
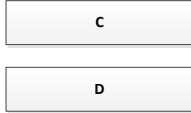
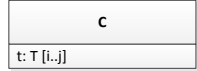
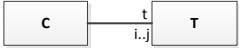
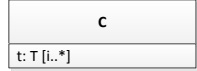
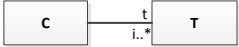
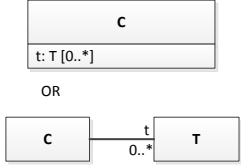
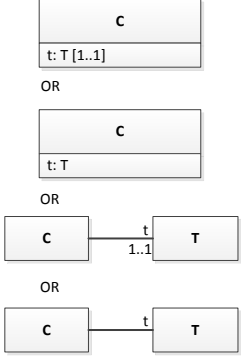
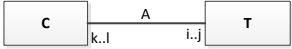
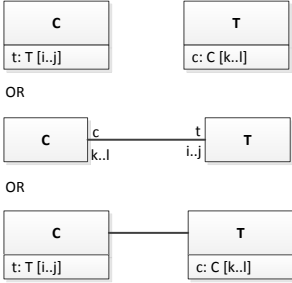


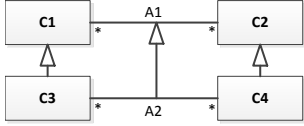
UML Class Diagram to OWL and SROIQ Reference

Henriette Harmse

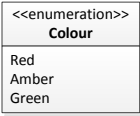
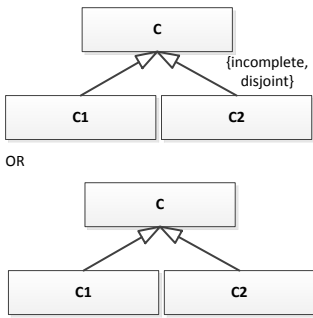
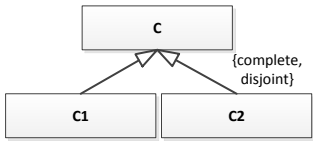
UML class diagram feature	$SR_{OIQ}^{(D)}$	OWL 2
 <p>Class C</p>	C	Class: C
 <p>Classes C and D</p>	$C \sqsubseteq \neg D$	Class: C Class: D DisjointWith: C
 <p>OR</p>  <p>Attribute t of type T with multiplicity $[i..j]$ OR Association end t of type T with multiplicity $[i..j]$</p>	$\exists t.T \sqsubseteq C$ $\exists t^-.T \sqsubseteq T$ $C \sqsubseteq (\geq i t.T) \sqcap (\leq j t.T)$	Class: C SubClassOf: (t min i Thing) and (t max j Thing) Class: T ObjectProperty: t Domain: C Range: T
 <p>OR</p>  <p>Attribute t of type T with multiplicity $[i..*]$ OR Association end t of type T with multiplicity $[i..*]$</p>	$\exists t.T \sqsubseteq C$ $\exists t^-.T \sqsubseteq T$ $C \sqsubseteq (\geq i t.T)$	Class: C SubClassOf: (t min i Thing) Class: T ObjectProperty: t Domain: C Range: T

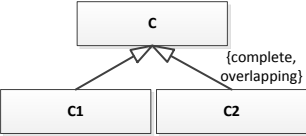
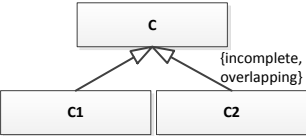
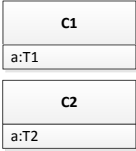
UML class diagram feature	$SR\mathcal{OIQ}^{(D)}$	OWL 2
 <p>Attribute t of type T with multiplicity [0..*] OR Association end t of type T with multiplicity [0..*]</p>	$\exists t.T \sqsubseteq C$ $\exists t^-.T \sqsubseteq T$	Class: C Class: T ObjectProperty: t Domain: C Range: T
 <p>Attribute t of type T with multiplicity [1..1] OR Class C with attribute t of type T OR Association end t of type T with multiplicity [1..1] OR Association between C and T with role t</p>	$\exists t.T \sqsubseteq C$ $\exists t^-.T \sqsubseteq T$ $C \sqsubseteq \exists t.T \sqcap (\leq 1 t.T)$	Class: C SubClassOf: t exactly 1 Thing Class: T

UML class diagram feature	$SROIQ^{(D)}$	OWL 2
 <p>Association A exists between classes C and T</p>	$\exists a.T \sqsubseteq C$ $\exists a^-.T \sqsubseteq T$ $C \sqsubseteq (\geq i a.T) \sqcap (\leq j a.T)$ $T \sqsubseteq (\geq k a^-.T) \sqcap (\leq l a^-.T)$	<pre> ObjectProperty: a Domain: C Range: T ObjectProperty: a_inv InverseOf: a Class: C SubClassOf: (a min i Thing) and (a max j Thing) Class: T SubClassOf: (a_inv min k Thing) and (a_inv max l Thing) </pre>
 <p>Attribute t of type T with multiplicity [i..j] belongs to class C and attribute c of type C with multiplicity [k..l] belongs to class T</p> <p>OR</p> <p>Association end t with multiplicity [i..j] is associated with class C and association end c with multiplicity [k..l] is associated with class T</p> <p>OR</p> <p>Line notation is used to make explicit that attributes t and c are also association ends</p>	$\exists t.T \sqsubseteq C$ $\exists t^-.T \sqsubseteq T$ $C \sqsubseteq (\geq i t.T) \sqcap (\leq j t.T)$ $c \sqsubseteq t^-$ $T \sqsubseteq (\geq k c.T) \sqcap (\leq l c.T)$	<pre> ObjectProperty: t Domain: C Range: T Class: C SubClassOf: (t min i Thing) and (t max j Thing) ObjectProperty: c InverseOf: t Class: T SubClassOf: (c min k Thing) and (c max l Thing) </pre>

