### SYMBOLS AND ABBREVIATIONS

1. $P'$  
   - Assertion Pre-Condition (Hoare Logic)
2. $Q'$  
   - Assertion Post-Condition (Hoare Logic)
3. $C$  
   - Command to establish the post-condition $Q'$
4. $\varnothing(x)$  
   - Coherent System structure function
5. $x = (x_1, x_2, ..., x_n)$  
   - Set of component states
6. $CMMI$  
   - Capability Maturity Model Integration
7. $IFRA$  
   - Increasing Failure Rate Average Distribution
8. $DFR$  
   - Decreasing Failure Rate
9. $\Lambda$  
   - Failure Rate
10. $\lambda(t)|F(t)$  
    - Failure Intensity Function
11. $P(x)$  
    - Probability of an event
12. $\bar{Q}$  
    - Mean Time Between Failure (MTBF)
13. $\bar{t}$  
    - Mean Time to Failure (MTTF)
14. $h(\tau)|z(t)|z(\Delta t|t_{i-1})$  
    - Hazard Function
15. $R(t)$  
    - Reliability Function
16. $NHPP$  
    - Non Homogeneous Poisson Process
17. $\mu(t)$  
    - Mean Value Function
18. $M(t)$  
    - Total number of failures experienced in time $t$
19. $N$  
    - Initial number of faults in software
20 $d(t)$  Fault Detection Rate per Fault

21 $V = \{v_1, v_2, ..., v_n\}$  Set of Vertices

22 $E = \{e_1, e_2, ..., e_n\}$  Set of Edges

23 $G(V, E)$  Graph of two finite sets; the set $V$ of vertices and set $E$ of edges

24 $e_i$  Edge from $v_j$ to $v_k$

25 $FSM$  Finite State Machine

26 $Q$  A set of finite states

27 $\Sigma$  An alphabet or a finite set of alphabets

28 $\delta: Q \times \Sigma \rightarrow Q$  Transition Function

29 $q_0 \in Q$  Start State

30 $F \subseteq Q$  Set of final or accepting states

31 $PFSM$  Probabilistic Finite State Machine

32 $PFA$  Probabilistic Finite Automata

33 $DFSM$  Deterministic Finite State Machine

34 $DFA$  Deterministic Finite Automata

35 $\bar{p}$  Probability Interval

36 $F(I, N)$  Function that calculates next software state using previous state information $N$ and assembly opcode $I$

37 $V_{ij}$  Weight between node $x_i$ and $x_j$

38 $P(i)$  Distinct collection of nodes through the FSM from the start node to the final node.
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<td>DTMC</td>
<td>Discrete Time Markov Chain</td>
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<tr>
<td>40</td>
<td>r</td>
<td>Probability that debugging generates a new fault</td>
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<tr>
<td>41</td>
<td>p</td>
<td>Probability that a detected fault is removed</td>
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<td>42</td>
<td>i</td>
<td>Failure Count</td>
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<td>43</td>
<td>Φ</td>
<td>Constant of proportionality denoting the failure rate contributed by each fault</td>
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<td>44</td>
<td>CCITT</td>
<td>International Telegraph and Telephone Consultative Committee</td>
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<td>45</td>
<td>CEGAR</td>
<td>Counter-Example Guided Abstraction Refinement</td>
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<td>46</td>
<td>VFSM-Valid</td>
<td>Virtual Finite State Machine</td>
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<tr>
<td>47</td>
<td>VI</td>
<td>Virtual Input</td>
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<tr>
<td>48</td>
<td>SDL</td>
<td>Specification and Description Language</td>
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<tr>
<td>49</td>
<td>LTL</td>
<td>Linear Temporal Logic</td>
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<tr>
<td>50</td>
<td>CTL</td>
<td>Computation Tree Logic</td>
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