

# Certain Answers for SPARQL?

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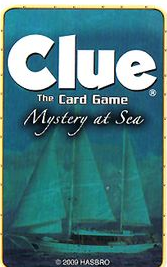
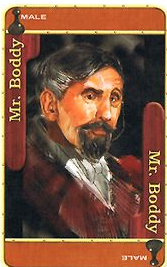
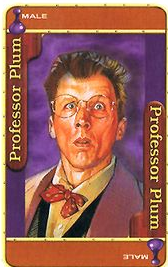
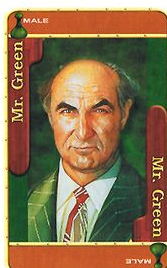
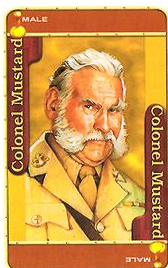
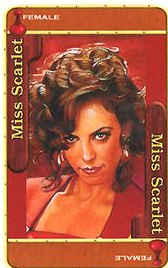
Center for Semantic Web Research, Chile.



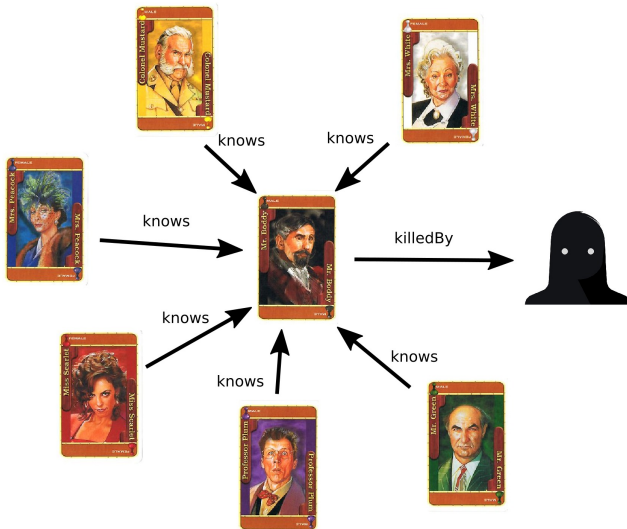
Mr. Boddy was killed by...



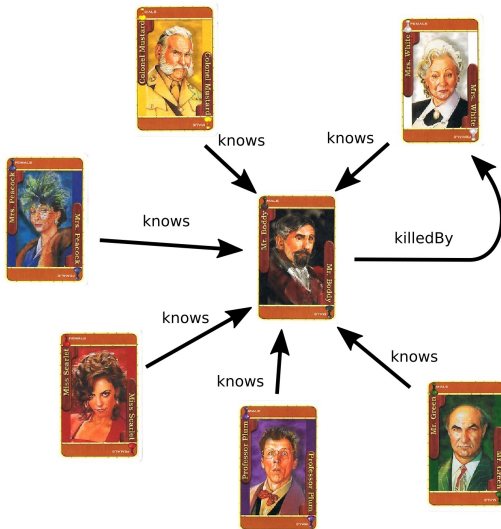
# The suspects



# The RDF graph



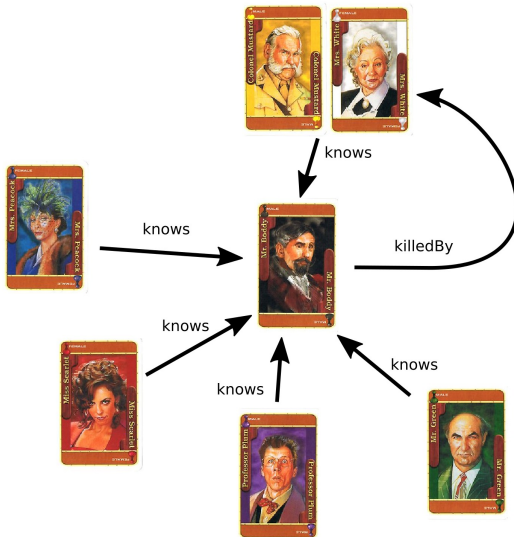
# A possible solution of the game



# Another possible solution

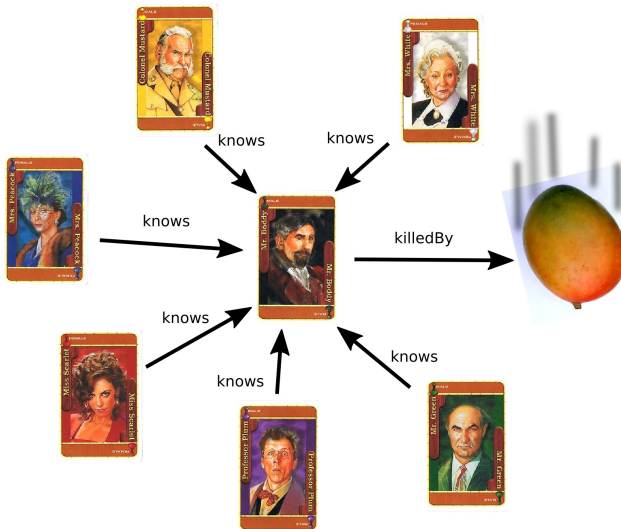


# Lack of unique name

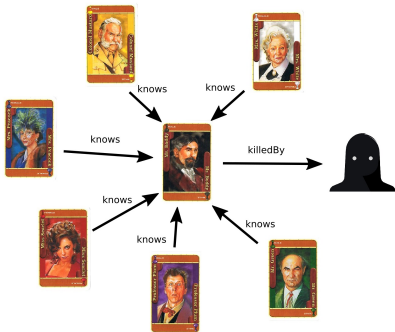




# Open world



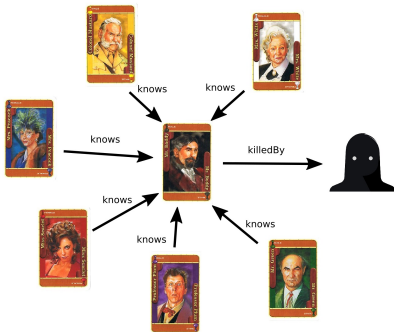
# The guilty



Who killed Mr. Boddy?

```
SELECT ?person
WHERE {
    :MrBoddy :killedBy ?person
}
```

