<u>Cardinality</u>

We want to indicate on the DRD whether a decision is single or multiple, i.e. has a result which is a singleton or a list. (Similarly it would be useful to indicate whether input data are single or multiple.) If there are a number of multiple elements on a DRD, we want to show the relationships between them, e.g. if multiple decision A requires multiple decision B and multiple decision C, is decision A being made for each B, or each C, or some combination of B & C?

A simple solution would need only two items of notation:

- A marker to show that a decision or input data element has an output which is a list. For compatibility with BPMN we could use three parallel lines
- A marker for an information requirement between two multiple elements, to show that a multiple decision is "keyed" on the required multiple item, i.e. each element in the decision list relates to one of the elements in the required item. I suggest a double-headed arrow.

Figure 1 provides examples of possible scenarios:

- Input data 1 is multiple; Input data 2 is single
- Decision 1 is multiple, and is "keyed" on Input data 1, i.e. each element in Decision 1 results relates to an element of Input data 1
- Decision 2 uses (multiple) Input data 1 and Input data 2 but has a singleton result
- Decision 3 is multiple and keyed on Decision 1, i.e. each element in Decision 3 results relates to an element in Decision 1 results (and therefore also to an element of Input data 1)
- Decision 4 is multiple, even though it has a singleton input
- Decision 5 is single, even though it has a multiple input
- Decision 6 is multiple and keyed on both Decision 3 and Decision 4, i.e. each element in Decision 6 results relates to a combination of an element from Decision 3 results and an element from Decision 4 results
- Decision 7 is multiple but its results do not relate one-to-one with those of Decision 4 or Decision 6.

Notice I say "each element in decision x relates to an element in y", rather than "there is an element in decision x for every element in y", since decision logic is very often about selecting items from a list. For example, if Decision 3 were "Available styles" and Decision 4 were "Available colours", Decision 6 could be "Available hats", which might not be every possible combination of style and colour, but a selected set of combinations (possibly restricted by a set of constraints imposed by Decision 7).
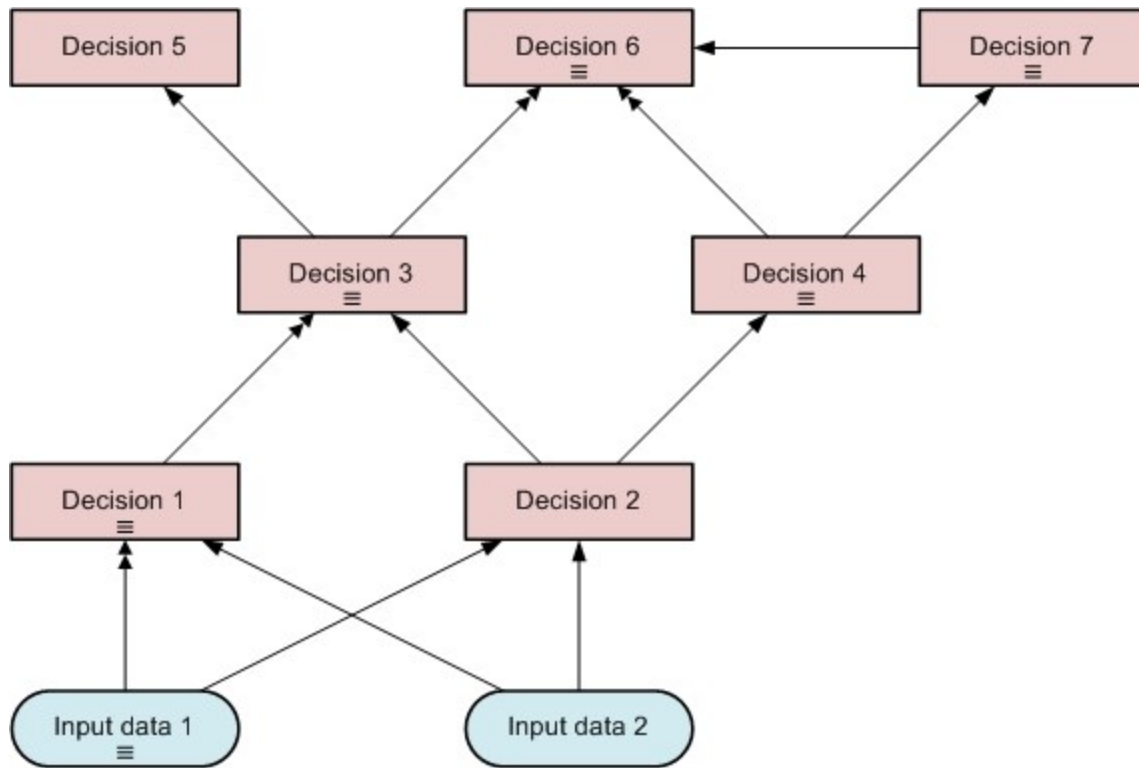
Figure 1: Cardinality on DRD

Proposal:

- Define the use of the "multiple" marker on decisions (6.2.1.1) and input data (6.2.1.3)
- Define the use of the "key" marker on information requirements (6.2.2.1)
- Explain the use of cardinality markers with examples (new section after 6.2.3)
- Add the marker properties to the metamodel for decision (6.3.7), input data (6.3.10) and information requirement (6.3.12)