In the following, I use blue to denote language stereotypes corresponding to FOL syntactic elements, red and green for variables, black for concept labels, and red for the “there exists” language stereotype.

P11 had participant (participated in)

Domain:

[E5](#_toc7383) Event

Range:

[E39](#_toc8005) Actor

Subproperty of:

[E5](#_toc7383) Event. [P12](#_toc9032) occurred in the presence of (was present at): [E77](#_toc8517) Persistent Item

**In First Order Logic:**

**P11(x,y) ⇒ E5(x)**

**P11(x,y) ⇒ E39(y)**

**P11(x,y) ⇒ P12(x,y)**

Read:

**P11(x,y) ⇒**

**E5(x)**

as:

**If a particular x is related to another particular y by the property P11 had participant, then**

**x must be an instance of E5 Event.**

Shorter: **If x** (P11)**had participant y, then x must be an instance of E5 Event.**

This is the domain condition.

Read:

**P11(x,y) ⇒**

**E39(y)**

as:

**If a particular x is related to another particular y by the property P11 had participant, then**

**y must be an instance of E39 Actor.**

Shorter: **If x** (P11)**had participant y, then y must be an instance of E39 Actor.**

This is the range condition.

**P11(x,y) ⇒**

**P12(x,y)**

**If a particular x is related to another particular y by the property P11 had participant, then**

**x must also be related to y by the property P12 occurred in the presence of**

Shorter: **If x** (P11)**had participant y, then x (**P12) **occurred in the presence of y.**

this is the “suproperty of” statement.

Note that the FOL statements are ontological, i.e., they refer to the assumed reality as premise, as far as the referred CRM concepts are applicable to this reality, regardless whether we have knowledge of this reality or not.

The “if…then…must be..” constitutes the inference described by and in the direction of the “⇒” arrow (also reading as “implies”).

**Now something more complicated, an existential statement:**

Look at the property:

**P8 took place on or within (witnessed)**

Domain:

[E4](#_toc7351) Period

Range:

[E18](#_toc7650) Physical Thing

Quantification:

many to many (0,n:0,n)

Scope note:

This property describes the location of an instance of E4 Period with respect to an instance of E19 Physical Object.

This property is a shortcut of the more fully developed path from E4 Period through *P7 took place at*, E53 Place, *P156i is occupied by* E18 Physical Thing.

It describes a period that can be located with respect to the space defined by an E19 Physical Object such as a ship or a building. The precise geographical location of the object during the period in question may be unknown or unimportant.

For example, the French and German armistice of 22 June 1940 was signed in the same railway carriage as the armistice of 11 November 1918.

Examples:

* The coronation of Queen Elizabeth II (E7) *took place on or within* Westminster Abbey (E18). (Strong, 2005)

**In First Order Logic:**

P8(x,y) ⇒ E4(x)

P8(x,y) ⇒ E18(y)

**P8(x,y) ⇐ (∃z) [E53(z) ˄ P7i(z,x) ˄ P156i(z,y)]**

The last statement above interprets the paragraph highlighted in yellow in the scope note above as a FOL statement.

For reading this properly, you need the property names of P7i, P156i, and their domain and range conditions.

Start reading in the direction of the “⇒” arrow:

**⇐ (∃z) [E53(z) ˄ P7i(z,x) ˄ P156i(z,y)]**

**If there exists a particular z, which is an instance of E53 Place and this z (**P7i) **witnessed x** (which therefore must be instance of E4 Period) **and this z P156i is occupied by y** (which therefore must be instance of E18 Physical Thing)

**…then x** (P8) **took place on or within y**

Note that we use in the parentheses above the domain – range conditions of P7 and P156.

Or more fluent:

**If there exists a particular E53 Place “z” which** (P7i) **witnessed x, an instance of E4 Period and** (P156i) **is occupied by y, an instance of E18 Physical Thing,**

**…then this Period x (P8) took place on or within this Physical Thing y**