



# simlailty flooding

\*Similarity Flooding

The



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graph TD; A[The] --- B[ ]; B --- C[ideas]; B --- D[graphs]; B --- E[flooding]; C --- F[ ]; D --- F; E --- F; F --- G[of similarity flooding.]
```

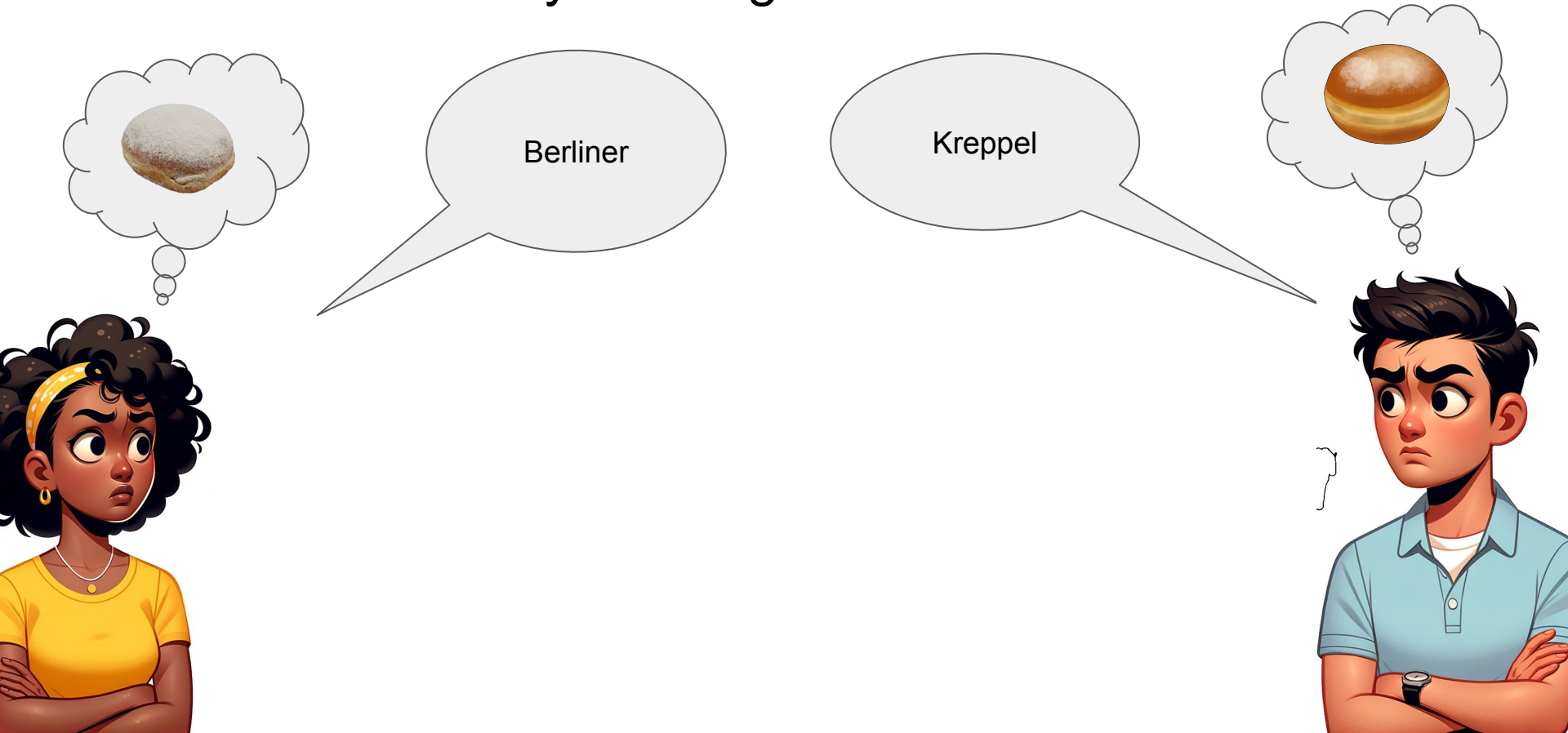
ideas

graphs

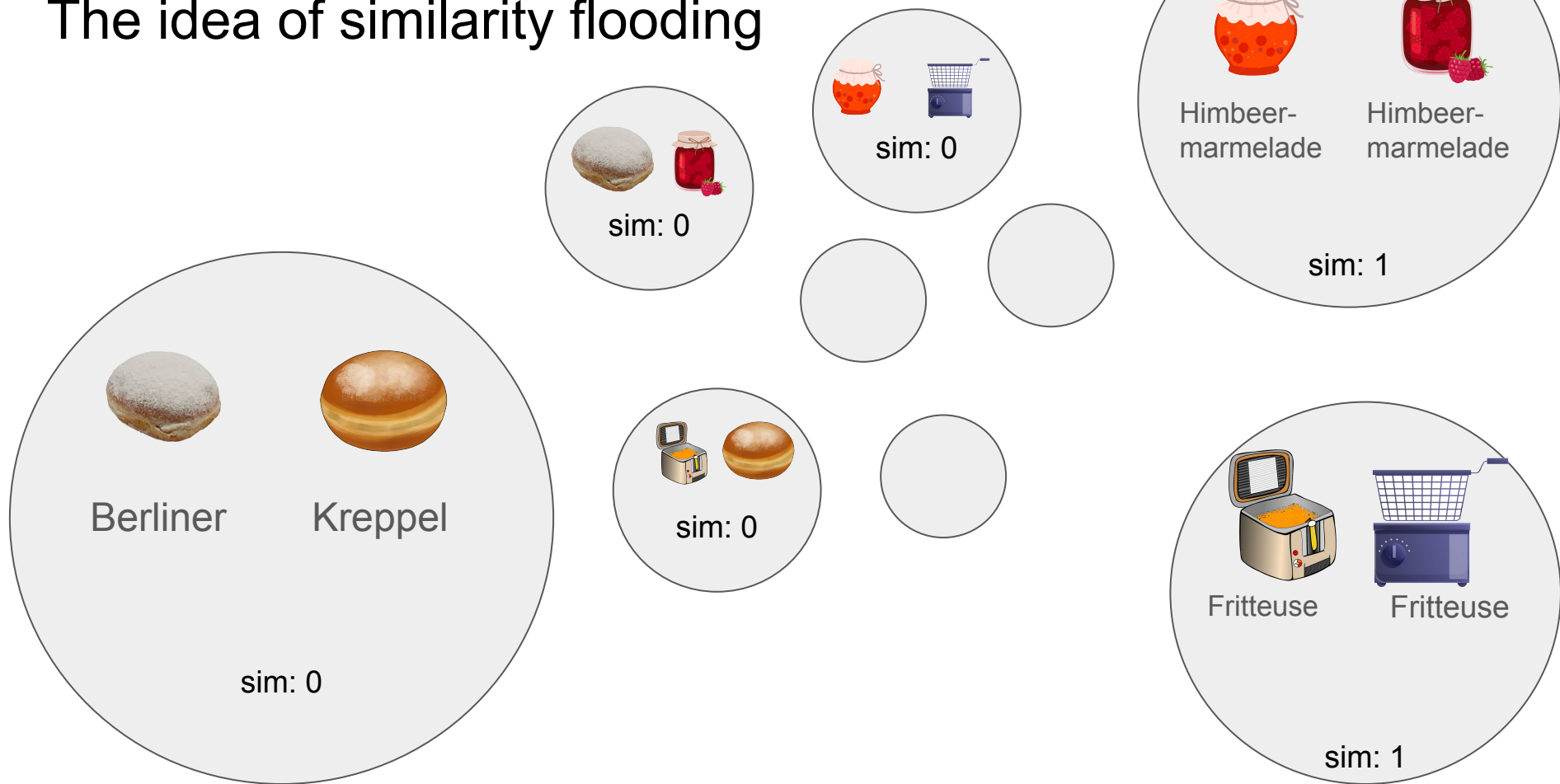
flooding

of similarity flooding.

# The idea of similarity flooding

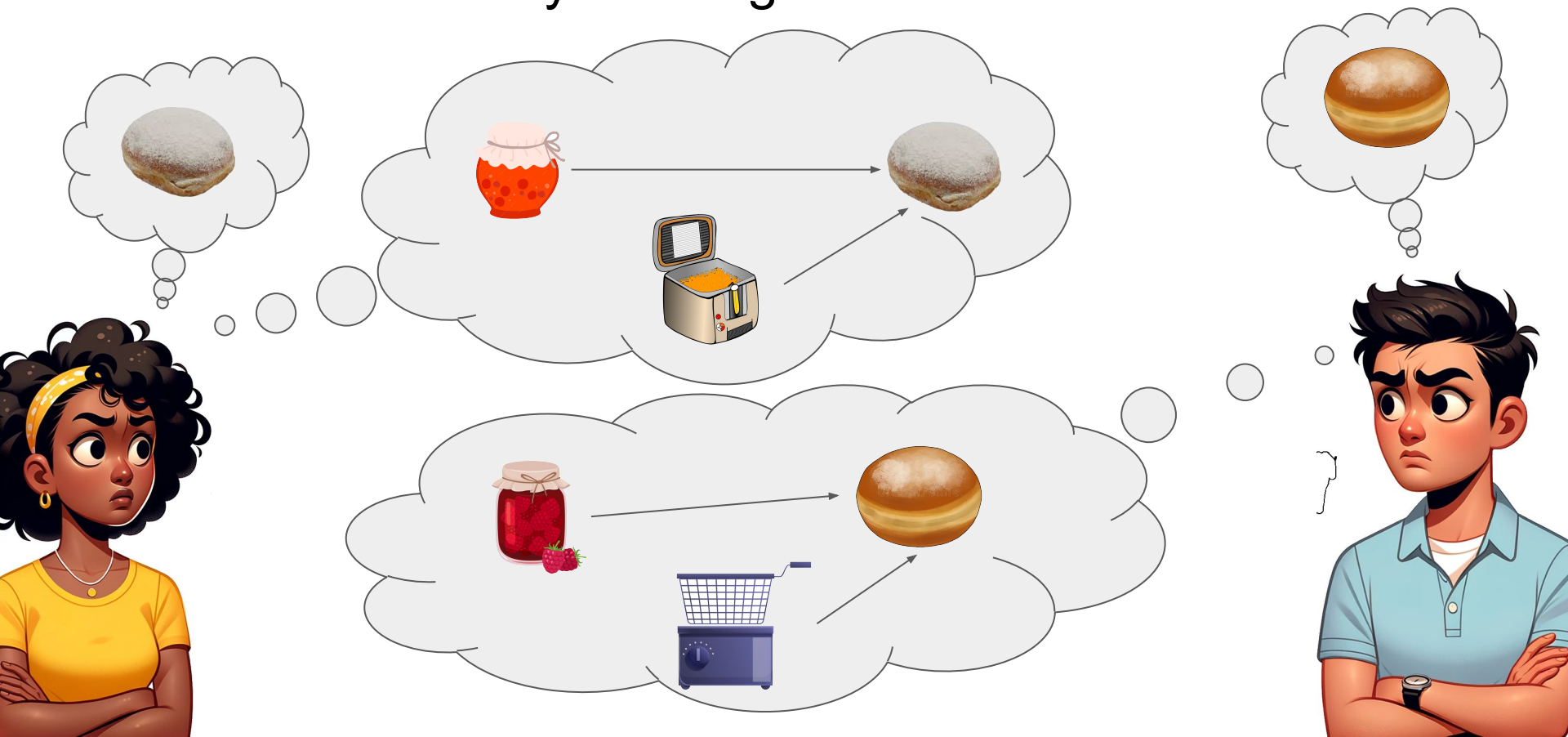


