

Funcons-beta: Multisets *

The P_{Plan}CompS Project

Multisets.cbs | PLAIN | PRETTY

Multisets (bags)

[*Type* **multisets**
Funcon **multiset**
Funcon **multiset-elements**
Funcon **multiset-occurrences**
Funcon **multiset-insert**
Funcon **multiset-delete**
Funcon **is-submultiset**]

Meta-variables $GT <: \text{ground-values}$

Built-in Type **multisets**(GT)

multisets(GT) is the type of possibly-empty finite multisets of elements of GT .

Built-in Funcon **multiset**($_ : (GT)^*$) : \Rightarrow **multisets**(GT)

Note that **multiset**(\dots) is not a constructor operation. The order of argument values is ignored, but duplicates are significant, e.g., **multiset**(1,2,2) is equivalent to **multiset**(2,1,2), but not to **multiset**(1,2) or **multiset**(2,1).

Built-in Funcon **multiset-elements**($_ : \text{multisets}(GT)$) : $\Rightarrow (GT)^*$

For each multiset MS , the sequence of values V^* returned by **multiset-elements**(MS) contains each element of MS the same number of times as MS does. The order of the values in V^* is unspecified, and may vary between multisets.

Assert **multiset**(**multiset-elements**(S)) == S

Built-in Funcon **multiset-occurrences**($_ : GT, _ : \text{multisets}(GT)$) : \Rightarrow **natural-numbers**

multiset-occurrences(GV, MS) returns the number of occurrences of GV in MS .

Built-in Funcon **multiset-insert**($_ : GT, _ : \text{natural-numbers}, _ : \text{multisets}(GT)$) : \Rightarrow **multisets**(GT)

*Suggestions for improvement: plancomps@gmail.com.
Reports of issues: <https://github.com/plancomps/CBS-beta/issues>.

multiset-insert(GV, N, MS) returns the multiset that differs from MS by containing N more copies of GV .

Built-in Funcon **multiset-delete**($_ : multisets(GT), _ : GT, _ : natural-numbers$) : $\Rightarrow multisets(GT)$

multiset-delete(MS, GV, N) removes N copies of V from the multiset MS , or all copies of GV if there are fewer than N in MS .

Built-in Funcon **is-submultiset**($_ : multisets(GT), _ : multisets(GT)$) : $\Rightarrow booleans$

is-submultiset(MS_1, MS_2) tests whether every element of MS_1 has equal or fewer occurrences in MS_1 than in MS_2 .