

line 8 & 9:

~~max 9x2: speed  $\geq 0$   
speed  $\leq 0$  speed  $\leq 0$   
T T N:1~~

~~max-time  $\leq 0$   
distance-position  $\leq 0$   
max-time  $\geq 0$   
N:1 distance-position  $\geq 0$~~

line 12: 1

line 11:

max-time  $\geq 0$   
max-time  $\leq 0$  max-time  $\leq 0$   
T T N:1

line 9:

speed  $\geq 0$   
speed  $\leq 0$  speed  $\geq 0$   
T T T N:1

max(max-time, (distance-position)/speed)  $\geq 0$

"  $\leq 0$   
T T  
"  $\leq 0$   
T T

↓

max-time  $> 0$   $\vee$  (distance-position)/speed  $> 0$   
 $\vee$  max-time  $< 0$   $\wedge$  (distance-position)/speed  $< 0$

↓

max-time  $> 0$   $\vee$  distance-position  $> 0$   $\wedge$  speed  $> 0$   
 $\vee$  distance-position  $< 0$   $\wedge$  speed  $< 0$   
 $\vee$  max-time  $< 0$   $\wedge$  (distance-position  $< 0$   $\wedge$  speed  $> 0$   $\vee$  distance-position  $> 0$   $\wedge$  speed  $< 0$ )

~~max-time  $\leq 0$   
distance-position  $\leq 0$   
distance-position  $\geq 0$  speed  $\geq 0$   
T T~~

~~speed  $\geq 0$   
speed  $\geq 0$   
max-time  $\geq 0$   
T T~~

max-time  $\leq 0$  T  
distance-position  $\leq 0$   
distance-position  $\geq 0$  speed  $\leq 0$   
T speed  $\geq 0$  speed  $\geq 0$  T  
speed  $\leq 0$  T max-time  $\geq 0$   
T max-time  $\geq 0$  T

input<sub>1,2</sub>  $\geq 0$     input<sub>1,2</sub>  $\leq 0$

$$\begin{array}{l}
 \text{max} - \text{time} \leq 0 \\
 \text{distance} - \text{input}_{1,1} \leq 0 \\
 \text{distance} - \text{input}_{1,2} \leq 0 \\
 \text{input}_{1,2} \geq 0 \\
 \text{input}_{1,2} \leq 0 \\
 \text{max} - \text{time} \geq 0
 \end{array}$$
$$\begin{array}{c} 5 \\ i \leq 0 \\ N(i) \setminus (i) \end{array} \quad \begin{array}{c} 5 \\ i \leq 0 \\ N(i) \setminus (i) \end{array} \quad \begin{array}{c} i \leq 0 \\ N(i) \setminus (i) \end{array} \quad \begin{array}{c} i \leq 0 \\ N(i) \setminus (i) \end{array}$$
[illegible]

$$\begin{array}{c} \text{input}_{2.2} \geq 0 \\ \text{input}_{2.2} \leq 0 \end{array} \quad (3)$$

$$\begin{array}{c} \text{input}_{2.2} \geq 0 \\ \text{input}_{2.2} \leq 0 \end{array} \quad (2) \quad \text{with} \quad \text{input}_{2.1} \quad \text{and} \quad \text{input}_{2.2}$$

$$(4)$$

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$$\begin{array}{l} n \leq 0 \\ \text{Ni} \quad (3) \end{array} \quad \begin{array}{l} n \leq 0 \\ \text{Ni} \quad (4) \end{array} \quad \begin{array}{l} i-1 \leq 0 \\ \text{Ni}' \quad (3) \end{array} \quad \begin{array}{l} i-1 \leq 0 \\ \text{Ni}' \quad (4) \end{array}$$

$n \leq 0$

$\text{max\_time} \geq 0$

$\text{max\_time} \leq 0$

$\rightarrow$  widening:

$n \in [0, \infty]$

$\text{distance} - \text{input}[c_{\text{avg}}].1 \geq 0$

$\text{input}[c_{\text{avg}}].2 \leq 0$

$\text{input}[c_{\text{avg}}].2 \geq 0$

$\text{max\_time} \geq 0$

$n \in [0, \infty]$

$\text{distance} - \text{input}[c_{\text{avg}}].1 \geq 0$

$\text{input}[c_{\text{avg}}].2 \leq 0$

$\text{input}[c_{\text{avg}}].2 \geq 0$

$\text{max\_time} \geq 0$

Y17 Recursion - Jang Min - 0-0 (with loop)

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line 5:  $n \leq 0$   $n \in [0, \infty]$

$\perp \setminus N:1$   $N:1$   $\text{distance} - \text{input}[1, \infty] 1 \leq 0$   
 $\text{distance} - \text{input}[1, \infty] 1 \geq 0$   $\text{input}[1, \infty] 2 \leq 0$   
 $\perp \setminus \text{input}[1, \infty] 2 \geq 0$   $\perp \setminus \text{input}[1, \infty] 2 \leq 0$

$n \in [0, \infty]$   $N:1$   $\text{input}[1, \infty] 2 \geq 0$   
 $\perp \setminus \text{input}[1, \infty] 2 \leq 0$   $\text{input}[1, \infty] 2 \geq 0$

line 4:  $\text{input}[0] 2 \leq 0$  *read to do some action before*

$\perp \setminus N:1$

$\text{input}[0] 2 \leq [0, \infty]$

~~distance~~  $\text{input}[0] 1 - \text{input}[1, \infty] 1 \leq 0$   
 $\text{input}[0] 1 - \text{input}[1, \infty] 1 \geq 0$   $\text{input}[1, \infty] 2 \leq 0$   
 $\perp \setminus \text{input}[1, \infty] 2 \geq 0$   $\perp \setminus \text{input}[1, \infty] 2 \leq 0$

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$\forall_{i \in [0, n]} ( \text{input}[0] 2 > i \wedge \text{input}[0] 1 - \text{input}[1, \infty] 1 < 0 \wedge \text{input}[1, \infty] 2 < 0$

$\wedge \text{input}[0] 2 > i \wedge \text{input}[0] 1 - \text{input}[1, \infty] 1 \geq 0 \wedge \text{input}[1, \infty] 2 > 0 )$

$\wedge ( \forall_{i \in [0, n]} ( \text{input}[1, \infty] 2 > 0 \vee \text{input}[1, \infty] 2 < 0 ) )$