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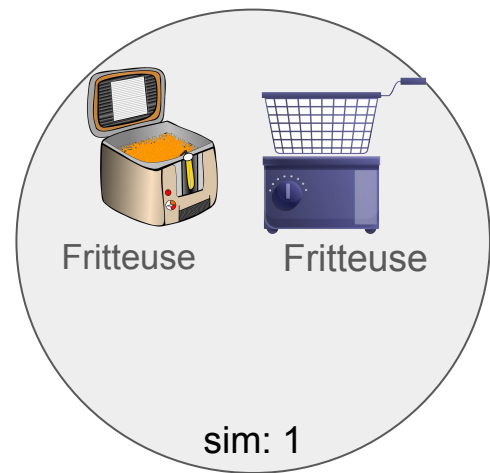
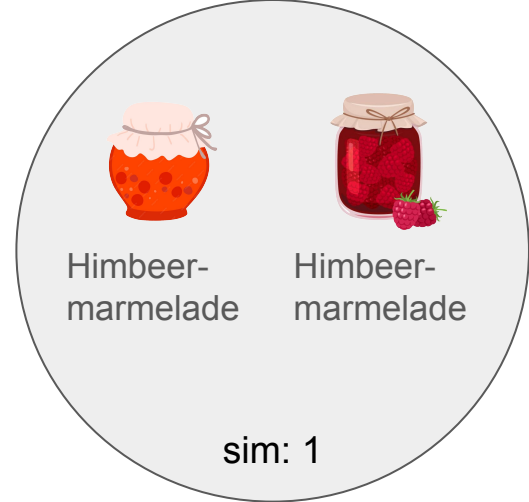
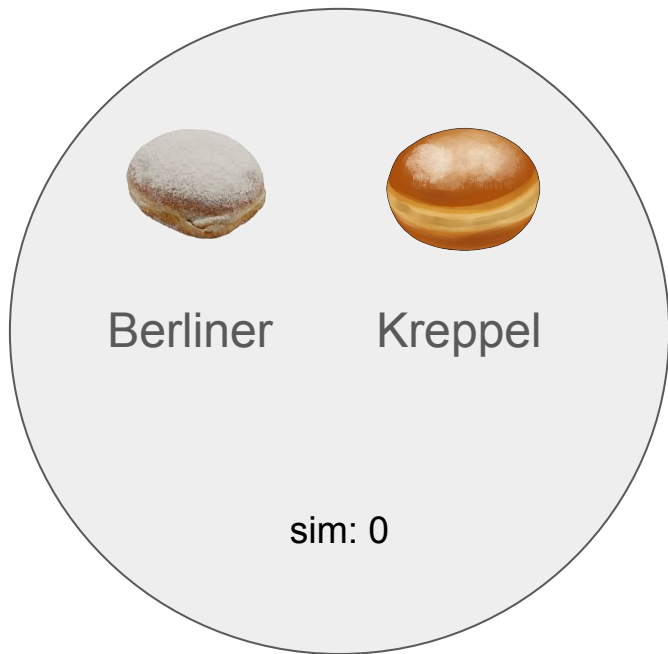




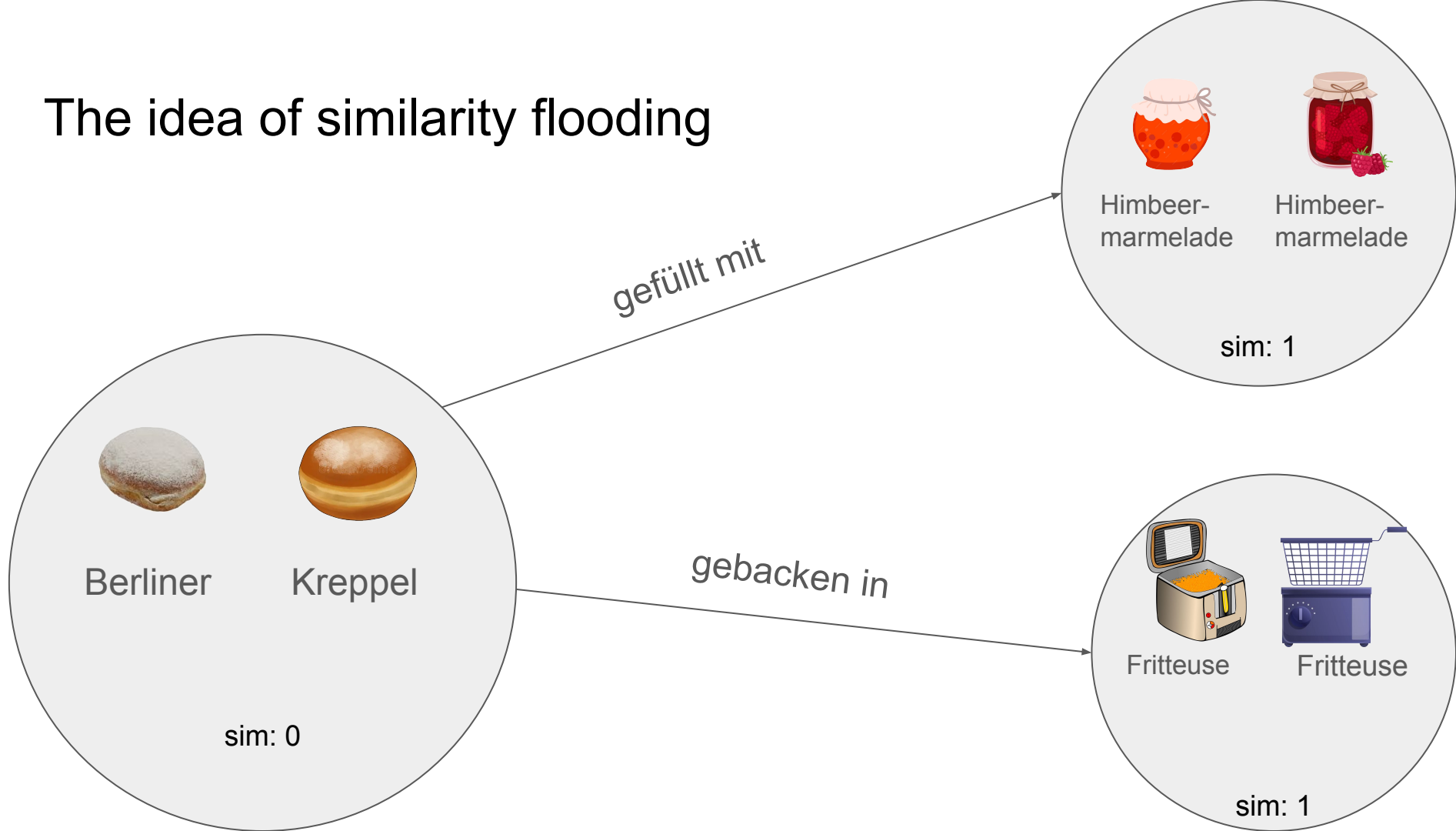
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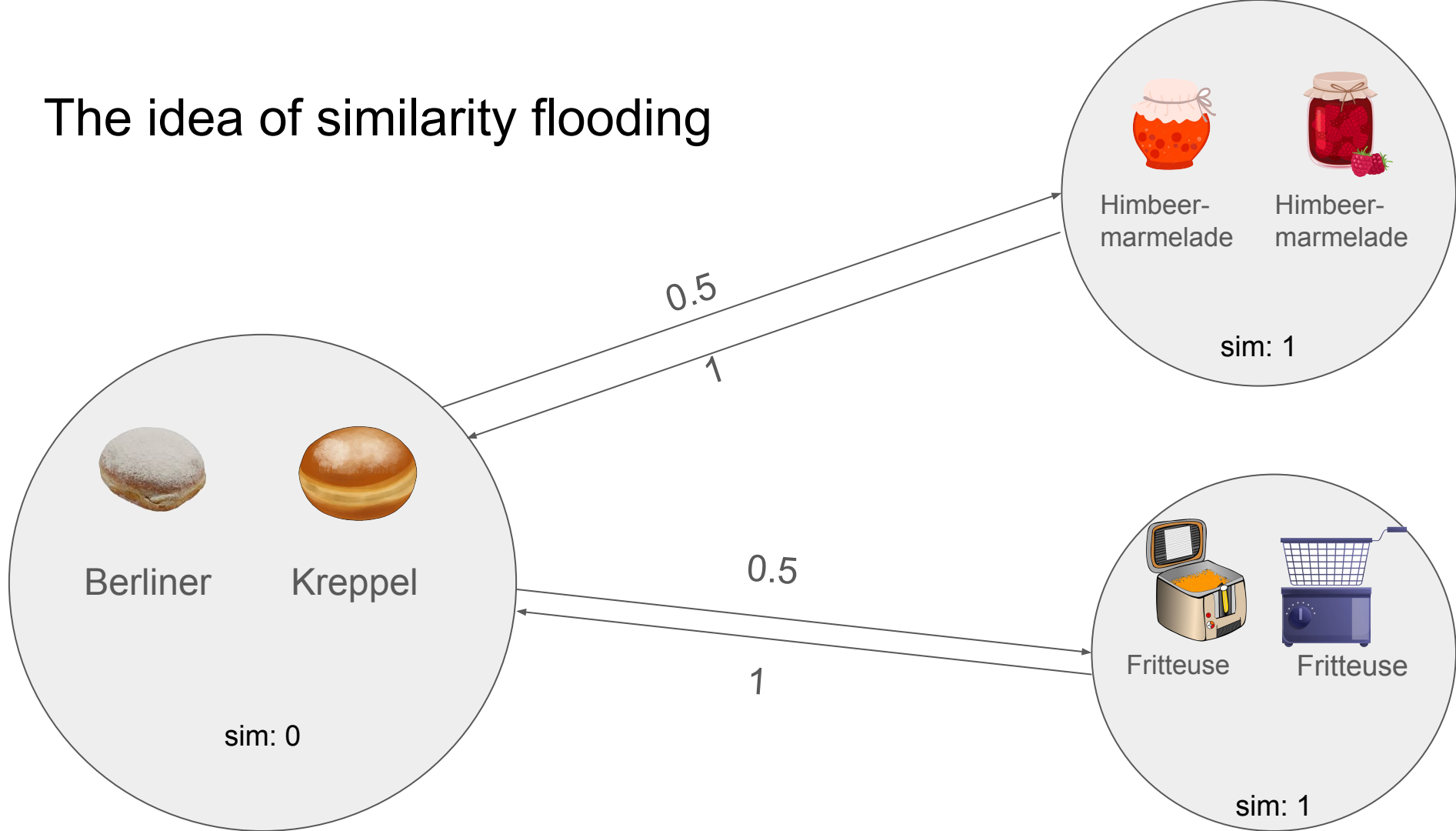
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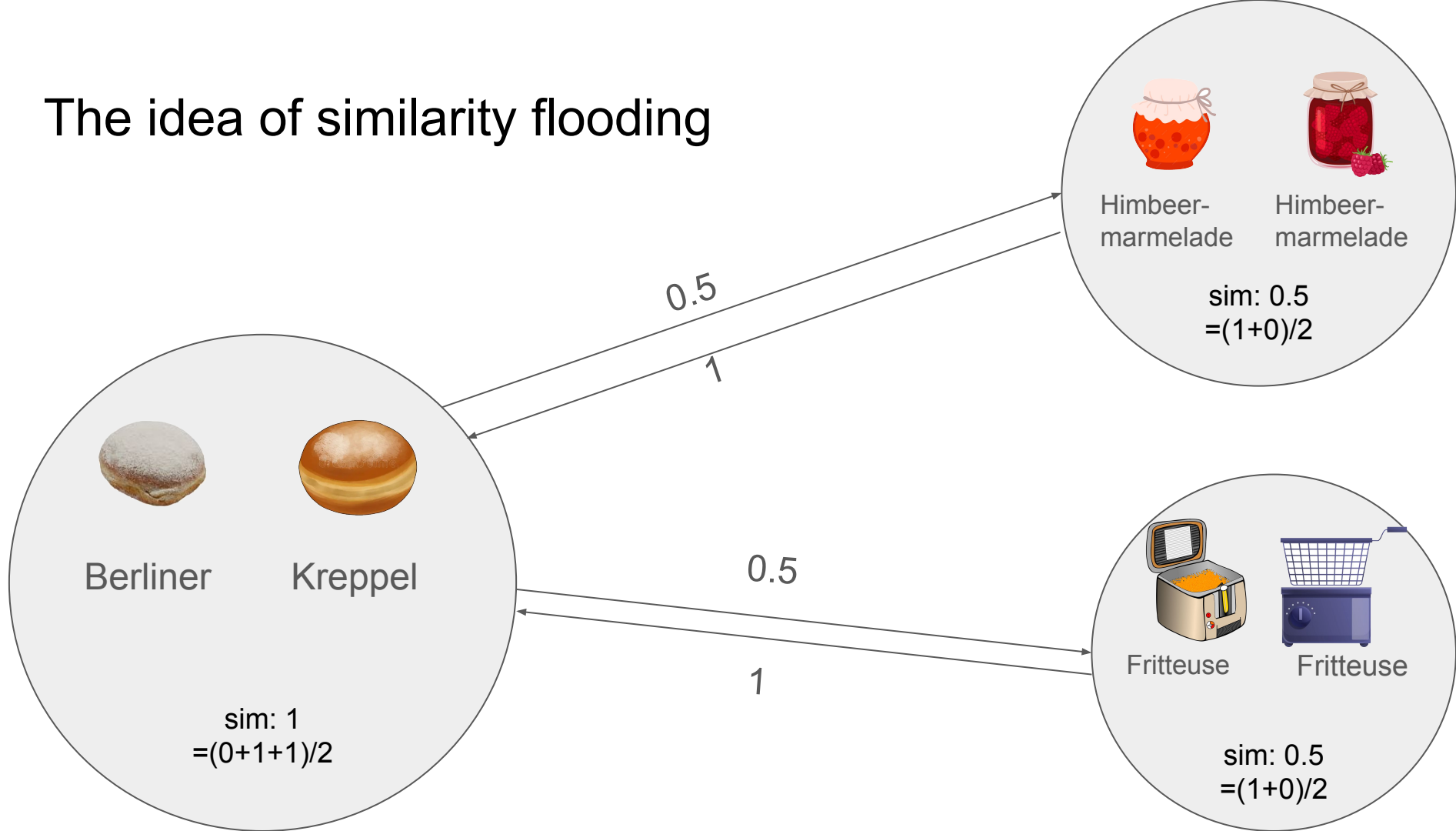


