

Consider the finite state machine (I, O, S, f, g, σ) given as defined below.

$$I = \{00, 01, 02, 10, 11, 12, 20, 21, 22\}$$

$$O = \{0, 1, 2\}$$

$$S = \{0, 1\}$$

$$\sigma = 0$$

$f: S \times I \rightarrow S$ is given by:

$S \setminus I$	00	01	02	10	11	12	20	21	22
0	0	0	0	0	0	1	0	1	1
1	0	0	1	0	1	1	1	1	1

$g: S \times I \rightarrow O$ is given by:

$S \setminus I$	00	01	02	10	11	12	20	21	22
0	0	1	2	1	2	0	2	0	1
1	1	2	0	2	0	1	0	1	2

1) Given the following inputs, find the corresponding output (4 points). At the same time illustrate this on a state diagram (4 points). Just one state diagram with only the parts relevant to this problem please.

Input "11"

Input "12"

Input "22"

Input "00"

2) Describe in simple English what this finite state machine does or models. You may answer either in general, or specifically with regards to the four inputs above.