

Knowledge Representation and Reasoning Logics for Artificial Intelligence

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13 Description Logic

Main reference:

Franz Baader, Diego Calvanese, Deborah L. McGuinness, Daniele Nardi, and Peter F. Patel-Schneider, Eds., *The Description Logic Handbook: Theory, Implementation and Applications, Second Edition*, Cambridge University Press, Cambridge, UK, 2007.

Typology of DL Languages

Construct	Syntax	Language			
Concept	A	FL ₀	FL ⁻	AL	S
Role name	R				
Intersection	$C \cap D$				
Value Restriction	$\forall R.C$				
Limited existential quantification	$\exists R.T$				
Top or Universal	\top				
Bottom	\perp				
Atomic negation	$\neg A$	C	U	E	
Negation	$\neg C$				
Union	$C \cup D$				
Existential restriction	$\exists R.C$				

Language S = ALC_{R+} = ALC plus transitive roles.

From A. Gómez-Pérez, M. Fernández-López & O. Corcho, *Ontological Engineering*, Springer-Verlag, London, 2004, Table 1.1, p. 17.

Typology, continued

Construct	Syntax	Language
Number restrictions	$(\geq n R) (\leq n R)$	N
Nominals	$\{a_1 \dots a_n\}$	O
Role hierarchy	$R \subseteq S$	H
Inverse role	R'	I
Qualified number restriction	$(\geq n R.C) (\leq n R.C)$	Q

Key to abbreviations under “Syntax”:

A: atomic concept

C, D: concept definitions

R: atomic role

S: role definition

From A. Gómez-Pérez, M. Fernández-López & O. Corcho, *Ontological Engineering*, Springer-Verlag, London, 2004, Table 1.1, p. 17.