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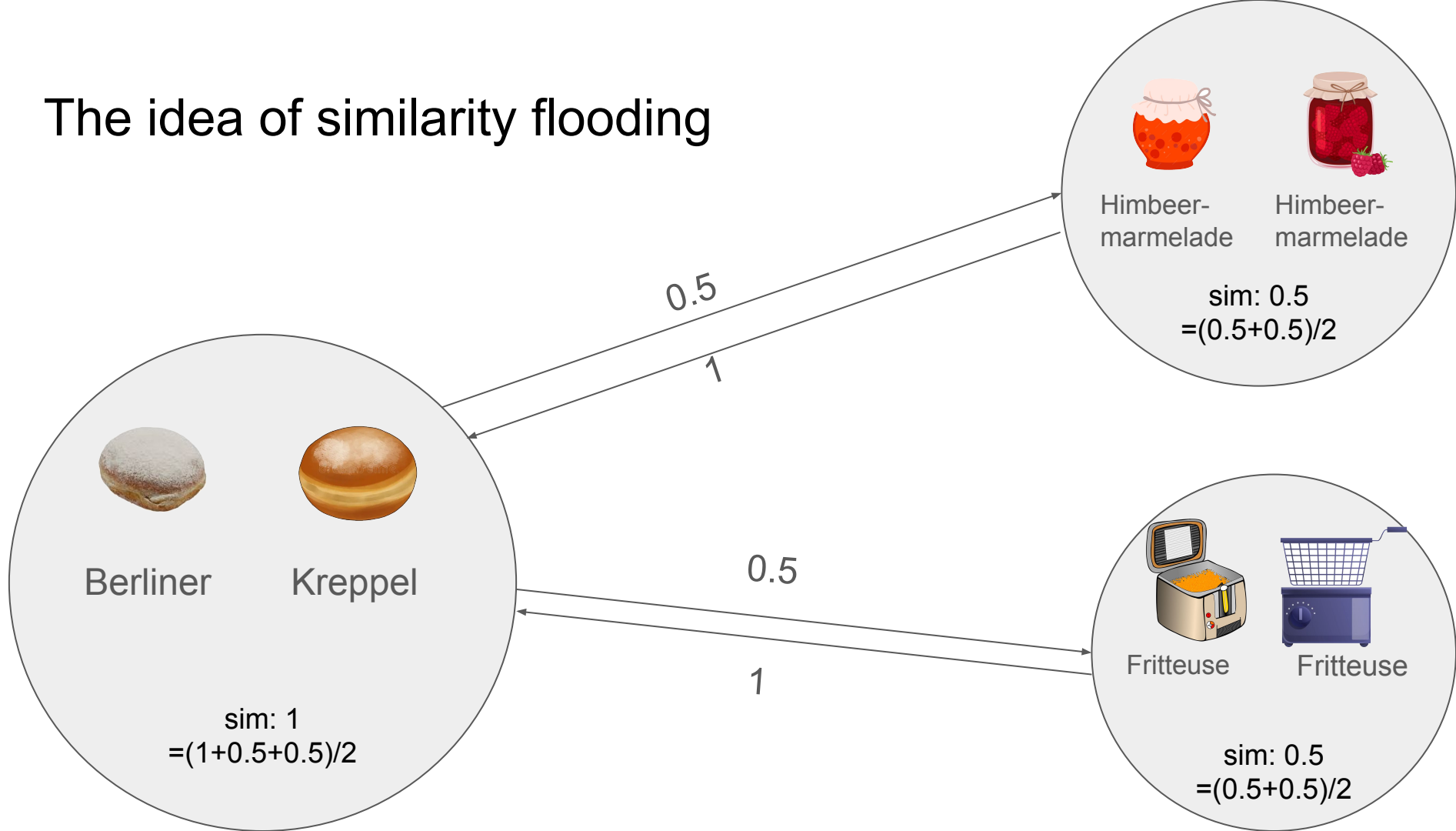




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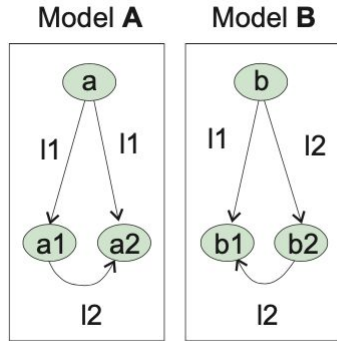


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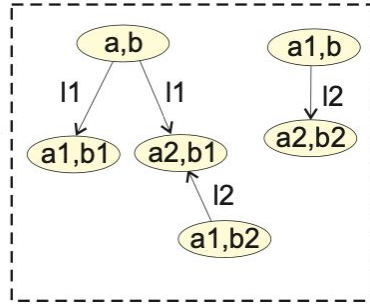


# The graphs of similarity flooding

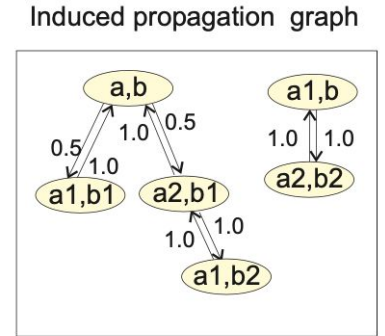
Directed labeled graph:



Pairwise connectivity graph:



Propagation graph:



Examples:

- “Berliner” production line
