

COMPLETE BINARY TREE MIS

Imported Modules

None

Interface

PROCEDURE	btParent(n : INTEGER) : INTEGER
PROCEDURE	btLeftChild(n : INTEGER) : INTEGER
PROCEDURE	btRightChild(n : INTEGER) : INTEGER
PROCEDURE	btGetVal(n : INTEGER) : INTEGER
PROCEDURE	btSetVal(n, i : INTEGER)

Exceptions

out_of_bounds : BOOLEAN

tree_max : BOOLEAN

State Constants

MAXSIZE : INTEGER ($1 \leq \text{MAXSIZE}$)

State Variables

s : list[INTEGER] (initially $\forall x \mid x \in s : x = 0$)

Behavior Rules

btParent

Input	Output	Transition	Exception
n : Integer	$\max((n \text{ DIV } 2), 1)$	---	n > MAXSIZE → out_of_bounds

btLeftChild

Input	Output	Transition	Exception
n : Integer	$2*n$	---	$2*n > \text{MAXSIZE} \rightarrow$ tree_max n > MAXSIZE → out_of_bounds

btRightChild

Input	Output	Transition	Exception
n : Integer	$2*n + 1$	---	$(2*n) + 1 > \text{MAXSIZE}$ → tree_max n > MAXSIZE → out_of_bounds

btGetVal

Input	Output	Transition	Exception
n : Integer	s[n-1]	---	n > MAXSIZE → out_of_bounds

btSetVal

Input	Output	Transition	Exception
n : Integer	---	s[n-1] := i	n > MAXSIZE → out_of_bounds
i : Integer			