# Finite State Machines

This is a Finite State Machine:

Diagram

Description automatically generated

Complete the following questions based on the Finite State Machine shown above:

1. Complete the State Transition Table below (fill in all of the missing gaps):

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Current State | S1 | S1 | S2 | S2 | S3 | S3 | S4 | S4 | S5 | S5 |
| Input Symbol | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| Next State | S2 | S3 | S2 | S4 | S3 | S3 | S4 | S5 | S5 | S4 |

1. The state S4 is a special state. What does the double circle shown in the diagram signify?

Accepted State

1. Are the following strings valid according to the FSM diagram. Write Yes/No on all the following strings, if yes then write the output otherwise just write No:

|  |  |
| --- | --- |
| Input String | Accepted? Output? |
| 101 | NO |
| 000 | NO |
| 001 | YES |
| 010001101 | NO |
| 0100011011 | YES |

1. What kind of strings does this this finite state machine allow?

Strings that start with a 0.

Followed by any sequence containing an odd number of 1s and zero or more 0s.

EXTENSION: What’s the main limitation of Finite State Machines? What can’t we represent with Finite State Machines? Feel free to Research and Google as much as you can.