- graph representation of DB schemas

Combine directed graphs based on the edge **labels**.

Formally:

$$((x, y), p, (x', y')) \in \text{PCG}(A, B)$$

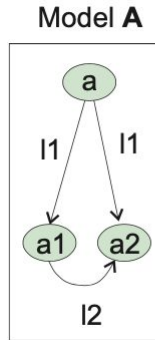
$$\iff$$

$$(x, p, x') \in A \text{ and } (y, p, y') \in B$$

- Add opposite edges
- Add propagation coefficients (weights), different approaches possible

# The graph

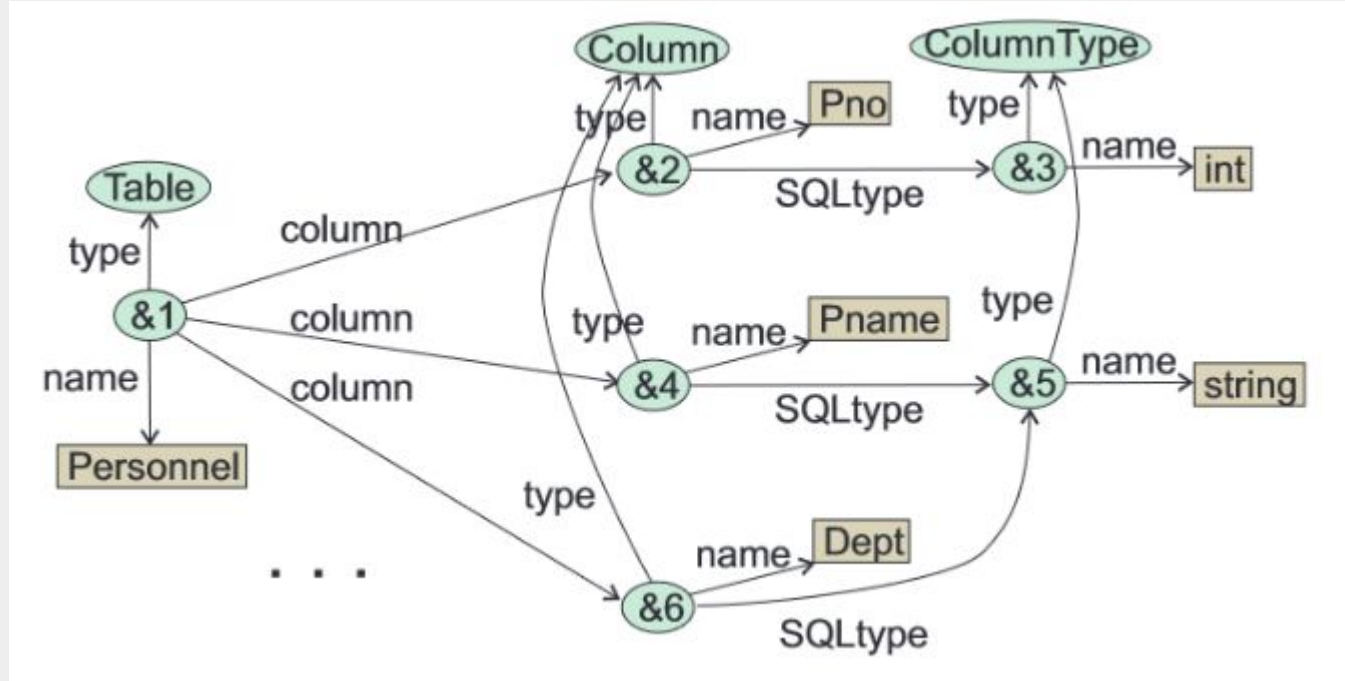
Directed la



Examples:

- “Berlin product
