Assignment: Designing a sequential circuit using JK Flip-Flops from the given state diagram.

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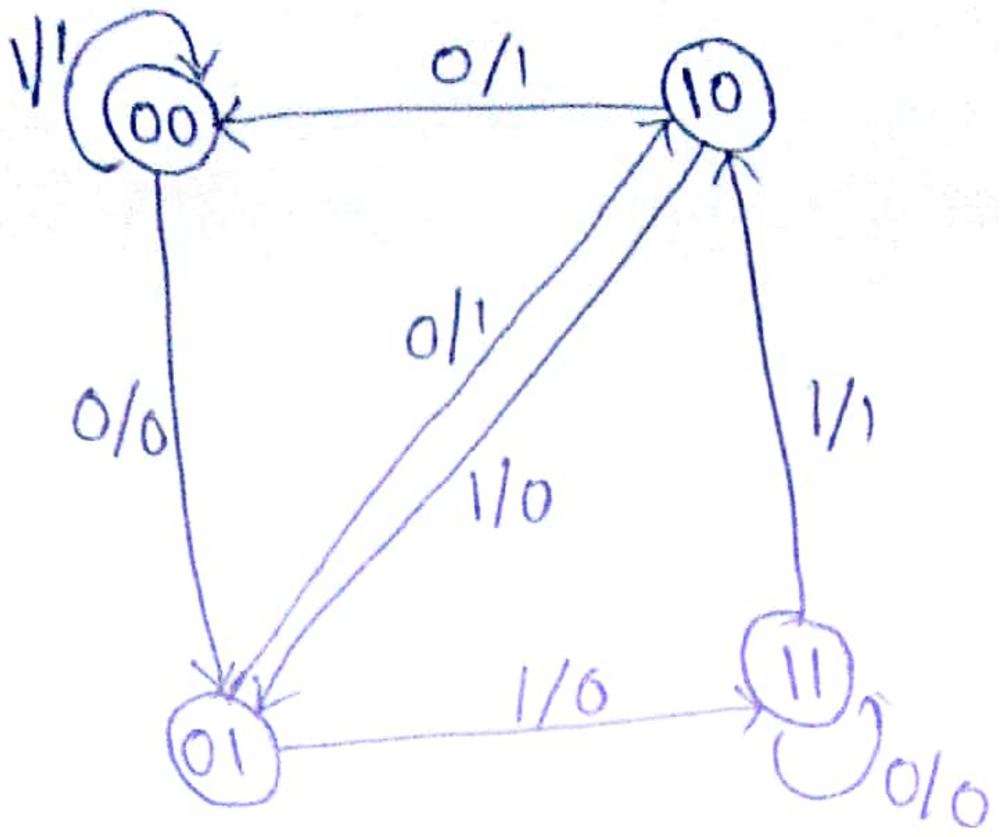
State Diagram:



State Table:

Present State		Input	Next State		Output	Input of JK FF			
Q_2	Q_1	x	Q_2^+	Q_1^+	y	J_2	K_2	J_1	K_1
0	0	0	0	1	0	0	X	1	X
0	0	1	0	0	1	0	X	0	X
0	1	0	1	0	1	1	X	X	1
0	1	1	1	1	0	1	X	X	0
1	0	0	0	0	1	X	1	0	X
1	0	1	0	1	0	X	1	1	X
1	1	0	1	1	0	X	0	X	0
1	1	1	1	0	1	X	0	X	1

K-map from state table.

