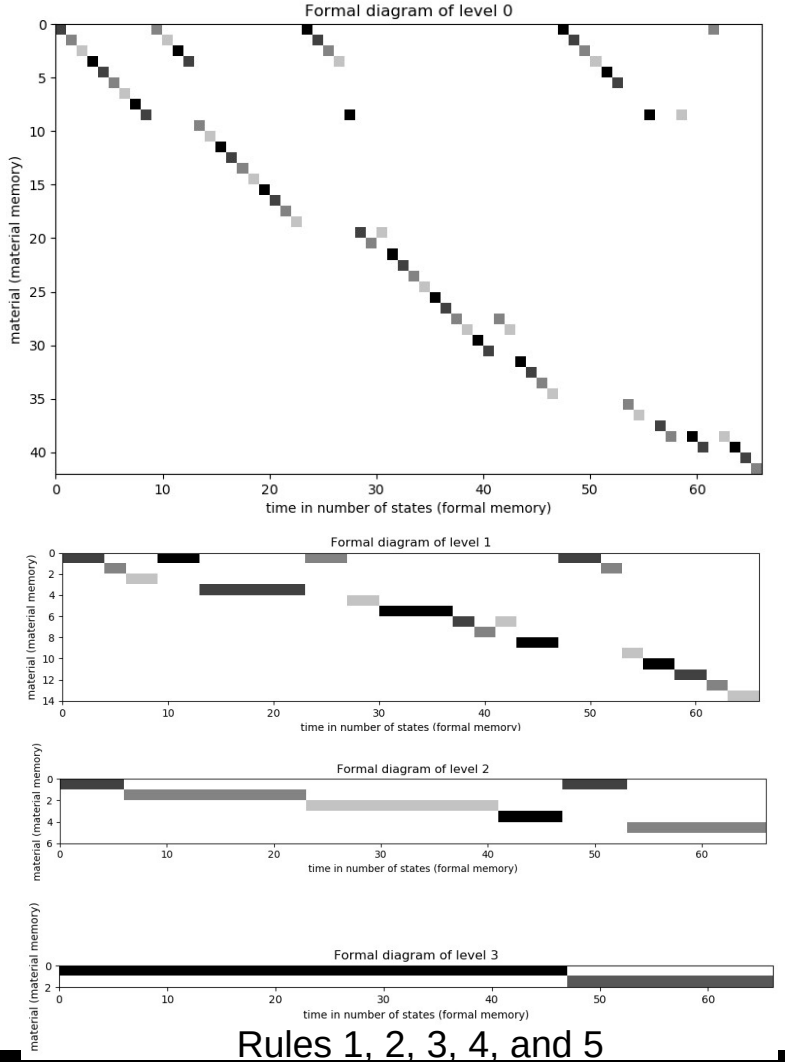
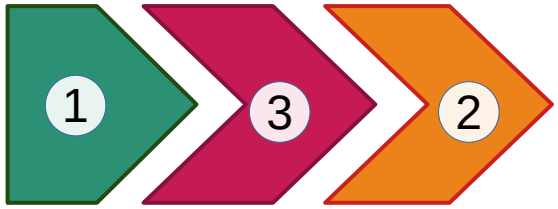
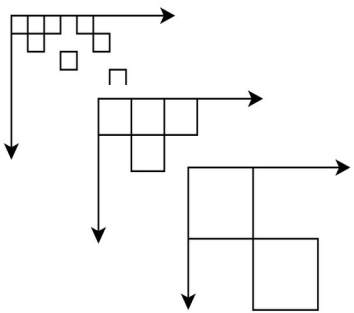


Rules 1, 2, 3, 4, and 5

Conclusion...

- Summary
- Ameliorations
- Representation
- Perspectives





ossia score