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

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

\[ O = \{0, 1, 2\} \]

\[ S = \{0, 1\} \]

\[ \sigma = 0 \]

\[ f : S \times I \to S \]

\[ g : S \times I \to O \]

\[ f : S \times I \to S \]

\[ g : S \times I \to O \]

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.