

DL SYMBOLS

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Table 1: List of DL Symbols

Name	DL	Manchester	Semantics
domain of interpretation	$\Delta^{\mathcal{I}}$		The maximal set of all the things this ontology deals with
Thing(OWL) or top(DL)	\top	<code>owl:Thing</code>	Equivalent to the domain of interpretation
Nothing(OWL) or bottom(DL)	\perp	<code>owl:Nothing</code>	Equivalent to the empty set
Top object property	U	<code>owl:topObjectProperty</code>	Maximal set of pairs for the domain of interpretation: $\Delta^{\mathcal{I}} \times \Delta^{\mathcal{I}}$
Bottom object property	B	<code>owl:bottomObjectProperty</code>	Empty set of pairs.
instance or individual	c	Individual: c	$c \in \Delta^{\mathcal{I}}$ which is read as: c is a member of the domain of interpretation
class(OWL) or concept(DL)	C	Class: C	$C \subseteq \Delta^{\mathcal{I}}$, which is read as: C is a set of individuals that is a subset of the domain of interpretation.
object property(OWL) or role(DL)	r	ObjectProperty: r	A set of ordered pairs of individuals
data property(OWL) or concrete role(DL)	t	DataProperty: t	A set of ordered pairs where the first component of each pair is an individual and the second component is a data value
concept subsumption axiom	$C \sqsubseteq D$	Class C: SubClassOf: D	The set of individuals represented by the concept C is a subset of the set of individuals represented by the concept D
concept equivalence axiom	$C \equiv D$	Class C: EquivalentTo: D	The set of individuals represented by the concept C is equivalent to the set of individuals represented by the concept D
role subsumption axiom	$r \sqsubseteq s$	ObjectProperty r: SubPropertyOf: s or if r and s are concrete roles/data properties: DataProperty r: SubPropertyOf: s	The set of pairs of individuals represented by the role r is a subset of the set of pairs of individuals represented by the concept s

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role equivalence axiom	$r \equiv s$	ObjectProperty r: EquivalentTo: s	The set of pairs of individuals represented by the role r is equivalent to the set of pairs of individuals represented by the concept s
instance of (OWL) or concept assertion (DL)	$C(x)$	Class: C Individual: x Type: C	The individual x is an instance of the concept C,
property assertion (OWL) or role assertion (DL)	$r(x, y)$	ObjectProperty: r Individual: y Individual: x Facts: r y	Individual x is related to individual y via the property r.
individuals are the same	$x \approx y$	Individual: x Individual: y SameAs: x	
individuals are different	$x \not\approx y$	Individual: x Individual: y DifferentFrom: x	
concept negation	$\neg C$	not C	Everything in the domain of interpretation that is not in C
intersection of concepts	$C \sqcap D$	C and D	The intersection of the sets represented by the concepts C and D. Read as: the conjunction of C and D.
disjunction of concepts	$C \sqcup D$	C or D	The union of the sets represented by the concepts C and D. Read as: the disjunction of C and D.
qualified existential restriction	$\exists r.C$	r some C	This represents the set of individuals such that for each individual d there is at least 1 element e that is linked to an individual d of type C via the role r. Read as: The set of individuals with an r-filler that is of type C.
unqualified existential restriction	$\exists r$ or $\exists r.\top$	r some owl:Thing	This represents the set of individuals such that for each individual d there is at least 1 element e that is linked to an individual d via the role r. Read as: The set of individuals with an r-filler.
value restriction	$\exists r.\{x\}$	r hasValue x	This a more specialized form of the existential restriction. This represents the set of individuals such that for each individual d belonging to the set, it is linked to the individual x (respectively value x when r is a data property or concrete role). Read as: The set of individuals with the individual x (respectively, the value x) as r-filler.
qualified universal restriction	$\forall r.C$	r only C	This is the set of individuals where for each individual d of the set, it holds that whenever d is linked to an individual e via r, then e is of type C. Read as: the set of individuals where all r-fillers are of type C.

unqualified universal restriction	$\forall r$ or $\forall r.\top$	r only owl:Thing	This is the set of individuals where for each individual d of the set, it holds that whenever d is linked to an individual e via r , then e is of type C .
qualified minimum cardinality restriction	$\geq nr.C$	r min n C	This represents the set of individuals such that each individual d is linked to at least n individuals of type C via the role r . Read as: The set of individuals with at least n r -fillers that are of type C .
unqualified minimum cardinality restriction	$\geq nr.\top$ or $\geq nr$	r min n owl:Thing	This represents the set of individuals such that each individual d is linked to at least n individuals via the role r . Read as: The set of individuals with at least n r -fillers.
qualified maximum cardinality restriction	$\leq nr.C$	r max n C	This represents the set of individuals such that each individual d is linked to at most n individuals of type C via the role r . Read as: The set of individuals with at most n r -fillers of type C .
unqualified maximum cardinality restriction	$\leq nr.\top$ or $\leq nr$	r max n owl:Thing	This represents the set of individuals such that each individual d is linked to at most n individuals via the role r . Read as: The set of individuals with at most n r -fillers.
inverse property(OWL) or inverse role(DL)	r^-	ObjectProperty: r ObjectProperty: s InverseOf: r	The set that is the inverse of r consists of the pairs (x,y) of r that are swapped around to (y,x) .
property chain(OWL) or role chain(DL)	$p1 \circ p2 \sqsubseteq p$	ObjectProperty: p1 ObjectProperty: p2 ObjectProperty: p SubPropertyChain: p1 o p2	If we have $p1(x,y)$ and $p2(y,z)$, then it follows that $p(x,z)$. An example is ObjectProperty: grandParentOf SubPropertyChain: parentOf o parentOf .
TBox	\mathcal{T}	NA	The set of all concept axioms.
RBox	\mathcal{R}	NA	The set of all role axioms .
ABox	\mathcal{A}	NA	The set of all assertions regarding individuals.
Ontology	\mathcal{O}	NA	Consists of the union of the TBox, RBox and ABox where any of these could be potentially be empty.
entailment	\models	NA	States that an axiom or assertion follows from a TBox, RBox, ABox or ontology. I.e., $\mathcal{T} \models C \sqsubseteq D$ states that C is subsumed by D follows from the TBox \mathcal{T} . Entailment is typically used in discussions wrt reasoning.

REFERENCES