# The guilty



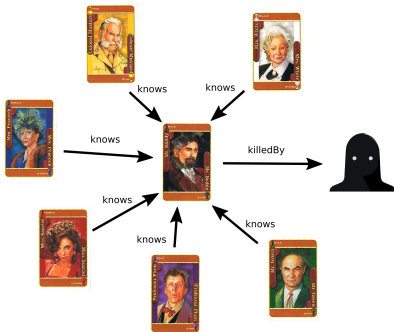
Who killed Mr. Boddy?

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SELECT ?person
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SPARQL result: Somebody.



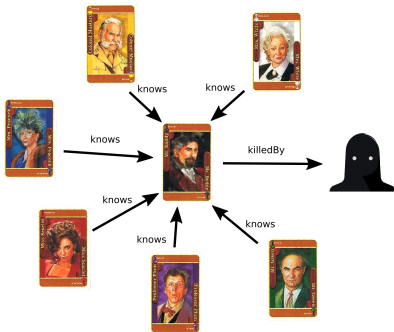
# The innocent



Who did not kill Mr. Boddy?

```
SELECT ?person
WHERE {
  ?person :knows :MrBoddy
MINUS
  :MrBoddy :killedBy ?person
}
```

# The innocent

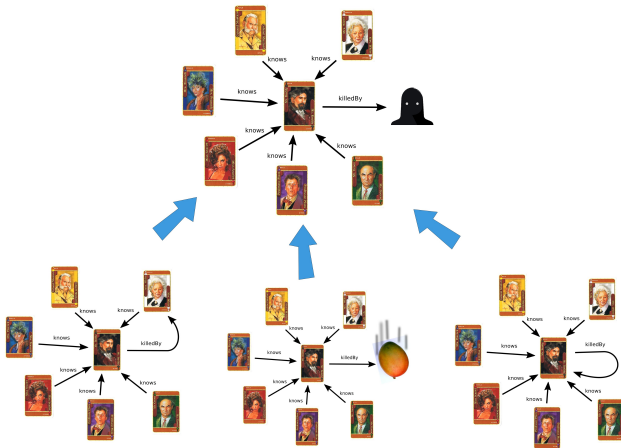


Who did not kill Mr. Boddy?

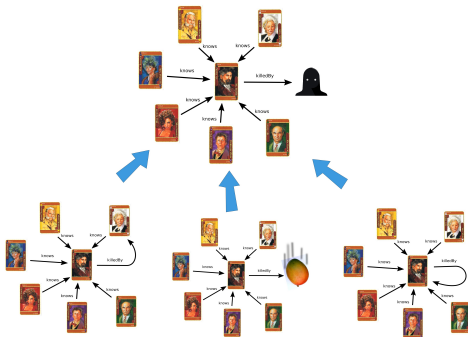
```
SELECT ?person
WHERE {
  ?person :knows :MrBoddy
  MINUS
  :MrBoddy :killedBy ?person
}
```

SPARQL result: Everybody.

# Simple entailment

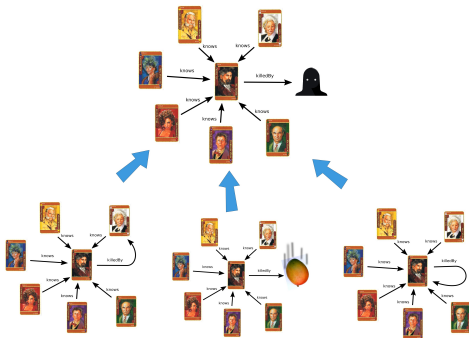


# Representatives and certain answers



$$\text{repr}(I) = \{I' \mid \nu(I) \subseteq I'\}$$

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$$\text{repr}(I) = \{I' \mid \nu(I) \subseteq I'\}$$

$$\text{certain}(Q, I) = \bigcap \{Q(I') \mid I \in \text{repr}(I')\}$$





Libkin, SQLs 3-valued logic (3V) and certain answers, ICDT 2015.





# Equality evaluation

Libkin, SQLs 3-valued logic (3V) and certain answers, ICDT 2015.

	=		RDF	SPARQL	3V
			true	true	true







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Libkin, SQLs 3-valued logic (3V) and certain answers, ICDT 2015.

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	=		true	true	true
	=		unknown	false	false
	=		unknown	false	unknown
	=		unknown	false	unknown
	=		true	true	true

- 1 SPARQL semantics is not aligned with RDF.
- 2 Certain answers are natural for RDF with blank nodes.
- 3 RDF+SPARQL is a good use-case for Libkin's 3V approach.
- 4 No results but lots of work to do.



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- 3 Additional features of SPARQL
- 4 Performance cost

Questions?