When designing a circuit diagram,

Example 1:
Design the following state diagram with two JK flip-flops.
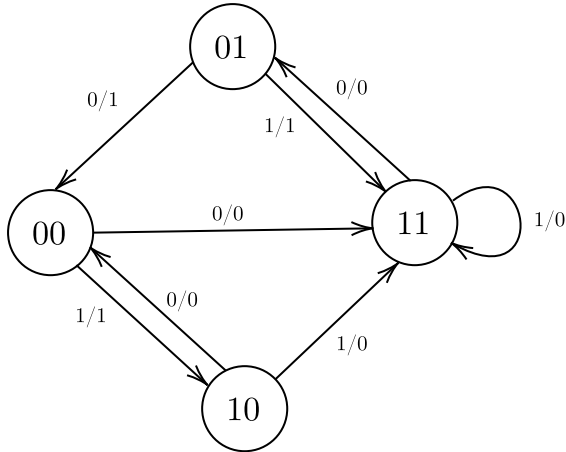
Input	Present State		Next State		Output
X	A	B	A	B	Y
0	0	0	1	1	0
0	0	1	0	0	1
0	1	0	0	0	0
0	1	1	0	1	0
1	0	0	1	0	1
1	0	1	1	1	1
1	1	0	1	1	0
1	1	1	1	1	0

Excitation Table

$Q(t)$	$Q(t+1)$	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

Input	Present State		Next State		Flip Flop Input				Output
X	A	B	A	B	JA	KA	JB	KB	Y
0	0	0	1	1	1	X	1	X	0
0	0	1	0	0	0	X	X	1	1
0	1	0	0	0	X	1	0	X	0
0	1	1	0	1	X	1	X	0	0
1	0	0	1	0	1	X	0	X	1
1	0	1	1	1	1	X	X	0	1
1	1	0	1	1	X	0	X	1	0
1	1	1	1	1	X	0	X	0	0

For each state A and B, we use the excitation table for JK flip-flop to know which inputs to feed to each flip-flop to represent going from one state to the next.

From this, we can also generate a boolean equation for each input as well as the output.

$$JA = \overline{B}$$
$$JB = \overline{A}\,\overline{X}$$
$$KA = \overline{X}$$
$$KB = \overline{A}\,\overline{X} + ABX$$
$$Y = \overline{A}X + \overline{A}B$$