# JK Flip Flop to SR Flip Flop

**Step-1:**

Available FF = JK

Required FF = SR

**Step-2:**

Characteristic Table for SR FF

| $Q_n$ | S | R | $Q_{n+1}$ | J | K |
|-------|---|---|-----------|---|---|
| 0 | 0 | 0 | 0 | 0 | X |
| 0 | 0 | 1 | 0 | 0 | X |
| 0 | 1 | 0 | 1 | 1 | X |
| 0 | 1 | 1 | X | X | X |
| 1 | 0 | 0 | 1 | X | 0 |
| 1 | 0 | 1 | 0 | X | 1 |
| 1 | 1 | 0 | 1 | X | 0 |
| 1 | 1 | 1 | X | X | X |

**Step – 4**

K-map for J

| 00 | 01 | 11 | 10 |
|----|----|----|----|
| 0 | 0 | X | 1 |
| X | X | X | X |

This yields => J = S

K-map for K

| 00 | 01 | 11 | 10 |
|----|----|----|----|
| X | X | X | X |
| 0 | 1 | X | 0 |

This yields => K = R

**Step – 3**

Excitation Table for JK Flip Flop

| $Q_n$ | $Q_{n+1}$ | J | K |
|-------|-----------|---|---|
| 0 | 0 | 0 | X |
| 0 | 1 | 1 | X |
| 1 | 0 | X | 1 |
| 1 | 1 | X | 0 |

You will face a difficulty in the rows I've highlighted. I'm giving a hint to solve this situation.

Hint: - We have following situation

| $Q_n$ | $Q_{n+1}$ |
|-------|-----------|
| 0 | X |

So $Q_{n+1}$ can take any value, either 0 or 1.

For $Q_n$ = 0 and $Q_{n+1}$ = 0 => J = 0 and K = X

For $Q_n$ = 0 and $Q_{n+1}$ = 1 => J = 1 and K = X

See that J is same as $Q_{n+1}$.

Now use your brain to figure out the solution. Do the same for the other highlighted case.

**Step – 5**

Make the circuit yourself from the Boolean expression.