

# NAT LIST

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1-a, hd (0 | 1 | nil) .



$x = 0 \quad L = (1 | nil)$

→ hd (0 | (1 | nil)) by (X | L)  
= 0 by (hd 2)

eq hd (nil) = errNat, ... hd 1  
eq hd (X | L) = X, ... hd 2  
eq tl (nil) = nil, ... tl 1  
eq tl (X | L) = L, ... tl 2  
eq [X .. Y] = if  $x > y$  then  $\{nil\}$  else  $\{X | [x+1 .. Y]\}$ , ... it 1  
eq if true then  $\{L\}$  else  $\{L2\} = L$ , ... if 1  
eq if false then  $\{L\}$  else  $\{L2\} = L2$ , ... if 2

1-b, tl (0 | 1 | nil)



$x = 0 \quad L = (1 | nil)$

→ tl (0 | (1 | nil)) by (X | L)  
= (1 | nil) by (tl 2)

1-c, [2 .. 5]

→ if 2 > 5 then  $\{nil\}$  else  $\{2 | [2+1 .. 5]\}$  by (it 1)  
→ if false then  $\{nil\}$  else  $\{2 | [3 .. 5]\}$  by ( $> + (+)$ )  $x = 2, y = 5, L = nil, L2 = 2 | [3 .. 5]$   
→ if 3 > 5 then  $\{nil\}$  else  $\{3 | [3+1 .. 5]\}$  by ( $(+2) + (it 1)$ ) → (2 | [3 .. 5])  
→ if false then  $\{nil\}$  else  $\{3 | [4 .. 5]\}$  by ( $> + (+)$ )  $x = 3, y = 5, L = nil, L2 = 3 | [4 .. 5]$   
→ if 4 > 5 then  $\{nil\}$  else  $\{4 | [4+1 .. 5]\}$  by ( $(+2) + (it 1)$ ) → (2 | (3 | [4 .. 5]))  
→ if false then  $\{nil\}$  else  $\{4 | [5 .. 5]\}$  by ( $> + (+)$ )  $x = 4, y = 5, L = nil, L2 = 4 | [5 .. 5]$   
→ if 5 > 5 then  $\{nil\}$  else  $\{5 | [5+1 .. 5]\}$  by ( $(+2) + (it 1)$ ) → (2 | (3 | (4 | [5 .. 5])))  
→ if false then  $\{nil\}$  else  $\{5 | [6 .. 5]\}$  by ( $> + (+)$ )  $x = 5, y = 5, L = nil, L2 = 5 | [6 .. 5]$   
→ if 6 > 5 then  $\{nil\}$  else  $\{6 | [6+1 .. 5]\}$  by ( $(+2)$ ) → (2 | (3 | (4 | (5 | [6 .. 5]))))  
→ if true then  $\{nil\}$  else  $\{6 | [6+1 .. 5]\}$  by ( $>$ )  $x = 6, y = 5, L = nil, L2 = 6 | [7 .. 5]$   
→ (2 | (3 | (4 | (5 | nil)))) by (it 1)  
= (2 | (3 | (4 | (5 | nil)))) by (it 1)