

An Event-B Specification of bYConstruction
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CONTEXT bYConstruction

CONSTANTS

NatBool

inl

inr

isNat

a

size

AXIOMS

def13 : $isNat = \{(n \mapsto FALSE \mapsto 0) \mapsto TRUE \mid n \in \mathbb{N}\} \cup \{(0 \mapsto b \mapsto 1) \mapsto FALSE \mid b \in BOOL\}$

def12 : $inr = \{b \mapsto (0 \mapsto b \mapsto 1) \mid b \in BOOL\}$

def10 : $NatBool = \{n \mapsto FALSE \mapsto 0 \mid n \in \mathbb{N}\} \cup \{0 \mapsto b \mapsto 1 \mid b \in BOOL\}$

axm9 : $size \in \mathbb{N}_1$

thm20 : $isNat \in NatBool \rightarrow BOOL$

def1 : $inl = \{n \mapsto (n \mapsto FALSE \mapsto 0) \mid n \in \mathbb{N}\}$

axm11 : $\forall n \cdot n \in \mathbb{N} \Rightarrow inl(n) \mapsto TRUE \in isNat$

axm10 : $\forall f, x, b \cdot f \in NatBool \rightarrow BOOL \wedge x \in NatBool \wedge b \in BOOL \wedge (x \mapsto b \in f) \Rightarrow f(x) = b$

axm8 : $a \in 1..size \rightarrow NatBool$

thm11 : $inl \in \mathbb{N} \mapsto NatBool$

thm2 : $inr \in BOOL \mapsto NatBool$

thm3 : $partition(NatBool, ran(inl), ran(inr))$

thm1 : $\forall n, b \cdot n \in \mathbb{N} \wedge b \in BOOL \Rightarrow inl(n) \neq inr(b)$

thm5 : $\forall n \cdot n \in \mathbb{N} \Rightarrow isNat(inl(n)) = TRUE$

thm6 : $\forall b \cdot b \in BOOL \Rightarrow isNat(inr(b)) = FALSE$

thm14 : $\forall n \cdot n \in \mathbb{N} \Rightarrow inl(n) = n \mapsto FALSE \mapsto 0$

nn

thm15 : $\forall b \cdot b \in BOOL \Rightarrow inr(b) = 0 \mapsto b \mapsto 1$

thm7 : $\forall x \cdot x \in \mathbb{N} \Rightarrow isNat(inl(x)) = TRUE$

thm16 : $\forall b \cdot b \in BOOL \Rightarrow isNat(inr(b)) = FALSE$

thm18 : $\forall x \cdot x \in NatBool \Rightarrow x \in ran(inl) \vee x \in ran(inr)$

END