

# Mathematical Logics

## Applications of Description Logic

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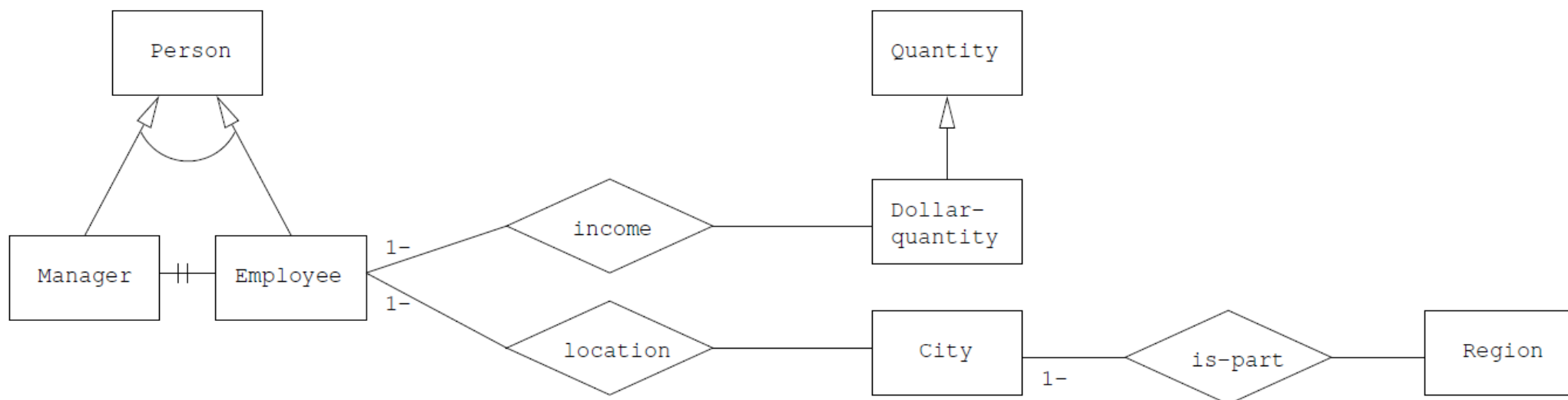
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# Motivation of uses of DL

1. Relational databases: Enterprise DB consistency, constrained Q/A
2. ER models: automatic validation of requirements
3. Knowledge Graphs: consistency, constrained Q/A in Data Integration, Web applications

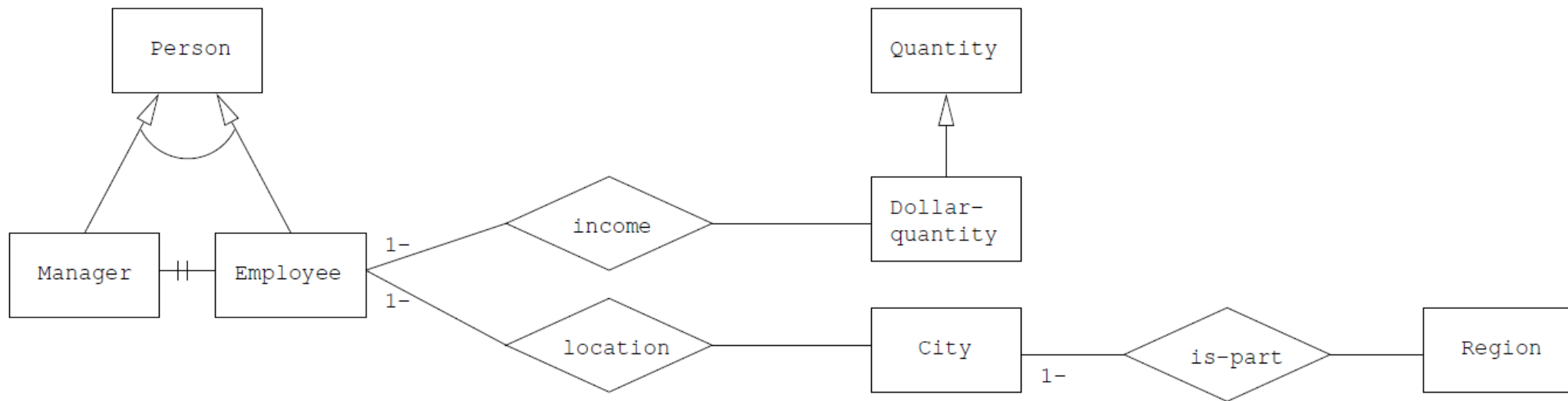
1. Introduction
2. Relational databases
3. ER models
4. Knowledge Graphs

# Defining DL theories for ER diagrams



- ❑ An ER conceptual schema can be expressed as a DL theory
- ❑ The models of the DL theory correspond to the legal database states of the ER schema.
- ❑ Reasoning services, such as satisfiability of a schema or of a logical implication, can be performed by the corresponding DL theory.
- ❑ A DL theory allows for a greater expressivity than an ER schema, in terms of full disjunction and negation and entity definitions by means of both necessary and sufficient conditions.

# Defining DL theories for ER diagrams



TBox = {  
Person  $\sqsubseteq$  Manager  $\sqcup$  Employee,  
Manager  $\sqsubseteq$  Person  $\sqcap$   $\neg$  Employee,  
Employee  $\sqsubseteq$  Person  $\sqcap$   $\exists$ income<sup>-1</sup>.Dollar-quantity  $\sqcap$   $\exists$ location<sup>-1</sup>.City  
Dollar-quantity  $\sqsubseteq$  Quantity  
City  $\sqsubseteq$   $\exists$ is-part<sup>-1</sup>.Region  
}

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