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Author(s)	Ferdous, Mohammad Farhan
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# An Investigation of Applications of State Machines

Mohammad Farhan Ferdous (1510215)

School of Information Science,  
Japan Advanced Institute of Science and Technology

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The writing computer programs are exceptionally vital and imperative on the world. It is hard to attempt and imagine our lives without the use of any program. The societal reliability is about the same as that of programming. How many individuals rely upon programming must augmentation later on. In this way, we require tried and true developments to make programming truly strong. So we have conducted some protocol model checking of the report.

State machines are addressed using state graphs. The yield of a state machine is a segment of the information and the present state. State machines expect an important part in locales, for instance, electrical engineering, phonetics, programming engineering, biology, science, arithmetic, and rationale. They are best used as a piece of the showing of use lead, programming building, plan of equipment computerized frameworks, organize conventions, compilers, and the investigation of calculation and dialects.

The state machine comprises of an arrangement of states, some of which are introductory states and a double connection over states. Components of paired connection are called (state) changes. State machines can be utilized to formalized different sort of frameworks, for example, common avoidance protocols, correspondence protocols, and validation protocols.

The state machines mathematical expression as follows:

A state machine  $M$  is  $\langle S, I, T \rangle$ , where  $S$  is a set of states,  $I \subseteq S$  is the set of initial states, and here  $T \subseteq S \times S$  is a binary relation over  $S$ .  $(s, s') \in T$  is called a state transition of state machine  $M$  and defined as  $s \rightarrow s'$ . Where  $s'$  called a successor state of  $s$ . The set  $R$  of reachable states : (1)  $I \subseteq R$  and (2) if  $s \in R$  and  $s \rightarrow s'$ , then  $s' \in R$ . A state machine predicate  $p$  is invariant then we can write  $M$  iff  $(\forall s \in R) p(s)$ . A state predicate  $p$  can be interpreted as a set  $P$  of states where we can write  $(\forall s \in P) p(s)$  and  $(\forall s \notin P) \neg p(s)$ .

We have utilized Maude programming which is a revamping rationale based coding languages outfitted with display checking offices. We additionally direct SMGA which is a state machine graphical movement instrument. We have utilized as the concrete case of various kinds of mutual exclusion protocol version, for example, Ticket, Anderson, and Qlock wrong protocols, right and Non-deterministic form individually. SMGA is a graphical activity instrument which utilized for drawing such a common rejection convention in each state and it is the better understanding for counterexamples found by Maude.

The goal of the research project inquire about is to learn state machines, how to mathematical formalize as the state machine, how to formalize frameworks as state machines, how to portray state machines in a formal particular dialect, for example, Maude, and how to show watch that state machine appreciates properties in view of such formal detail. Instructions to create graphical movements of the state machines utilized as a part of the contextual investigations with SMGA by reconstructing the graphical animation.

There are numerous conceivable approaches to portray state machines in numerous formal particular dialects. One conceivable way formal detail dialect is Maude, an immediate successor of OBJ3, the most celebrated arithmetical determination dialect. Maude has been utilized to depict numerous state machines formalizing different sorts of frameworks and model watch that such state machines appreciate wanted properties formalized as invariants in light of such formal detail in Maude.

It merits learning machines, how to formalize frameworks as state machines, how to portray state machines in Maude and how to demonstrate watch that state machines, how to depict state machines in Maude and how to show watch that state machines wanted in invariant properties in light of such formal particulars with Maude. Some shared prohibition conventions, for example, the Flawed rendition of Ticket convention, the correct variant of Ticket, Non-deterministic adaptation of Ticket protocol, the Flawed form of Anderson protocol, the correct version of Anderson, Non-deterministic rendition of Anderson protocol,

There are utilized some mutual exclusion protocol such as QLOCK0, the version of QLOCK1, the correct form of QLOCK, Non-deterministic rendition of QLOCK protocol, used as solid examples to lead the undertaking.

A tool called SMGA for graphical animation of state machines has been created. We have utilized as a part of the diverse contextual analyses, for example, FTicket, Ticket, FAnderson, Anderson, FQLOCK0, FQLOCK1, QLOCK with SMGA by reconstructing the graphical animation.