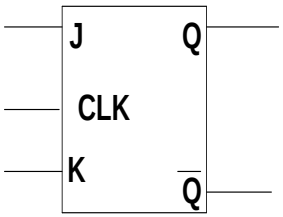
Síntese de Flip-Flops

FF JK mestre escravo

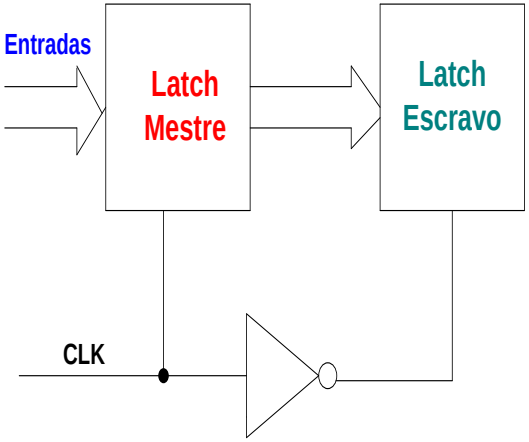
Tabela de operações: FF JK MS

CLK	J	K	Q_{N+1}
↓	0	0	Q_N
↓	0	1	0
↓	1	0	1
↓	1	1	$\overline{Q_N}$

Objetivo: robustez para risco essencial



(a) Símbolo: FF JK MS



(b) Esquema simplificado: FF mestre escravo

Tabela de fluxo de estados: FF JK MS

	C LK=0				CLK=1			
Z_0 Q \ J K	00	01	11	10	00	01	11	10
00	00	00	00	00	00	00	10	10
01	00	00	00	00	01	01	01	01
11	11	11	11	11	11	01	01	11
10	11	11	11	11	10	10	10	10

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Exemplo: FF JK MS

C LK=0				CLK=1			
J K / Z0 Q	00	01	11	10	00	01	11	10
00	00	00	00	00	00	00	10	10
01	00	00	00	00	01	01	01	01
11	11	11	11	11	11	01	01	11
10	11	11	11	11	10	10	10	10

Funções SET e RESET: Z0

C LK=0				CLK=1			
J K / Z0 Q	00	01	11	10	00	01	11	10
00	0	0	0	0	0	0	1	1
01	0	0	0	0	0	0	0	0
11	x	x	x	x	x	0	0	x
10	x	x	x	x	x	x	1	1

$$F_{Z0\text{-SET}} = CLK\ J\ \overline{Q}$$

C LK=0				CLK=1			
J K / Z0 Q	00	01	11	10	00	01	11	10
00	x	x	x	x	x	x	0	0
01	x	x	x	x	x	1	1	x
11	0	0	0	0	0	1	1	0
10	0	0	0	0	0	0	0	0

$$F_{Z0\text{-RESET}} = CLK\ K\ Q$$

Síntese de Flip-Flops

Exemplo: FF JK MS

Funções SET e RESET: Q

J K / Z_0 Q	C LK=0 00	01	11	10	CLK=1 00	01	11	10
00	00	00	00	00	00	00	10	10
01	00	00	00	00	01	01	01	01
11	11	11	11	11	11	01	01	11
10	11	11	11	11	10	10	10	10

J K / Z_0 Q	C LK=0 00	01	11	10	CLK=1 00	01	11	10
00	0	0	0	0	0	0	0	0
01	0	0	0	0	x	x	x	x
11	1	1	1	1	x	x	x	x
10	1	1	1	1	0	0	0	0

$$F_{Q\text{-SET}} = \overline{CLK}\ Z_0$$

J K / Z_0 Q	C LK=0 00	01	11	10	CLK=1 00	01	11	10
00	1	1	1	1	x	x	x	x
01	1	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0
10	0	0	0	0	x	x	x	x

$$F_{Q\text{-RESET}} = \overline{CLK}\ \overline{Z_0}$$

Síntese de Flip-Flops

Circuito lógico: arquitetura standard RS

Exemplo: FF JK MS

$F_{Z_0\text{-SET}} = CLK\ J\ \overline{Q}$

$F_{Z_0\text{-RESET}} = CLK\ K\ Q$

$F_{Q\text{-SET}} = \overline{CLK}\ Z_0$

$F_{Q\text{-RESET}} = \overline{CLK}\ \overline{Z_0}$

Z_0 Q \ J K	C LK=0				CLK=1			
	00	01	11	10	00	01	11	10
00	00	00	00	00	00	00	10	10
01	00	00	00	00	01	01	01	01
11	11	11	11	11	11	01	01	11
10	11	11	11	11	10	10	10	10