

# Funcons-beta: Graphs

The P<sub>Plan</sub>CompS Project

Funcons-beta/Values/Composite/Graphs/Graphs.cbs\*

## Graphs

```
[ Type directed-graphs
  Funcon is-cyclic
  Funcon topological-sort ]
```

*Meta-variables*  $GT$  <: ground-values

*Type*  $\text{directed-graphs}(GT) \rightsquigarrow \text{maps}(GT, \text{sets}(GT))$

$\text{directed-graphs}(GT)$  models directed graphs with vertices of type  $GT$ , represented as maps from vertices to the set of vertices to which the vertex has an edge. E.g., the graph

(1)--->(2)

would be represented as  $\{1 \mapsto \{2\}, 2 \mapsto \{\}\}$

*Built-in Funcon*  $\text{is-cyclic}(\_ : \text{directed-graphs}(GT)) : \Rightarrow \text{booleans}$

*Built-in Funcon*  $\text{topological-sort}(\_ : \text{directed-graphs}(GT)) : \Rightarrow (GT)^*$

$\text{topological-sort}(DG)$  returns a topological ordering of the vertices of the graph  $DG$ , as a sequence of vertices, provided that  $DG$  is not cyclic.

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\*Suggestions for improvement: [plancomps@gmail.com](mailto:plancomps@gmail.com).  
Issues: <https://github.com/plancomps/CBS-beta/issues>.