

|   | Estado actual |    |    | Estado siguiente |    |    | Entradas a os |    |    |    |    |    |
|---|---------------|----|----|------------------|----|----|---------------|----|----|----|----|----|
|   | Q2            | Q1 | Q0 | Q2               | Q1 | Q0 | J2            | K2 | J1 | K1 | J0 | K0 |
| 2 | 0             | 0  | 0  | X                | X  | X  | X             | X  | X  | X  | X  | X  |
| 3 | 0             | 0  | 1  | X                | X  | X  | X             | X  | X  | X  | X  | X  |
| 4 | 0             | 1  | 0  | 0                | 1  | 1  | 0             | X  | X  | 0  | 1  | X  |
| 5 | 1             | 0  | 1  | 1                | 0  | 0  | 1             | X  | 0  | X  | 1  | X  |
| 6 | 1             | 0  | 0  | 1                | 1  | 1  | X             | X  | 0  | X  | 1  | X  |
| 7 | 1             | 1  | 0  | 1                | 1  | 0  | X             | X  | 1  | X  | 0  | X  |
| 8 | 1             | 1  | 1  | X                | X  | X  | X             | X  | X  | X  | X  | X  |

tabla exacta de J-K

| Q <sub>t</sub> | Q <sub>t+1</sub> | J | K |
|----------------|------------------|---|---|
| 0              | 0                | 0 | X |
| 0              | 1                | 1 | X |
| 1              | 0                | X | 1 |
| 1              | 1                | X | 0 |

\*J<sub>2</sub>

|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| Q <sub>1</sub> Q <sub>0</sub> | 00 | 01 | 11 | 10 |
| Q <sub>2</sub> 0              | X  | X  | 1  |    |
| Q <sub>2</sub> 1              | X  | X  | X  | X  |

J<sub>2</sub> = Q<sub>0</sub>

\*K<sub>2</sub>

|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| Q <sub>1</sub> Q <sub>0</sub> | 00 | 01 | 11 | 10 |
| Q <sub>2</sub> 0              | X  | X  | X  | X  |
| Q <sub>2</sub> 1              |    |    | X  | 1  |

K<sub>2</sub> = Q<sub>1</sub>

\*J<sub>1</sub>

|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| Q <sub>1</sub> Q <sub>0</sub> | 00 | 01 | 11 | 10 |
| Q <sub>2</sub> 0              | X  | X  | X  | X  |
| Q <sub>2</sub> 1              |    | 1  | X  | X  |

J<sub>1</sub> = Q<sub>0</sub>

\*K<sub>1</sub>

|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| Q <sub>1</sub> Q <sub>0</sub> | 00 | 01 | 11 | 10 |
| Q <sub>2</sub> 0              | X  | X  | 1  | 0  |
| Q <sub>2</sub> 1              | X  | X  | X  | 0  |

K<sub>1</sub> = Q<sub>0</sub>

\*J<sub>0</sub>

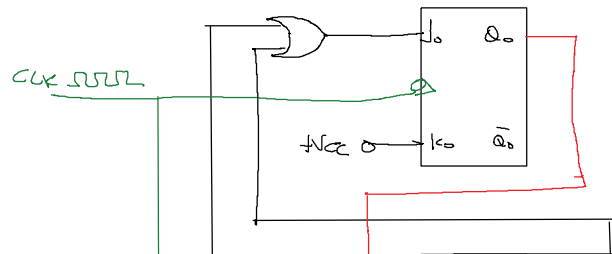
|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| Q <sub>1</sub> Q <sub>0</sub> | 00 | 01 | 11 | 10 |
| Q <sub>2</sub> 0              | X  | X  | X  | 1  |
| Q <sub>2</sub> 1              | 1  | X  | X  | 0  |

J<sub>0</sub> = Q<sub>1</sub> + Q<sub>2</sub>

\*K<sub>0</sub>

|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| Q <sub>1</sub> Q <sub>0</sub> | 00 | 01 | 11 | 10 |
| Q <sub>2</sub> 0              | X  | X  | X  | X  |
| Q <sub>2</sub> 1              | X  | 1  | 1  | X  |

