ENGR/ECE 212
5 March, 2003

Combinational circuit

Output is a strict function of current input

Sequential circuit

Output depends on current and past input

$I_0, I_1, \ldots I_{n-1} \rightarrow O$

State captures information about the past

S, I → S, O

Simple state machine

Output 1 after two successive 1's

Output 0 after two successive 0's

input 0001001100111000

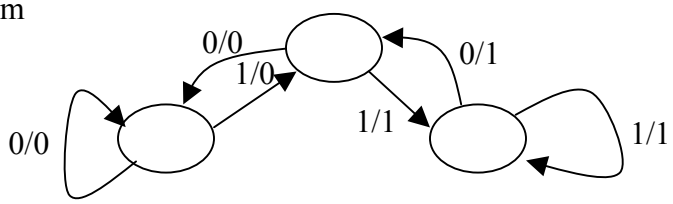
output 0000000110011100

As a C Program

```
OutputBit = 0 ;
LastBit = 0 ;
while (1)
{
      NewBit = ReadFromInput() ;
      if (LastBit == NewBit)
            OutputBit = NewBit ;
      LastBit = NewBit ;
      WriteToOutput(OutputBit)

}
```

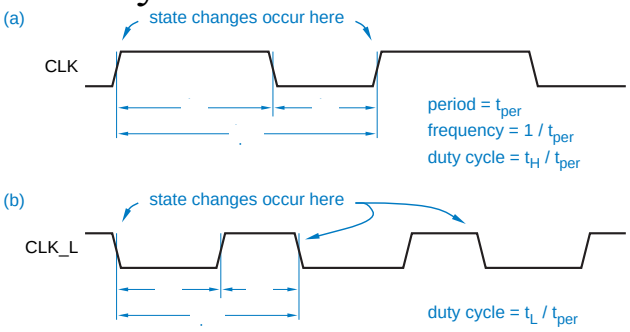
As a State diagram



As a State Table

present		next	
state	input	state	output
A	0	A	0
A	1	B	0
B	0	A	0
B	1	C	1
C	0	B	1
C	1	C	1

Clocks – needed in synchronous circuits for state changes



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What do these do?

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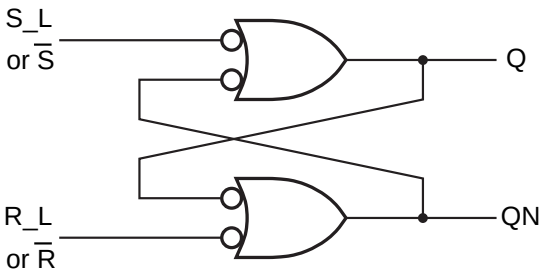

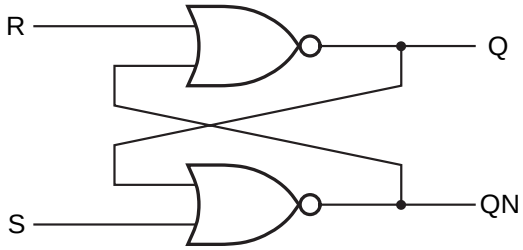

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