UML class diagram feature	$\mathcal{SROIQ}^{(D)}$	OWL 2
 <p>Association A2 specializes association A1</p>	$\begin{aligned} &\exists a_1.\top \sqsubseteq C_1 \\ &\exists a_1^{-}.\top \sqsubseteq C_2 \\ &\exists a_2.\top \sqsubseteq C_3 \\ &\exists a_2^{-}.\top \sqsubseteq C_4 \\ &a_2 \sqsubseteq a_1 \end{aligned}$	<pre> Class: C1 Class: C2 Class: C3 Class: C4 ObjectProperty: a1 Domain: C1 Range: C2 ObjectProperty: a2 Domain: C3 Range: C4 SubPropertyOf: a1 </pre>

UML class diagram feature	$SR\mathcal{OIQ}(\mathcal{D})$	OWL 2
<p>OR</p> <p>OR</p> <p>OR</p> <p>OR</p> <p>Association end (resp. attribute) c3 subsets association end (resp. attribute) c1 and association end (resp. attribute) c4 subsets association end (resp. attribute) c2</p> <p>OR</p> <p>Association end (resp. attribute) c3 redefines association end (resp. attribute) c1 and association end (resp. attribute) c4 redefines association end (resp. attribute) c2</p>	$c_1 \equiv c_2^-$ $\exists c_1.\top \sqsubseteq C_1$ $\exists c_1^-. \top \sqsubseteq C_2$ $c_3 \equiv c_4^-$ $\exists c_3.\top \sqsubseteq C_3$ $\exists c_3^-. \top \sqsubseteq C_4$ $c_3 \sqsubseteq c_1$ $c_4 \sqsubseteq c_2$	<p>Class: C1</p> <p>Class: C2</p> <p>Class: C3</p> <p>Class: C4</p> <p>ObjectProperty: c1</p> <p>Domain: C1</p> <p>Range: C2</p> <p>InverseOf: c2</p> <p>ObjectProperty: c2</p> <p>ObjectProperty: c3</p> <p>Domain: C3</p> <p>Range: C4</p> <p>InverseOf: c4</p> <p>SubPropertyOf: c1</p> <p>ObjectProperty: c4</p>

UML class diagram feature	$SROIQ^{(D)}$	OWL 2
 <p>The Colour enumeration consists of the colours Red, Amber and Green</p>	$Colour \equiv \{Green, Amber, Red\}$ $Green \not\sqsubseteq Amber$ $Green \not\sqsubseteq Red$ $Amber \not\sqsubseteq Red$	<pre> Class: Colour EquivalentTo: {Green, Amber, Red} Individual: Green Types: Colour Individual: Amber Types: Colour Individual: Red Types: Colour DifferentIndividuals: Green, Amber, Red </pre>
 <p>Class C is specialized by the disjoint classes C1 and C2 which do not cover class C</p>	$C_1 \sqsubseteq C$ $C_2 \sqsubseteq C$ $C_1 \sqsubseteq \neg C_2$	<pre> Class: C Class: C1 SubClassOf: C Class: C2 SubClassOf: C DisjointClasses: C1, C2 </pre>
 <p>Class C is specialized by the disjoint classes C1 and C2 which cover class C</p>	$C \sqsubseteq C_1 \sqcup C_2$ $C_1 \sqsubseteq \neg C_2$ $C_1 \sqsubseteq C$ $C_2 \sqsubseteq C$	<pre> Class: C DisjointUnionOf: C1, C2 Class: C1 SubClassOf: C Class: C2 SubClassOf: C </pre>

UML class diagram feature	$\mathcal{SROIQ}^{(D)}$	OWL 2
 <p>Class C is specialized by the overlapping classes C1 and C2 which cover class C</p>	$C \sqsubseteq C_1 \sqcup C_2$ $C_1 \sqsubseteq C$ $C_2 \sqsubseteq C$	<pre> Class: C SubClassOf: C1 or C2 Class: C1 SubClassOf: C Class: C2 SubClassOf: C </pre>
 <p>Class C is specialized by the overlapping classes C1 and C2 which do not cover class C</p>	$C_1 \sqsubseteq C$ $C_2 \sqsubseteq C$	<pre> Class: C Class: C1 SubClassOf: C Class: C2 SubClassOf: C </pre>
 <p>Classes C1 and C2 both have an attribute a respectively of type T1 and T2.</p>	$\exists a.T \sqsubseteq C_1 \sqcup C_2$ $\exists a^-.T \sqsubseteq T_1 \sqcup T_2$ $C_1 \sqsubseteq \exists a.T \sqcap (\leq 1 a.T)$ $C_2 \sqsubseteq \exists a.T \sqcap (\leq 1 a.T)$	<pre> Class: C1 SubClassOf: t exactly 1 Thing Class: C2 SubClassOf: t exactly 1 Thing Class: T1 Class: T2 ObjectProperty: a Domain: C1 or C2 Range: T1 or T2 </pre>