1. Properties

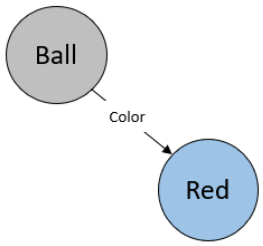
The purpose of this section is to explain properties which are used to provide important information about models, terms, structures, associations, rules, and facts.

1.1. Introduction to Properties

Properties are logical statements about the important qualities and traits of the models, structures, terms, associations, rules, and facts that describe, categorize, and/or allow you to identify its possessor.

A property is a trait, quality, feature, attribute, or peculiarity which is used to define its possessor and is therefore dependent on the possessor (thing which has the property). A property belongs to something. For example, the color of a ball belongs to and is therefore is dependent on (it is a property of) the ball.

For example, below we represent graphically that a ball has the property "color" and in this case that color is "red".

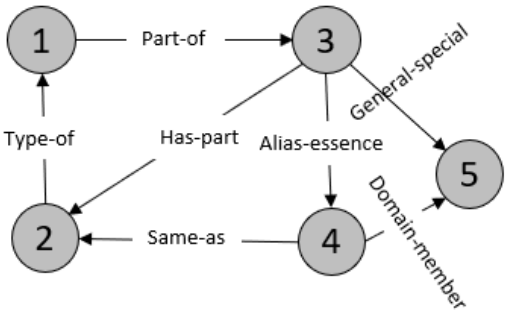


Keep in mind the difference between universals and particulars. As an example, the notion of a ball could be the universal set of all balls or ball could mean a particular, specific ball within that set of balls. So, all things that are balls can have the property of "color" and a particular, specific ball could have the property of "color" which would have a value or "red" in our case.

We are going to leave it at that for now. We will continue with our description of properties using specific, tangible examples that are easier to follow.

1.2. Directed Labeled Property Graphs

We discussed directed labeled property graphs in the section Knowledge Graphs of the chapter Financial Report knowledge Graphs.



There are many different approaches to representing properties and sometimes it can be challenging to differentiate, say, an association or rule from a property. Everything distills down to a logical statement. How that logical statement is instantiated or physically implemented is less important than the actual logic being represented by the statement.

1.3. Machine Readable Properties

Note that if you have the term, say "Current Assets" that a machine reading that term does not really understand that the thing you are referring to is either "current" or an "asset". You, as a human and as someone that has a background in the area of knowledge accounting understand what "Current Assets" means.

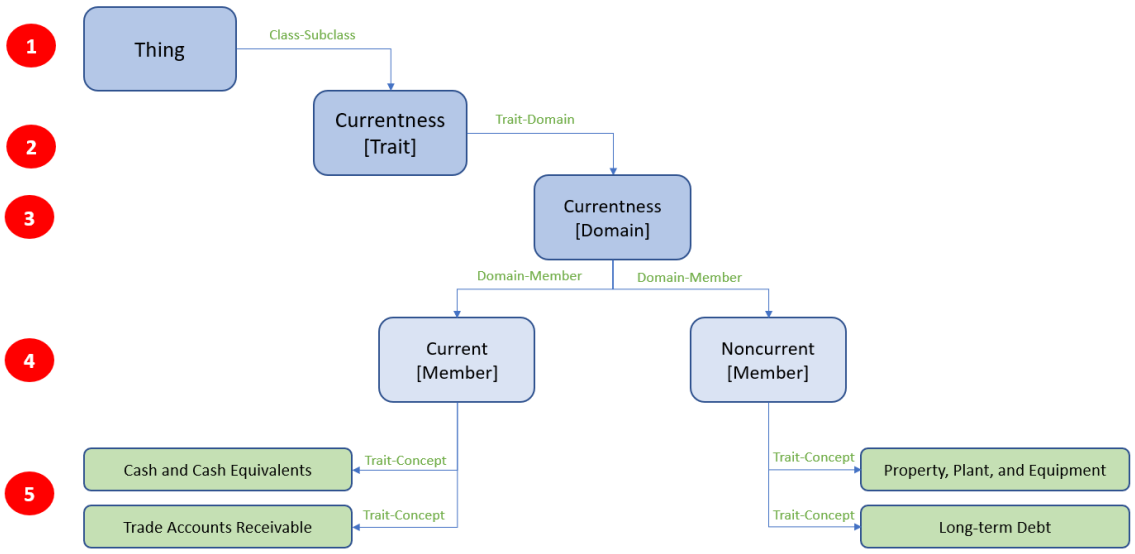
As we have pointed out, computers are a lot like babies. You have to "lead computers by then hand" and carefully creating machine readable properties that is truly understandable to a computer can get the computer to perform work for you reliably.