K<sub>0</sub> = 1

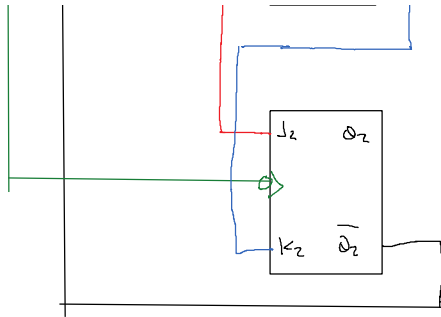


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**EJERCICIO**

Diseñar un contador para la secuencia 1,3,5,7,9,1,3,5,... (síncrono)

Bits: 46.

|   | Estado actual  |                |                |                | Estado siguiente |                |                |                | Entrada a los Bistables. |                |                |                |                |                |                |                |
|---|----------------|----------------|----------------|----------------|------------------|----------------|----------------|----------------|--------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|   | Q <sub>3</sub> | Q <sub>2</sub> | Q <sub>1</sub> | Q <sub>0</sub> | Q <sub>3</sub>   | Q <sub>2</sub> | Q <sub>1</sub> | Q <sub>0</sub> | J <sub>3</sub>           | K <sub>3</sub> | J <sub>2</sub> | K <sub>2</sub> | J <sub>1</sub> | K <sub>1</sub> | J <sub>0</sub> | K <sub>0</sub> |
| 1 | 0              | 0              | 0              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 0              | 0              | 0              | 1              | x                | 0              | 1              | 1              | 0                        | x              | 0              | x              | 1              | x              | x              | 0              |
| 3 | 0              | 0              | 1              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 0              | 0              | 1              | 1              | 0                | 1              | 0              | 1              | 0                        | x              | 1              | x              | x              | 1              | x              | 0              |
| 5 | 0              | 1              | 0              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 0              | 1              | 0              | 1              | 0                | 1              | 1              | 1              | 0                        | x              | 0              | x              | 1              | x              | x              | 0              |
| 7 | 0              | 1              | 1              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 0              | 1              | 1              | 1              | 1                | 0              | 0              | 1              | 1                        | x              | 1              | x              | x              | 1              | x              | 0              |
| 9 | 1              | 0              | 0              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 1              | 0              | 0              | 1              | 0                | 0              | 0              | 1              | x                        | 1              | 0              | x              | 0              | x              | x              | 0              |
|   | 1              | 0              | 1              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 1              | 0              | 1              | 1              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 1              | 1              | 0              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 1              | 1              | 0              | 1              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |
|   | 1              | 1              | 1              | 0              | x                | x              | x              | x              | x                        | x              | x              | x              | x              | x              | x              | x              |

tabla exacta de J-K

| Q <sub>t</sub> | Q <sub>t+1</sub> | set | Reset |
|----------------|------------------|-----|-------|
|                |                  | J   | K     |
| 0              | 0                | 0   | x     |
| 0              | 1                | 1   | x     |
| 1              | 0                | x   | 1     |
| 1              | 1                | x   | 0     |



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|           |  |    |    |    |    |
|-----------|--|----|----|----|----|
| $Q_3 Q_2$ |  | 00 | 01 | 11 | 10 |
| 00        |  |    |    |    |    |
| 01        |  |    |    |    |    |
| 11        |  |    |    |    |    |
| 10        |  |    |    |    |    |

$$J_3 = Q_2 + Q_1$$

|           |  |    |    |    |    |
|-----------|--|----|----|----|----|
| $Q_3 Q_2$ |  | 00 | 01 | 11 | 10 |
| 00        |  |    |    |    |    |
| 01        |  |    |    |    |    |
| 11        |  |    |    |    |    |
| 10        |  |    |    |    |    |

