CS 690-009 Week 3

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# An Introduction to Description Logics

<table>
<thead>
<tr>
<th>Previous Representations of Knowledge</th>
<th>Description Logics</th>
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<tbody>
<tr>
<td>Network-based (cognitive) structures such as semantic networks and frame systems very effective, practical, and human-centered but are not consistent (apparently identical systems behave differently)</td>
<td>Hierarchical network (terminology) of concepts (defining sets of individuals) related by an underlying logical system. Underlying logic does not necessarily need to be as complex as first-order logic, allowing for more practicality by not requiring first-order logic theorem provers.</td>
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<td>Logic-based systems (variants of first-order predicate calculus) are general purpose by nature but not as practical or human-centered as cognitive approaches</td>
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**TBox (Intensional Knowledge)**

Woman $\equiv$ Person $\cap$ Female

**ABox (Extensional Knowledge)**

Woman(ANNA)

**Implied:**

Person(ANNA)
Female(ANNA)
An Introduction to Description Logics

• Used used in application areas such as Natural Language Processing, Software Engineering, Medicine, and Web-Based Information Systems, Planning, and Data Mining

• Some problems with DL’s might be high worst-case complexity, although there have been significant improvements in algorithms since the writing of this book, and empirical tests have shown that the worst-case rarely occurs in practice