Package 'pooh'

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Title Partial Orders and Relations

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Depends R (>= 3.0.2)

Description Finds equivalence classes corresponding to a symmetric relation or undirected graph. Finds total order consistent with partial order or directed graph (so-called topological sort).

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URL http://www.stat.umn.edu/geyer/pooh/

NeedsCompilation yes

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Contents

`tsort` *Topological Sort*

Description

Find One Total Order Consistent with Partial Order or With Directed Acyclic Graph

Usage

```
tsort(from, to, domain, strict = TRUE)
```

Arguments

from	an atomic vector
to	an atomic vector of the same mode and length as from
domain	an atomic vector of the same mode as from containing all the elements of from and to. If missing, union(from, to) is used. The domain of the relation or the nodes of the graph.
strict	logical. If TRUE then from[i] == to[i] is an error. Otherwise, such edges of the graph are ignored.

Details

Pairs (from[i], to[i]) can be though of either as elements of a relation on a set or as edges in a directed graph. This function finds one total order on the domain (nodes of the graph) that is consistent with the relation (graph) if one exists (that is if the graph is directed).

Value

A vector that is a reordering of domain so that every element of from appears in the value before the corresponding element of to.

Throws an error if there is no consistent total order (the graph has a cycle).

Examples

```
from <-   LETTERS[c(1, 1, 1, 1, 2, 2, 6)]
to <- LETTERS[c(2, 3, 4, 5, 3, 5, 7)]
from
to
tsort(from, to)
```

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weak *Equivalence Classes*

Description

Calculates Equivalence Classes

Usage

```
weak(from, to, domain, markers = FALSE)
```

Arguments

from	an atomic vector
to	an atomic vector of the same mode and length as from
domain	an atomic vector of the same mode as from containing all the elements of from and to. If missing, union(from, to) is used. The domain of the relation or the nodes of the graph.
markers	controls the type of result; see Values below.

Details

Pairs `(from[i], to[i])` can be though of either as elements of a symmetric relation on a set or as edges in an undirected graph. This function calculates the equivalence classes of the transitive closure of the relation or the components of the graph. If the edges are thought of as directed, then we calculate the weak components, meaning the components of the associated undirected graph, rather than the so-called strong components of the directed graph.

Value

If `markers = FALSE`, a list, elements of which are the components (equivalence classes). If `markers = TRUE`, an integer vector of the same length as `domain` or as `union(from, to)` if `domain` is missing, elements of which are the same if and only if the corresponding elements of the domain (nodes of the graph) are in the same connected component (equivalence class).

Examples

```
to <- sample(1:100, 75, replace = TRUE)
from <- sample(1:100, 75, replace = TRUE)
out <- weak(from, to)
sapply(out, length)
```

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