1.4. Financial Reporting Related Properties

Suppose we wanted to define a financial reporting related trait using XBRL, how would we do that? This would be achieved by defining XBRL elements within an XML schema and then using arcroles to define associations between the XBRL elements. In technical terms, that is how properties are defined.

Usually though, those creating report models will simply be using properties which have already been defined by others rather than defining the properties themselves.

We will walk you through the definition of properties and the use of properties using the PROOF representation. The following is what we will represent:



There is a lot going on in the above diagram, probably more than you might recognize. Once you understand that is going on and why then understanding properties will be easier.

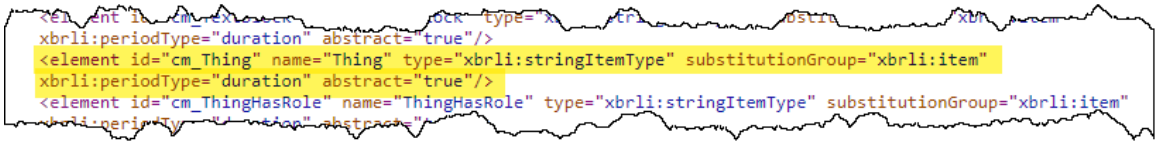
So, let's walk through the definition of the above step-by-step.

1.4.1.Define "Currentness" Trait

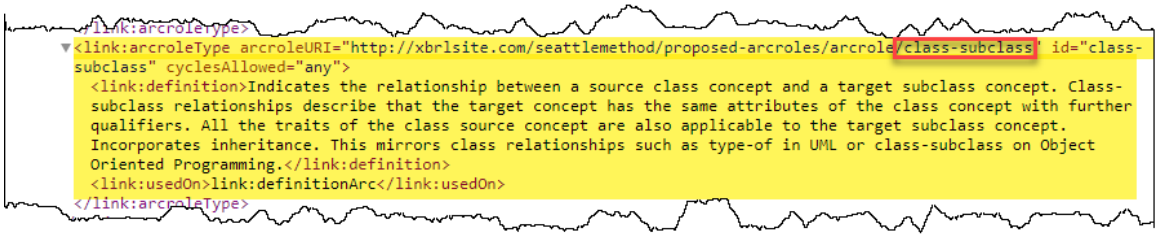
This example is taken from XBRL US who uses the term "trait" rather than "property". Here, a trait and a property are exactly the same thing.

The first thing we want to do is define the trait we will refer to as "currentness". To do that, we define "Currentness" within an XBRL taxonomy schema[1].

The notion of a "thing" is already defined within the PROOF conceptual framework:



To create an association between the "cm:Thing" and the property "prop:CurrentnessTrait", we need the arcroles to express that association. XBRL US provides those arcroles which I prototyped here in this XBRL taxonomy schema[2]:

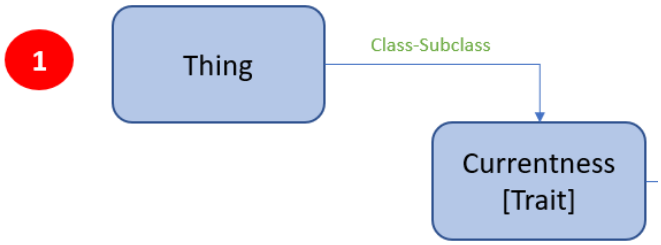


So we have all the pieces we need; now we define the actual association between the cm:Thing and the prop:CurrentnessTrait with an XBRL definition linkbase:

And so now we have the following association defined between the Thing and the Currentness trait which we need:

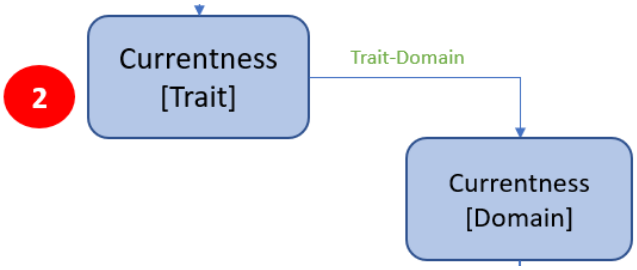
[1] PROOF properties, XBRL taxonomy schema, http://xbrlsite.com/seattlemethod/cm/properties.xsd

