Finite State Machines

Tutorial

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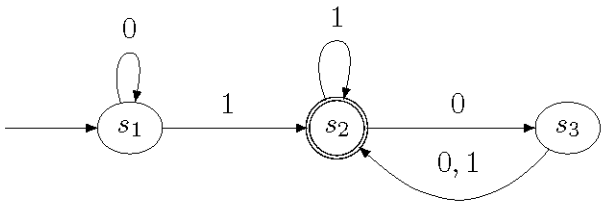
Finite state machines (FSMs) are simple computational constructs that have no read/write memory allowing the creation of simple devices. It is capable of accepting or rejecting certain inputs to complete a simple computation.

In this tutorial, you will solve fundamental FSM related problems and explore concepts such as transition diagrams/tables, as well as properties of regular languages associated with FSMs.

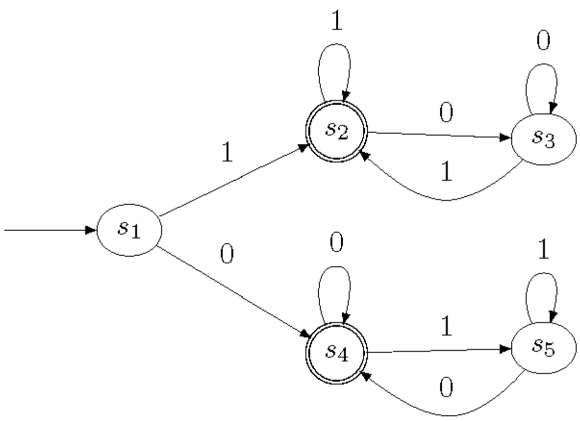
Problem 1



For the given FSM above

a) List the set of all possible states.
b) Write the transition table.
c) Show that it accepts the strings $w = 10100$ and $u = 0001$.
d) What type of strings does this machine accept?

Problem 2



For the given FSM above

a) List the set of all possible states.
b) Write the transition table.
c) Show that it accepts the strings $w = 101$ and $u = 00$.
d) What type of strings does this machine accept?

Problem 3

Design and define the following FSMs using either a transition table or state diagram

a) An FSM M_1 that only accepts set of strings containing even zeros
b) An FSM M_2 that only accepts set of strings containing odd ones
c) An FSM M_3 whose language is the union of the languages of the two machines. In other words, if the language accepted by M_1 is A and language accepted by M_2 is B then construct M_3 such that $A \cup B$, where the alphabet for M_3 is also the same as alphabet for M_1 and M_2.