

Mapa de Karnaugh

- Agrupamento por múltiplos de potência 2.

| | | A, B | | | |
|---|---|------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| C | 0 | 0 | 1 | 1 | 0 |
| | 1 | 0 | 1 | 0 | 0 |

$$S = \overline{A}B + B\overline{C}$$

Forma disjuntiva

| | | A, B | | | |
|---|---|------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| C | 0 | 0 | 1 | 1 | 0 |
| | 1 | 0 | 1 | 0 | 0 |

$$S = B(\overline{A} + \overline{C})$$

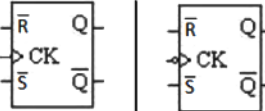
Forma conjuntiva

Flip-Flop

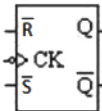
- RS

| CK | \overline{R} | \overline{S} | Q | \overline{Q} |
|--------------|----------------|----------------|-------|------------------|
| 0 | X | X | Q_a | \overline{Q}_a |
| 1 | X | X | Q_a | \overline{Q}_a |
| \downarrow | 0 | 0 | Q_a | \overline{Q}_a |
| \downarrow | 0 | 1 | 0 | 1 |
| \downarrow | 1 | 0 | 1 | 0 |
| \downarrow | 1 | 1 | 1 | 1 |

Sensível a borda de subida



Sensível a borda de descida

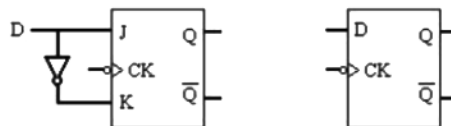


- JK

| CK | J | K | Q | \overline{Q} |
|--------------|---|---|------------------|------------------|
| 0 | X | X | Q_a | \overline{Q}_a |
| 1 | X | X | Q_a | \overline{Q}_a |
| \downarrow | 0 | 0 | Q_a | \overline{Q}_a |
| \downarrow | 0 | 1 | 0 | 1 |
| \downarrow | 1 | 0 | 1 | 0 |
| \downarrow | 1 | 1 | \overline{Q}_a | Q_a |

- D

| CK | D | Q |
|--------------|---|-------|
| 0 | X | Q_a |
| \downarrow | 0 | 0 |
| | 1 | 1 |



Contadores

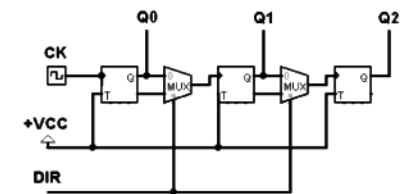
- Diagrama de Estados
- Tabela de Transição de estados
- Karnaugh
- Circuito Lógico

- Síncronos

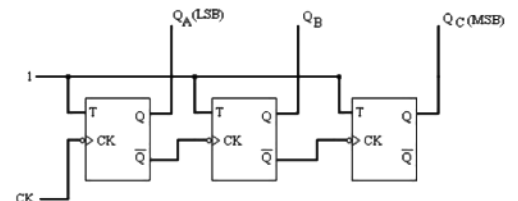
| Transição | Possibilidades | | Conclusão |
|-----------|----------------|---|-----------|
| | J | K | |
| 0 → 0 | 0 | 0 | 0 X |
| | 0 | 1 | 0 X |
| 0 → 1 | 1 | 1 | 1 X |
| | 1 | 0 | 1 X |
| 1 → 0 | 1 | 1 | X 1 |
| | 0 | 1 | X 1 |
| 1 → 1 | 0 | 0 | X 0 |
| | 1 | 0 | X 0 |

- Assíncronos

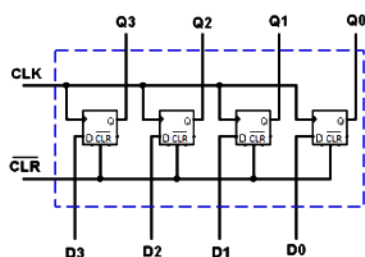
- ❖ Crescente/Decrescente



- ❖ Decrescente

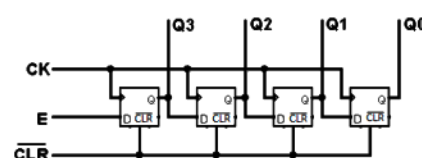


Registradores



- Shift-Registers

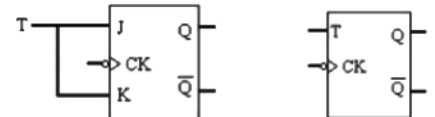
| Pulsos De Clock | \overline{CLR} | E | Q3 | Q2 | Q1 | Q0 |
|-----------------|------------------|---|----|----|----|----|
| 0 | 0 | X | 0 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 2 | 1 | 1 | 1 | 0 | 0 | 0 |
| 3 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 1 | 1 | 1 | 0 | 1 | 0 |
| 5 | 1 | 0 | 0 | 1 | 0 | 1 |
| 6 | 1 | 0 | 0 | 0 | 1 | 0 |
| 7 | 1 | 0 | 0 | 0 | 0 | 1 |
| 8 | 1 | 0 | 0 | 0 | 0 | 0 |



Formulário Fornecido pelos Alunos

- T

| CK | T | Q |
|--------------|---|------------------|
| 0 | X | Q_a |
| \downarrow | 0 | Q_a |
| | 1 | \overline{Q}_a |



- JK Master Slave

| \overline{PR} | \overline{CL} | CK | J | K | Q |
|-----------------|-----------------|--------------|---|---|------------------|
| 1 | 0 | X | X | X | 0 |
| 0 | 1 | X | X | X | 1 |
| 1 | 1 | \downarrow | 0 | 0 | Q_a |
| | | | 0 | 1 | 0 |
| | | | 1 | 0 | 1 |
| | | | 1 | 1 | \overline{Q}_a |

