

```

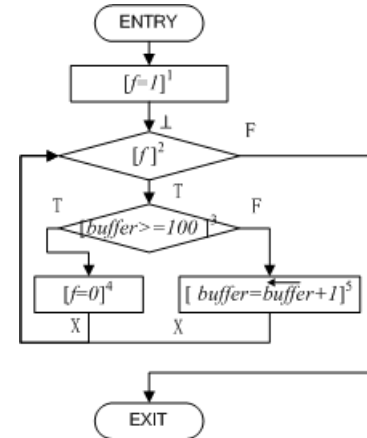
1  int buffer = 0;
2  void main(){
3    cobegin{
4      /* producer */
5      {
6        int f;
7        f = 1;
8        while(f)
9          if(buffer >= 100);
10         f = 0;
11        else
12          buffer = last buffer + 1;
13      }
14     /* consumer */
15     {
16       int f;
17       f = 1;
18       while(f)
19         if(buffer >= 0)
20           buffer = last buffer - 1;
21         else
22           f = 0;
23     }
24   coend
25 }

```

(a) The original source code simple producer and consumer

$T_1$ /* producer */ $[f = 1;]^1$ while( $[f]^2$ ) if( $[buffer \geq 100]^3$ ) $[f = 0;]^4$ else $[buffer = \overleftarrow{buffer} + 1;]^5$	$T_2$ /* consumer */ $[f = 1;]^6$ while( $[f]^7$ ) if( $[buffer > 0]^8$ ) $[buffer = \overleftarrow{buffer} - 1;]^9$ else $[f = 0;]^{10}$
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(b) The labeled abstract code



(c) The flow graph of  $T_1$

$l$	$kill_{LH}$	$gen_{LH}$	$LH_{in}^{(1)}$	$LH_{out}^{(1)}$	$LH_{in}$	$LH_{out}$	$\mathcal{H}_a$	$\mathcal{H}_r$
1, 2, 4	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$
3	$\{buffer\}$	$\emptyset$	$\emptyset$	$\{buffer\}$	$\emptyset$	$\{buffer\}$	$\{buffer\}$	$\{(buffer, T)\}$
5	$\{buffer\}$	$\{buffer\}$	$\{buffer\}$	$\emptyset$	$\{buffer\}$	$\emptyset$	$\emptyset$	$\{(buffer, \perp)\}$

(d) The last holding analysis result and holding information of thread  $T_1$

**Figure 1.** Example: a simple producer and consumer program.