

**Definition 1** (Execution). *Let  $\pi$  be an error trace of length  $n$ . An execution of  $\pi$  is a sequence of states  $s_0, s_1 \dots s_n$  such that  $s_i, s_{i+1} \models T$ , where  $T$  is the transition formula of  $\pi[i]$ .*

**Definition 2** (Blocked Execution). *An execution of a trace  $\pi$  of size  $n$  is called a blocked execution, if there exists a sequence of states  $s_0, s_1 \dots s_j$  where  $i < j \leq n$  such that  $s_i, s_{i+1} \models T$  where  $T$  is the transition formula of  $\pi[i]$  and there exists an assume statement in the trace  $\pi$  at position  $j$  such that  $s_j \not\models \text{guard}(\pi[j])$*

**Definition 3** (Relevant Statement). *Let  $\pi$  be an error trace of length  $n$ . Let there be an assignment statement at position  $i$  of the form  $x := t$  where  $x$  is a variable and  $t$  is an expression. Let  $P$  and  $Q$  be two predicates such that for all possible executions of the trace  $\pi$  with  $s_i, s_{i+1} \models T$ ,  $s_i \in P$  and  $s_{i+1} \in Q$ . The assignment statement  $\pi[i]$  is relevant if we replace it with a havoc statement of the form  $\text{havoc}(x)$  to get a new trace  $\pi'$  and there exists a blocked execution with  $s'_i, s'_{i+1} \models T'$  such that  $T'$  is the transition formula for  $\text{havoc}(x)$ ,  $s'_i \in P$ ,  $s'_{i+1} \in Q' \setminus Q$  where  $Q \subsetneq Q'$ .*