



Figure A-2. A Partial Taxonomy of Meronymic Relations

D.9 (defrelation member-of (?x ?y))

D.10 (defrelation has-member (?x ?y) := (member-of ?y ?x))

- The relation has-member is defined as the inverse relation of the relation member-of.

D.11 (defrelation activity-within (?x ?y))

D.12 (defrelation contains-activity (?x ?y) := (activity-within ?y ?x))

- The relation contains-activity is defined as the inverse relation of the relation activity-within.

D.13 (defrelation made-of (?x ?y) :=> (material ?y))

D.14 (defrelation makes-up (?x ?y) := (made-of ?y ?x))

- The relation makes-up is defined as the inverse relation of the relation made-of.

D.15 (defrelation stuff-of (?x ?y) :=> (material ?y))

D.16 (defrelation makes-in-part (?x ?y) := (stuff-of ?y ?x))

- The relation makes-in-part is defined as the inverse relation of the relation stuff-of.

D.17 (defrelation portion-of (?x ?y)
(forall (?x ?y ?z) (exists (?z) (and (not (equal ?x ?z)) (portion-of ?z ?y))))))

- If x is a portion of y, then there exists some other material z of which x is composed.

D.18 (defrelation has-portion (?x ?y) := (portion-of ?y ?x))

- The relation has-portion is defined as the inverse relation of the relation portion-of.

D.19 (defrelation component-of (?x ?y))

D.20 (defrelation has-component (?x ?y) := (component-of ?y ?x))

- The relation has-component is defined as the inverse relation of the relation component-of.

D.21 (defrelation place-within (?x ?y))

D.22 (defrelation contains-place (?x ?y) := (place-within ?y ?x))

- The relation contains-place is defined as the inverse relation of the relation place-within.

D.23 (defrelation physical-part-of (?x ?y)

:= (or (component-of ?x ?y) (stuff-of ?x ?y) (portion-of ?x ?y) (place-within ?x ?y)))

- The relations component-of, stuff-of, portion-of, and place-within are all physical-part-of relations and there exists no other physical-part-of relation.

D.24 (defrelation conceptual-part-of (?x ?y)

:= (or (member-of ?x ?y) (feature-of ?x ?y)))

- The relations member-of and feature-of are all conceptual-part-of relations and there exists no other conceptual-part-of relation.

D.25 (defrelation part-of (?x ?y)

:= (or (physical-part-of ?x ?y) (conceptual-part-of ?x ?y)))

- The part-of relations consist of the physical-part-of relations and the conceptual part-of relations.

A.2.3 Relation Characterization

In this subsection, the relations defined in Subsection A.2.2 are characterized. The characterization is organized according to common properties of relations.

A.2.3.1 Mutual Exclusivity

A set of n-ary relations (i.e., relations with n arguments) has the property of mutually exclusivity if, given n objects, either the objects stand in none of the relations or they stand in exactly one relation. The axioms below formally state that all meronymic relations are mutually exclusive.

Ax.10 (forall (?x ?y) (\Rightarrow (component-of ?x ?y)

(and (not (conceptual-part-of ?x ?y)) (not (stuff-of ?x ?y)))