

# Alphabetic List of Existential Paths

## Standard Dictionary for Path Semantics

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### Binary Operators

$\exists(< k) \iff \text{if } k == 0 \{ \text{id} \} \text{ else } \{ \text{true}_1 \}$   
 $\exists\exists(< k) \iff \text{if } k == 0 \{ \text{true}_1 \} \text{ else } \{ \text{id} \}$   
 $\exists(<= k) \iff \text{true}_1$   
 $\exists(> k) \iff \text{true}_1$   
 $\exists(>= k) \iff \text{if } k == 0 \{ \text{id} \} \text{ else } \{ \text{true}_1 \}$   
 $\exists\exists(>= k) \iff \text{if } k == 0 \{ \text{true}_1 \} \text{ else } \{ \text{id} \}$   
 $\exists(+ k) \iff \exists\text{add}(k) \iff \exists(+ k) \iff (>= k)$   
 $\exists(\cdot k) \iff \exists\text{mul}_{\mathbb{N}}(k) \iff \backslash(x) = (x == 0) \parallel (x \% k) == 0$   
 $\exists(\% k) \iff (< k)$

### A

$\exists\text{add} \iff \text{true}_1$   
 $\exists\text{add}\{[\text{even}] a, [\text{even}] b\} := \backslash(x) = \text{if } x == 0 \{ a \wedge b \} \text{ else } \{ (a == b) == \text{even}(x) \}$   
 $\exists\exists\text{add}\{[\text{even}] \_, [\text{even}] \_ \} \iff \text{true}_1$   
 $\exists\text{add}\{[\text{odd}] a, [\text{odd}] b\} := \backslash(x) = \neg\text{if } x == 0 \{ a \wedge b \} \text{ else } \{ (a == b) == \text{even}(x) \}$   
 $\exists\exists\text{add}\{[\text{odd}] \_, [\text{odd}] \_ \} \iff \text{true}_1$   
 $\exists\text{add}(k) \iff \exists(+ k) \iff (>= k)$   
 $\exists\exists\text{add}(k) \iff \exists\exists(+ k) \iff \text{if } k == 0 \{ \text{id} \} \text{ else } \{ \text{true}_1 \}$   
 $\exists\text{and} \iff \text{true}_1$

### D

$\exists\text{div} \iff (\neg = 0)$   
 $\exists\text{div}(k) \iff (\neg = 0)$

### E

$\exists\text{eq} \iff \text{true}_1$   
 $\exists\text{eq}(k) \iff \exists(= k) \iff \text{true}_1$

## F

$\exists \text{false}_1 \Leftrightarrow \text{not}$

## G

$\exists \text{ge} \Leftrightarrow \text{true}_1$

$\exists \text{ge}(k) \Leftrightarrow \exists (< k) \Leftrightarrow \text{true}_1$

$\exists \text{gt} \Leftrightarrow \text{true}_1$

$\exists \text{gt}(k) \Leftrightarrow \exists (< k) \Leftrightarrow \text{if } k == 0 \{ \text{id} \} \text{ else } \{ \text{true}_1 \}$

## I

$\exists \text{id} \Leftrightarrow \text{true}_1$

## L

$\exists \text{le} \Leftrightarrow \text{true}_1$

$\exists \text{le}(k) \Leftrightarrow \exists (>= k) \Leftrightarrow \text{if } k == 0 \{ \text{id} \} \text{ else } \{ \text{true}_1 \}$

$\exists \text{len} \Leftrightarrow \text{true}_1$

$\exists \text{lt} \Leftrightarrow \text{true}_1$

$\exists \text{lt}(k) \Leftrightarrow \exists (> k) \Leftrightarrow \text{true}_1$

## M

$\exists \text{mul}_{\mathbb{N}} \Leftrightarrow \text{true}_1$

$\exists \text{mul}_{\mathbb{N}}(k) \Leftrightarrow \exists (\cdot k) \Leftrightarrow \backslash(x) = (x == 0) \parallel (x \% k) == 0$

$\exists \exists \text{mul}_{\mathbb{N}}(k) \Leftrightarrow \exists \exists (\cdot k) \Leftrightarrow \text{if } k == 0 \{ \text{true}_1 \} \text{ else if } k == 1 \{ \text{id} \} \text{ else } \{ \text{true}_1 \}$

## N

$\exists \text{neg} \Leftrightarrow \text{true}_1$

$\exists \text{not} \Leftrightarrow \text{true}_1$

## O

$\exists \text{or} \Leftrightarrow \text{true}_1$

## R

$\exists \text{random} \Leftrightarrow \text{probl}$

## S

$\exists \text{sequence}(0, 2) \Leftrightarrow \text{even}$

$\exists \text{sequence}(1, 2) \Leftrightarrow \text{odd}$

$\exists \text{sequence}(a, b) \Leftrightarrow \text{linear}(a, b)$

$\exists \text{sub}_{\mathbb{N}} \Leftrightarrow \text{true}_1$

$\exists \text{sym} \Leftrightarrow \text{true}_1$

## T

$\exists \text{true}_1 \Leftrightarrow \text{id}$

## U

$\exists \text{unit} \Leftrightarrow \text{true}_1$

## X

$\exists \text{xor} \Leftrightarrow \text{true}_1$