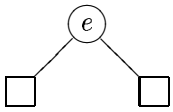
Implementation of a general tree with a binary tree

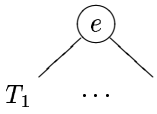
The transformation $\mathcal{T}$ maps a general tree to a binary tree as described in the textbook.

$\mathcal{T}$ (e) =

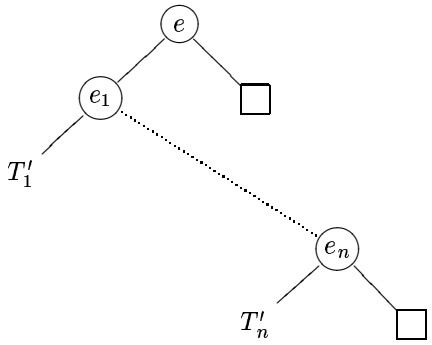


and

$\mathcal{T}$ (

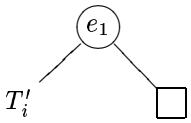


) =



where

$\mathcal{T}(T_i)$ =

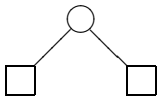


Variables

tree: binary tree
invariant: the binary tree represents the tree according to the above transformation.

Initialization

tree ←



Algorithms

size()
  output: size of tree
return $\frac{\text{size of } tree-1}{2}$

isEmpty()
  output: tree is empty?
return (size of *tree* = 1)

parent(*position*):
  input: position of the tree
  output: parent of *position*
while *position* is right child of some position **do**
    position ← parent of *position*
return parent of *position*

isExternal(*position*):
  input: position of the tree
  output: *position* is a leaf?
return (left child of *position* is a leaf)