9.1.1 SNOMED CT Languages

SNOMED International is developing a consistent family of computable languages to support a variety of use cases involving SNOMED CT, including querying and defining intensional subsets. The SNOMED CT family of computable languages will include:

- Compositional Grammar – for defining SNOMED CT expressions
- Expression Constraint Language – for constraining a set of possible expressions
- Query Language – for querying over SNOMED CT content
- Template Languages – using the other languages with slots that may be filled at a later time

SNOMED CT compositional grammar, which provides a common foundation for all the SNOMED CT computable languages, was adopted as an international standard in 2010. In 2014, the first version of the SNOMED CT expression constraint language was then published. The SNOMED CT template languages and query language are currently under development and will be made available in the near future.

Both the SNOMED CT Expression Constraint Language and the SNOMED CT Query Language can be used to define queries against SNOMED CT content.

The SNOMED CT Expression Constraint Language is a formal language used to represent SNOMED CT Expression Constraints. A SNOMED CT Expression Constraint is a computable rule that can be used to define a bounded set of clinical meanings represented by either precoordinated or postcoordinated expressions. SNOMED CT Expression Constraints allows a set of clinical meanings to be defined using hierarchical relationships, attribute values, reference set membership, and other features such as cardinality, conjunction, disjunction and exclusion. For example, the following expression constraint represents the set of clinical findings, which have both a finding site of ‘pulmonary valve structure’ (or a subtype of ‘pulmonary valve structure’) and an associated morphology of ‘stenosis’ (or a subtype of ‘stenosis’).

```
<< 404684003 clinical finding:
  363698007 finding site = << 39057004 pulmonary valve structure,
  116676008 associated morphology = << 415582006 stenosis
```

The SNOMED CT Query Language is a formal language used to represent SNOMED CT Queries. This language is based on the same features as the SNOMED CT Expression Constraint Language, with the addition of SNOMED CT specific filters. These filters allow the author of the query to restrict the results based on the version of SNOMED CT being used and the value of SNOMED CT’s release file fields (e.g. definitionStatus, characteristicType, languageCode, term and typeId). Additional keywords are also provided (e.g. preferredTerm, fullySpecifiedName) to simplify the use of common filter combinations. For example, the following SNOMED CT query finds all fully defined diseases which have a preferredTerm (in the GB English language reference set) that contains the substring “heart”.

```
<< 64572001 disease { ( definitionStatus = 900000000000073002 defined,
preferredTerm = "heart", languageRefSet = 900000000000508004 :GB English ) } }
```

B2i’s Snow Owl Terminology Server (see case study) supports the execution of SNOMED CT queries using a precursor to the SNOMED CT Expression Constraint Language (referred to as ‘Extended SNOMED CT Compositional Grammar’ or ‘ESCG’).