[2] Proposed arcroles for defining properties proposed by XBRL US, http://xbrlsite.com/seattlemethod/proposed/sm-proposed-arcroles.xsd



1.4.2.Define "Currentness" Domain

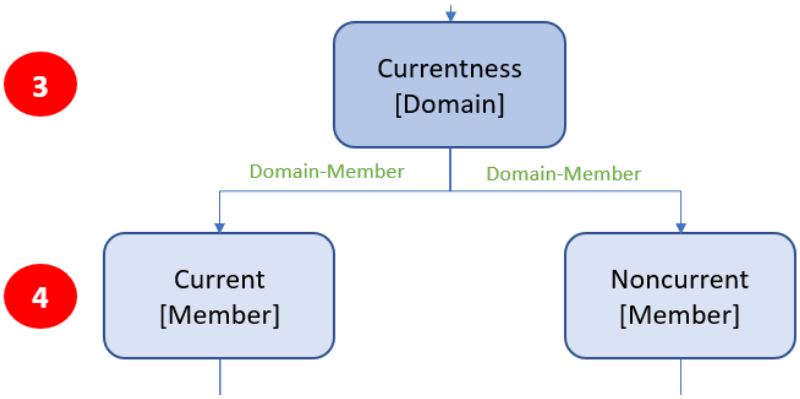
In the prior step we defined the currentness trait. In this step we define the currentness domain. There are apparently technical reasons why we would not do this in one step. So, following XBRL US' guidance, we define the currentness domain.



What defining this domain gives us is the capability to limit the domain of possible values for the currentness domain using XBRL dimensions.

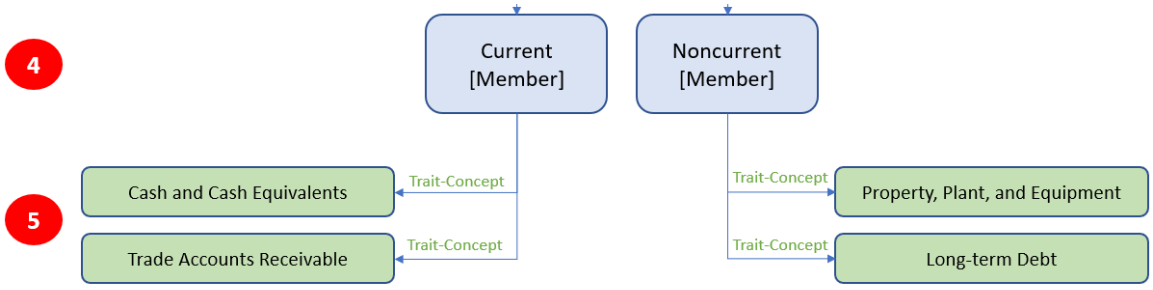
1.4.3.Define Possible Members of the "Currentness" Domain

There are only two possible allowed values for the currentness trait "current" and "noncurrent". Using the currentness domain we define those two members of the domain and use XBRL dimensions arcroles to specify the two possible values for currentness: current and noncurrent:



1.4.4.Define Possible Members of the "Currentness" Domain

So now we have the property (trait) defined, we have the domain established, and whe have the possible members of the domain; the next step is to assign XBRL taxonomy elements to the defined members to indicate which XBRL taxonomy elements are current and which are noncurrent:



1.5. Classes and Subclasses

Classes and subclasses is an approach to define "universals" and express relationships between universals. So a "ball" is a universal. A "football", a "basketball", and a "soccer ball" are subclasses of the class "ball".

And so a "class-subclass" association expresses that some subclass is a part of a class.

Every subclass has the same properties as the class that it is a subclass of. For example, a "football", a "soccer ball", and a "basketball" like the class of which they are all apart, have a color.

This brings up the notion of inheritance which we will explain next.

1.6. Logical Inheritance

Inheritance relates to the types and subtypes of things. Both universals and particulars follow the rules of inheritance. Inheritance is the notion that every subclass has the same properties of a class that the subclass is a member of.

Classes form a hierarchy. You have superclasses and subclasses.

1.7. Logical Composition

Composition relates to the parts and components of things. For example, a chair has legs. A wall is composed of brick and mortar.

1.8. XBRL US Proposal for Traits

XBRL US has made the following proposal for traits (means the same thing as properties), *Proposed Link Roles*[3].

[3] XBRL US, Proposed Link Roles, http://xbrlsite.com/seattlemethod/proposed/NewLinkRoles.pdf