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## SUPPLEMENTARY FILE

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### Algorithm 6: Depth-first Search (DFS) on Reachability Trees

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**Input:** A PN  $N$ ,  $M_0$ ,  $M_d$ , and a NIS  $X$   
**Output:** The existence of LFSs corresponding to  $X$

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1  Function  $DFS(N, M_0, M_d, X)$ 
2     $x = \sum X(i)$ , where  $i \in \mathbf{N}_n^+$ ;
3    Put  $M_0$  on stack  $S$ ,  $M_0.l = 0$ , and  $M_0.t = 0$ , where  $M_0.l$ 
    is the number of layer of  $M_0$ ;
4    while  $S \neq \emptyset$ , then
5      Let the marking at the top of  $S$  be  $M_p$ , where  $M_p$ 
      is a parent marking;
6      if  $M_p.l == x$ , then
7         $M_p$  is removed from  $S$ , continue;
8         $X(k) = X(k) + 1$ , where  $M_p.t = k$ ;
9      else if  $M_p.l \neq x$ , then
10        $i = n$  and  $M_p$  is removed from  $S$ ;
11       while  $i \neq 0$ 
12         if  $M_p[t_i]M_c$  and  $X(i) > 0$  then
13           if  $M_c == M_d$ , then
14             There are LFSs corresponding to  $X$ ,
             and return;
15           else
16              $X(i) = X(i) - 1$ ;
17             Add  $M_c$  to  $S$ ,  $M_c.l = x + 1$ ,  $M_c.t = i$ ;
18           end
19         end
20        $i = i - 1$ ;
21     end
22   end
23   end
24   if  $S == \emptyset$ , then
25     There is no LFS corresponding to  $X$ , and
     return;
26   end
27   return;
28 end

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### Algorithm 7: Breadth-first Search (BFS) on Reachability Trees

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**Input:** A PN  $N$ ,  $M_0$ ,  $M_d$ , and a NIS  $X$   
**Output:** The existence of LFSs corresponding to  $X$

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1  Function  $BFS(N, M_0, M_d, X)$ 
2     $x = \sum X(i)$ , where  $i \in \mathbf{N}_n^+$ ;
3    Put  $M_0$  on queue  $Q$  and  $M_0.l = 0$ , where  $M_0.l$  is the
    number of layer of  $M_0$ ;
4     $i = 1$ ;
5    while  $i \leq \text{length}(Q)$ , where  $\text{length}(Q)$  is the length
    of  $Q$ , then
6      if  $M_p.l == x$ , then
7        There is no LFS corresponding to  $X$ , and
        return;
8      else if  $M_p.l \neq x$ , then
9         $j = 1$ ;
10       while  $j \leq n$ 
11         if  $M_p[t_j]M_c$  and  $X(j) > 0$ , then
12           if  $M_c == M_d$ , then
13             There are LFSs corresponding to  $X$ ,
             and return;
14           else
15              $X(j) = X(j) - 1$ ;
16             Add  $M_c$  to  $Q$ ,  $M_c.l = x + 1$ ;
17           end
18         end
19        $j = j + 1$ ;
20     end
21      $i = i + 1$ ;
22   end
23   if  $i > \text{length}(Q)$ , then
24     There is no LFS corresponding to  $X$ , and
     return;
25   end
26   return;
27 end

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