J_2

Q_2 \ Q_1x	00	01	11	10
0	0	0	1	1
1	x	x	x	x

$J_2 = Q_1$

J_1

Q_2 \ Q_1x	00	01	11	10
0	1	0	x	x
1	0	1	x	x

$J_1 = \bar{Q}_2\bar{x} + Q_2x = \overline{Q_2 \oplus x}$

K_2

Q_2 \ Q_1x	00	01	11	10
0	x	x	x	x
1	1	1	0	0

$K_2 = \bar{Q}_1$

K_1

Q_2 \ Q_1x	00	01	11	10
0	x	x	0	1
1	x	x	1	0

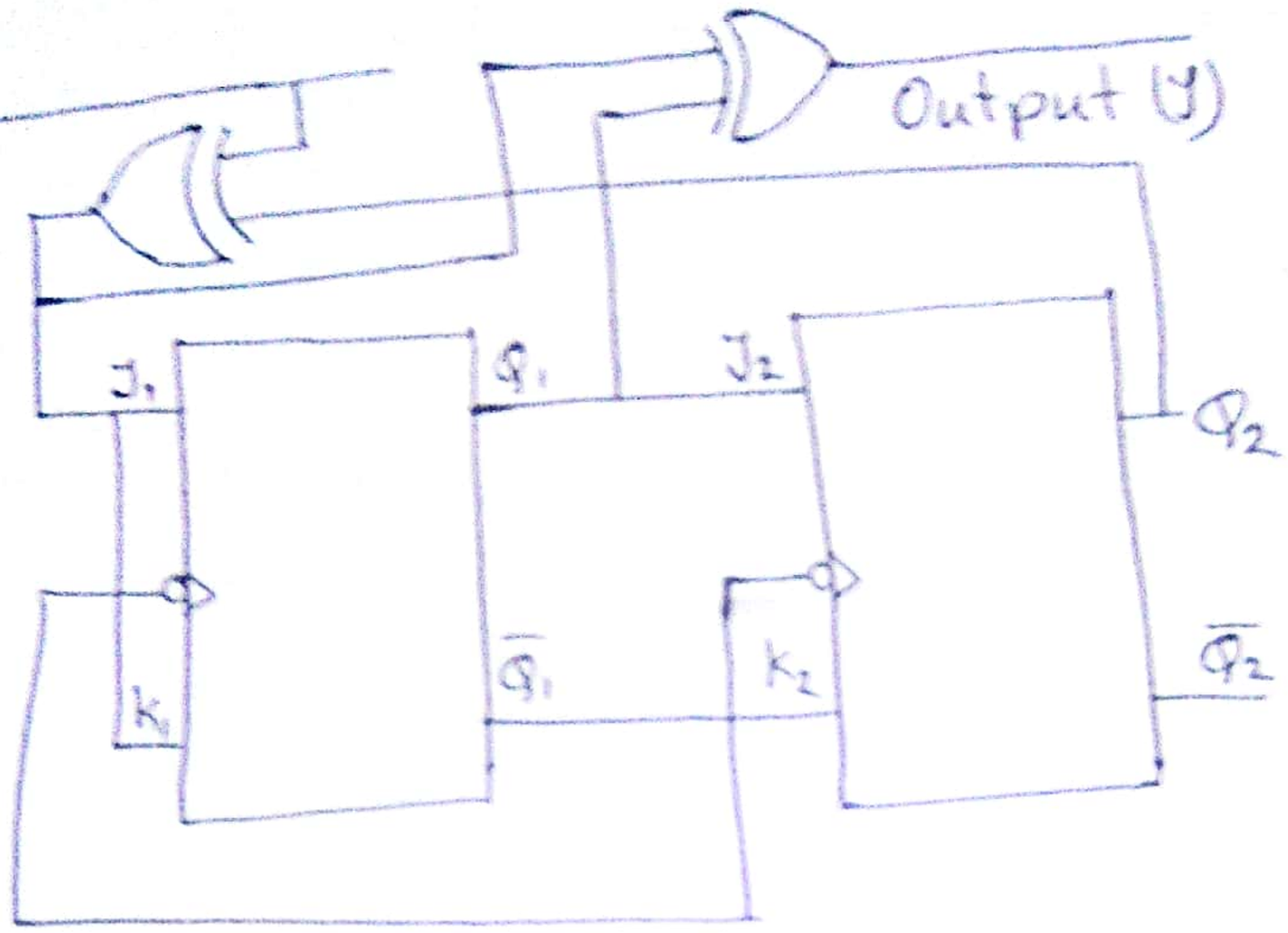
$K_1 = \bar{Q}_2\bar{x} + Q_2x = \overline{Q_2 \oplus x}$

y

Q_2 \ Q_1x	00	01	11	10
0	0	1	0	1
1	1	0	1	0

$$y = \bar{Q}_2\bar{Q}_1x + \bar{Q}_2Q_1\bar{x} + Q_2\bar{Q}_1\bar{x} + Q_2Q_1x,$$
$$= \bar{Q}_2(Q_1 \oplus x) + Q_2(\overline{Q_1 \oplus x})$$
$$= Q_2 \oplus Q_1 \oplus x$$

Circuit:



This circuit will output the given state diagram.