

```

1 TASK1(pr: 1) :
2   atomic(prev) {
3     crit(pr: 3) {
4       d := diff(prev, x)
5       prev := prev - 1
6     }
7   convert(prev)
8
9 ISR_IN(pr: 2):
10  crit(pr: 2) {
11    x := read_in()
12    if (d == 0):
13      x := filter(x)
14    else:
15      skip
16  }

```

**States (Left Column):**

- Step 1:  $3 \geq 1, 3 \geq 2$
- Step 4:  $(Id \cup Id \cup Id) \cup (Nid \cup Id \cup Id) \subseteq Nid$
- Step 5:  $(Id \cup Id \cup Id) \subseteq Id$
- Step 16:  $Nid \cup (Nid \cup Id \cup Id) \subseteq Nid$

**Annotations:**

- Step 1: A green checkmark is present.
- Step 4: A green checkmark is present.
- Step 5: A green checkmark is present.
- Step 16: A green checkmark is present.
- Step 16: A blue box highlights the entire state expression.
- Step 16: A blue arrow points from the end of the state expression to the start of the ISR\_IN task code.

$$\Gamma_{\text{IN}} = \{d : i @ \langle \text{Id}, \text{Nid}, \text{Id} \rangle, x : i @ \langle \text{Nid}, \text{Id}, \text{Id} \rangle$$

$$\Gamma_{T1} = \{ d : i @ \langle \text{Nid}, \text{Id}, \text{Id} \rangle, \ prev : i @ \langle \text{Id}, \text{Id}, \text{Id} \rangle \\ x : i @ \langle \text{Id}, \text{Id}, \text{Nid} \rangle \}$$

$$\Gamma_{T1^a} = \{ d : i @ \langle \text{Nid}, \text{Id}, \text{Id} \rangle, prev : i @ \langle \text{Id(Ck)}, \text{Id}, \text{Id} \rangle \\ x : i @ \langle \text{Id(Rd)}, \text{Id}, \text{Nid} \rangle \}$$

line #	pr.	id level	$N$	$N_k$	$S$	$S_k$				
1	1	Id	$\ell_x \quad \ell_d \quad \ell_p$ <table border="1"><tr><td>3</td><td>0</td><td>5</td></tr></table>	3	0	5	$\ell_p$ <table border="1"><tr><td>5</td></tr></table>	5	$\emptyset$	$F_J(pID)$ (crit...; 1)
3	0	5								
5										
2			$\vdots$							
3	$3 \triangleright 1$									
4	$\vdots$				$\vdots$					
5	$\vdots$									
6	1									
7	$2 \triangleright 1$				$\vdots$	$TASK1$				
8	$2 \triangleright 2 \triangleright 1$					$\vdots$				
9			<table border="1"><tr><td>11</td><td>2</td><td>4</td></tr></table>	11	2	4				
11	2	4								
10		$Nid \triangleright Id$			$\vdots$					
11	$\vdots$	$\vdots$	$\vdots$							
12										
13										
-										
3	$3 \triangleright 1$	Id	<table border="1"><tr><td>11</td><td>2</td><td>5</td></tr></table>	11	2	5	<table border="1"><tr><td>5</td></tr></table>	5	$\emptyset$	(crit...; 1)
11	2	5								
5										
4	$\vdots$									
5	$\vdots$									
6	1									
15			$\vdots$							
16										
-										
	$\emptyset$	$\emptyset$	<table border="1"><tr><td>11</td><td>6</td><td>4</td></tr></table>	11	6	4		$\emptyset$	$F_J(pID)$	
11	6	4								
						$\emptyset$				

```

1 TASK1(pr: 1) :
2   atomic(prev) {
3     crit(pr: 3) {
4       d := diff(prev, x)
5       prev := x
6     }
7     convert(prev)
8   }
9 }
```

✓ 3 ≥ 1, 3 ≥ 2  
✓ (Id ⊒ Id ⊒ Id) ⊒  
(Nid ⊒ Id ⊒ Id) ⊑ Nid  
✗ (Nid ⊒ Id ⊒ Id) ⊑ Id(Ck)  
→ ISR\_IN(pr: 2):
✓ 2 ≥ 2, 2 ≥ 1  
✓ Nid ⊑ Nid  
✓ (Nid ⊒ Id ⊒ Id) ⊑ Nid  
✗ (Nid ⊒ Id ⊒ Id) ⊑ Nid

$$\Gamma_{T1} = \{d : i @ \langle Nid, Id, Id \rangle, prev : i @ \langle Id, Id, Id \rangle, x : i @ \langle Id, Id, Nid \rangle\}$$

$$\Gamma_{T1^a} = \{d : i @ \langle Nid, Id, Id \rangle, prev : i @ \langle Id(Ck), Id, Id \rangle, x : i @ \langle Id(Rd), Id, Nid \rangle\}$$

$$\Gamma_{IN} = \{d : i @ \langle Id, Nid, Id \rangle, x : i @ \langle Nid, Id, Id \rangle\}$$

line #	pr.	id level	N	N <sub>k</sub>	S	S <sub>k</sub>
1	1	Id	$\ell_x \quad \ell_d \quad \ell_p$ 3 0 5	$\ell_p$ 5	$\emptyset$	$F_J(pID, jit)$
2				⋮		$\text{crit(pr : 3)\{ ... \}}$
3	3	▷ 1				
4		⋮	3 2 5		⋮	
5		⋮	3 2 3			
6	1					
7	2	▷ 1				
8	2	▷ 2 ▷ 1				
9			11 2 3			
10		Nid ▷ Id	⋮		⋮	
11		⋮	11 2 3		⋮	
12		⋮	11 2 3			
-				5	$\emptyset$	$\text{crit(pr : 3)\{ ... \}}$
3	3	▷ 1	Id	11 2 5		
4		⋮		11 6 5		
5				⋮		
6	1		⋮			
14				11 6 5		
15						
					$\emptyset$	$F_J(pID, jit)$