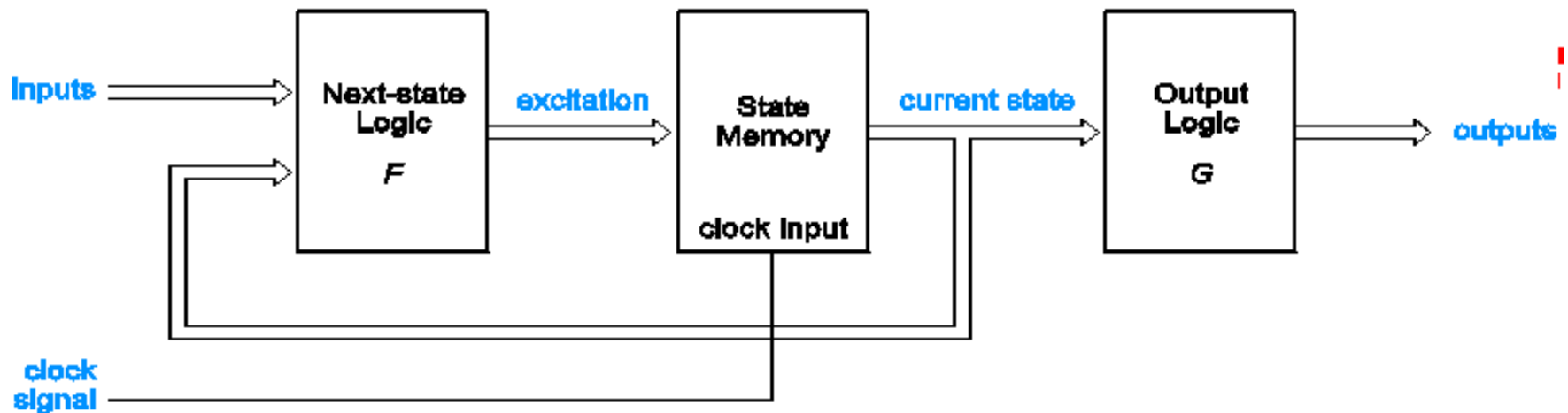


State Machine Structure

- State memory – a set of n flip-flops.
- Next-state logic – combinational logic circuit which determines the next state.
 - Next-state = $F(\text{current state}, \text{input})$
- Output logic – combinational logic circuit which determines the output.
- There are two models for the output logic:
 - Mealy Model.
 - Moore Model.

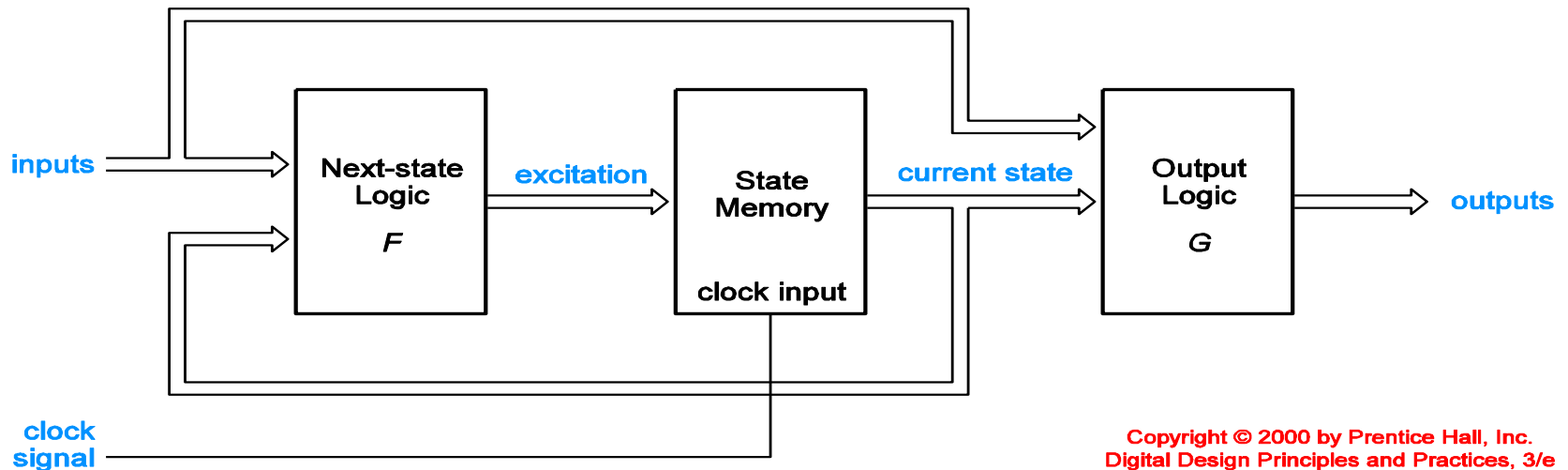
Moore Model

- The output is based on current state only.
 - $\text{Output} = G(\text{current state})$
- In high speed circuits the output circuit may be absent and the output is generated directly from the flip-flop's outputs. This is called *output coded state assignment*.



Mealy Model

- The output is based on both current state and input.
 - $\text{Output} = G(\text{current state}, \text{input})$



State Machine designs

- State table are used for a relation between the input and output of the sequential circuit. The input of the flip flop used as state to sequence circuit are also called as state variable .
- 'X' representation external input and 'Y' are output of sequential circuit

Fig. 39. shows the general state table

Present States		Next States				Output Y	
		X = 0		X = 1		X = 0	X = 1
Q ₀	Q ₁	Q ₀	Q ₁	Q ₀	Q ₁	Y ₀	Y ₁
0	0	0	0	1	1	0	0
0	1	1	0	1	0	0	1
1	0	1	1	0	1	1	0
1	1	0	1	0	0	1	1

State diagram

- When a state table is represented graphically. It is called as state diagram
- 'X' representation external input and 'Y' are output of sequential circuit

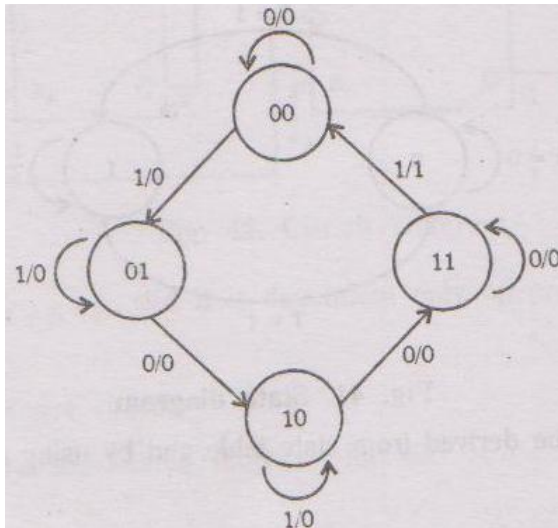


Fig. 39. shows the general state table

Present States		Next States				Output Y	
		X = 0		X = 1		X = 0	X = 1
Q_0	Q_1	Q_0	Q_1	Q_0	Q_1	Y_0	Y_1
0	0	0	0	1	1	0	0
0	1	1	0	1	0	0	1
1	0	1	1	0	1	1	0
1	1	0	1	0	0	1	1

Example

- From the given circuit of state diagram. Draw state reduction diagram .