$$K_3 = 1$$

|           |  |    |    |    |    |
|-----------|--|----|----|----|----|
| $Q_3 Q_2$ |  | 00 | 01 | 11 | 10 |
| 00        |  | x  | 0  | 1  | x  |
| 01        |  | x  | x  | x  | x  |
| 11        |  | x  | x  | x  | x  |
| 10        |  | x  | 0  | x  | x  |

$$J_2 = Q_1$$

|           |  |    |    |    |    |
|-----------|--|----|----|----|----|
| $Q_3 Q_2$ |  | 00 | 01 | 11 | 10 |
| 00        |  | x  | x  | x  | x  |
| 01        |  | x  | 0  | 1  | x  |
| 11        |  | x  | x  | x  | x  |
| 10        |  | x  | x  | x  | x  |

$$K_2 = Q_1$$

|           |  |    |    |    |    |
|-----------|--|----|----|----|----|
| $Q_3 Q_2$ |  | 00 | 01 | 11 | 10 |
| 00        |  | x  | 1  | x  | x  |
| 01        |  | x  | 1  | x  | x  |
| 11        |  | x  | x  | x  | x  |
| 10        |  | x  | 0  | x  | x  |

$$J_1 = \overline{Q_3}$$

|           |  |    |    |    |    |
|-----------|--|----|----|----|----|
| $Q_3 Q_2$ |  | 00 | 01 | 11 | 10 |
| 00        |  |    |    |    |    |
| 01        |  |    |    |    |    |
| 11        |  |    |    |    |    |
| 10        |  |    |    |    |    |

$$K_1 = 1$$

+Vcc

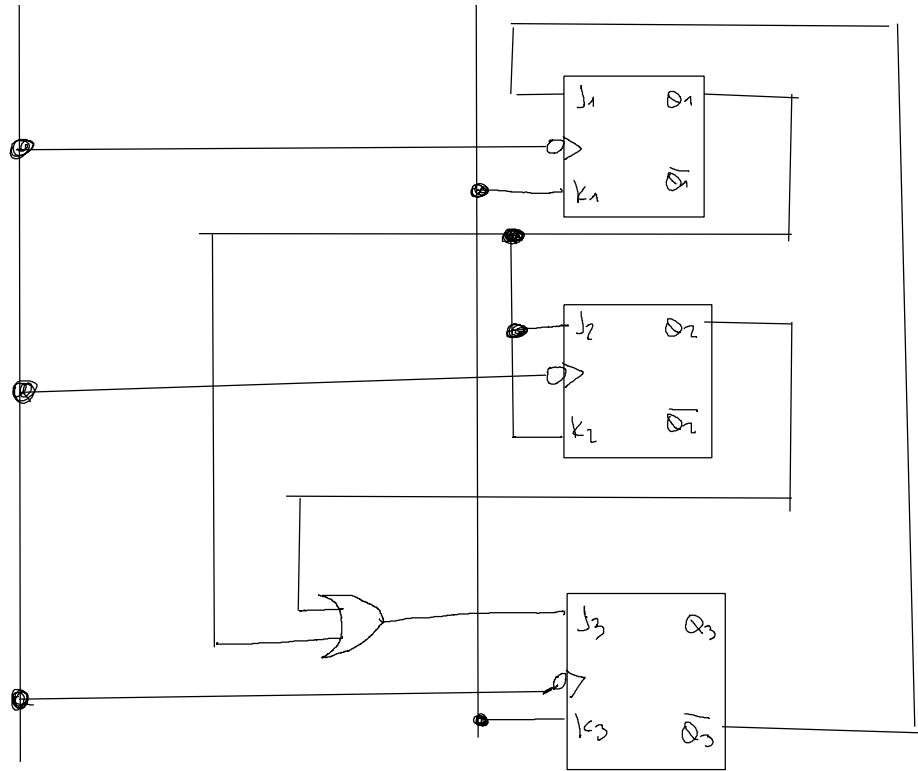
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Cartagena99



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