- graph representation of DB schemas

SQL2Graph:



$$(x, y, p, (x', y')) \in \text{PCG}(A, B)$$

$$\iff (x, p, x') \in A \text{ and } (y, p, y') \in B$$

different approaches possible

# The flooding of similarity flooding

Fixpoint computation:

**Needed:** initial similarity measure  $\sigma^0: A \times B \rightarrow [0,1]$   
e.g.: Similarity matrix, String comparison...

**Notation:** sim measure after  $i$  steps:  $\sigma^i: A \times B \rightarrow [0,1]$

**Alg**  $\sigma^i \rightarrow \sigma^{i+1}$ : Different fixpoint formula possible.  
Normalize: e.g. divide by max similarity

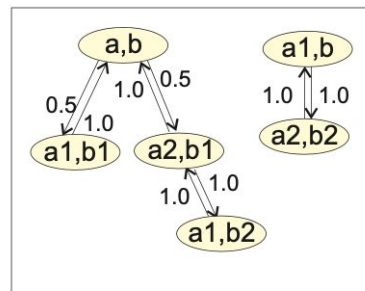
$$\varphi(\sigma^i(a,b)) = \sum_{x \text{ n.o. } (a,b)} w(x \rightarrow (a,b)) \cdot \sigma^i(x)$$

**Termination:** e.g. capped number of iteration steps,  
residual vector vanishes, ...

**Hope for convergence!**

Propagation graph:

Induced propagation graph



Fixpoint formula

$$\sigma^{i+1} = \text{normalize}(\sigma^i + \varphi(\sigma^i))$$

$$\sigma^{i+1} = \text{normalize}(\sigma^0 + \varphi(\sigma^i))$$

$$\sigma^{i+1} = \text{normalize}(\varphi(\sigma^0 + \sigma^i))$$

$$\sigma^{i+1} = \text{normalize}(\sigma^0 + \sigma^i + \varphi(\sigma^0 + \sigma^i))$$

## Sources:

[https://www.researchgate.net/profile/Erhard-Rahm/publication/279509283\\_Similarity\\_Flooding\\_A\\_Versatile\\_Graph\\_Matching\\_Algorithm\\_Extended\\_Technical\\_Report/links/568d68e608aef987e565efbf/Similarity-Flooding-A-Versatile-Graph-Matching-Algorithm-Extended-Technical-Report.pdf](https://www.researchgate.net/profile/Erhard-Rahm/publication/279509283_Similarity_Flooding_A_Versatile_Graph_Matching_Algorithm_Extended_Technical_Report/links/568d68e608aef987e565efbf/Similarity-Flooding-A-Versatile-Graph-Matching-Algorithm-Extended-Technical-Report.pdf)

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