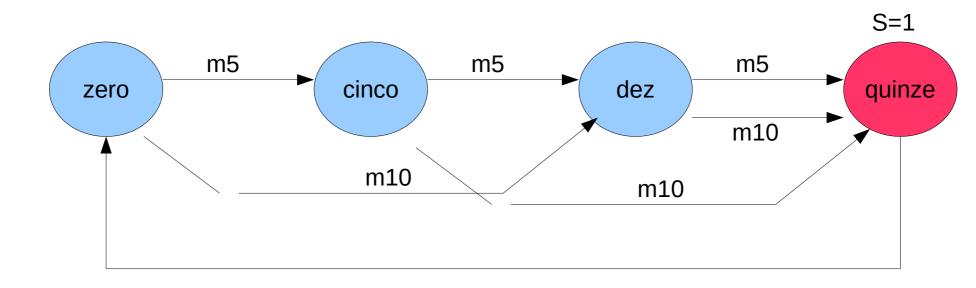
## Departamento de Informática UFV

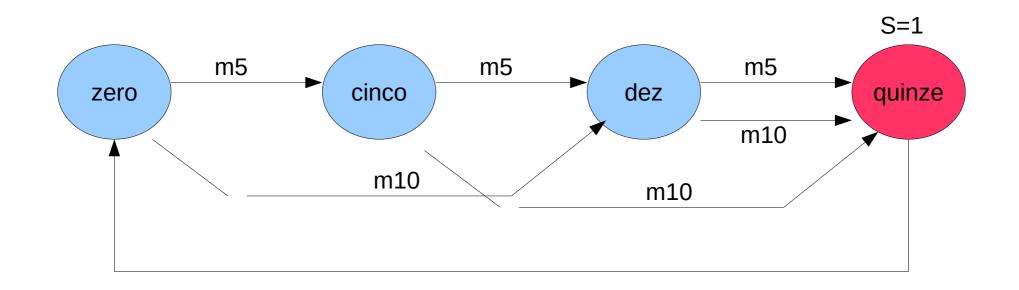
Maquina de Vendas

# Especificação

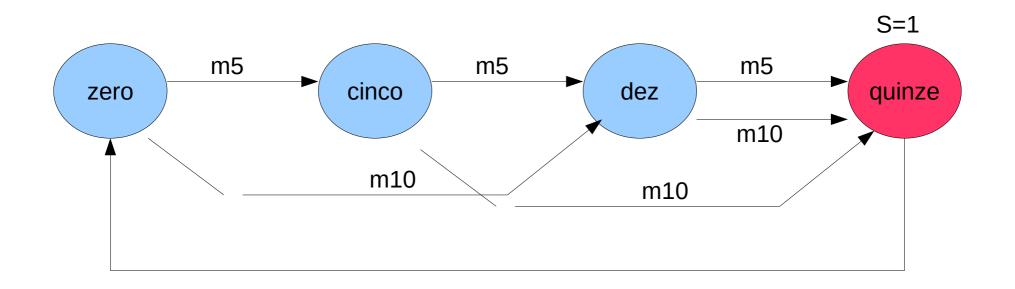
- Entradas Moedas de 5 e 10
- Saída S para vender o produto
- Preço do produto é 15
- Primeira versão sem troco....

## Primeira Versão



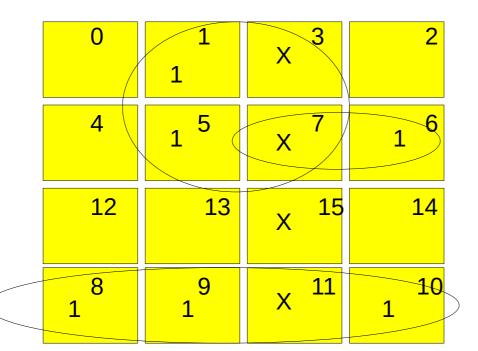


 0 0 1	M10 0 1 0 1	Proximo zero 00 dez 10 cinco 01 XX	S 0 0 0 X



Estrado M5 Zero 00 0 Zero 0 Zero 1 Zero 1 Cinco 0 Cinco 0 Cinco 1 Cinco 1	M10 0 1 0 1 0 1	Proximo zero 0 0 dez 1 0 cinco 0 1	S 0 0 0 X 0 0 X
---	-----------------------------------	------------------------------------	--------------------------------------

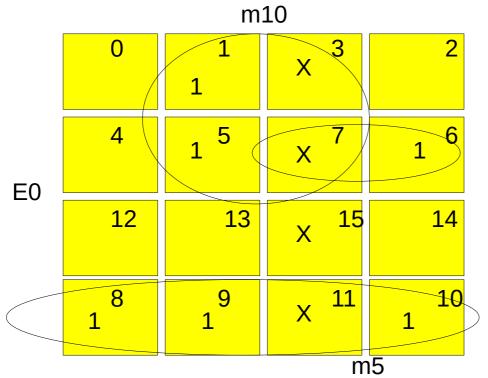
Estrado M5 M10 dez 00 0 0 dez 0 1 dez 1 0 dez 1 1 quinze 0 0 quinze 0 1 quinze 1 0 quinze 1 1	Proximo dez 10 quinze 11 quinze 11 XX zero 00 zero 00 zero 00 XX	S 0 0 X 1 1 X
---	--	---------------------------------



P1 = S(1,5,6,8,9,10)

Estrado	M5	M10	Proximo	S
Zero 00	0	0	zero 00	0
Zero	0	1	dez 10	0
Zero	1	0	cinc <mark>o 0</mark> 1	0
Zero	1	1	XX	X
Cinco	0	0	cinc <mark>o 0   1</mark>	0
Cinco	0	1	quin <mark>ze1</mark> 1	0
Cinco	1	0	dez 1 0	0
Cinco	1	1	XX	X

dez 00 0 0 dez 0 1 dez 1 0 dez 1 1	quinze 1 1 quinze 1 1 X X	0 0 X
quinze 0 0 quinze 0 1 quinze 1 0 quinze 1 1	zero 0 0 czero 0 0 x X	1 1 1 X



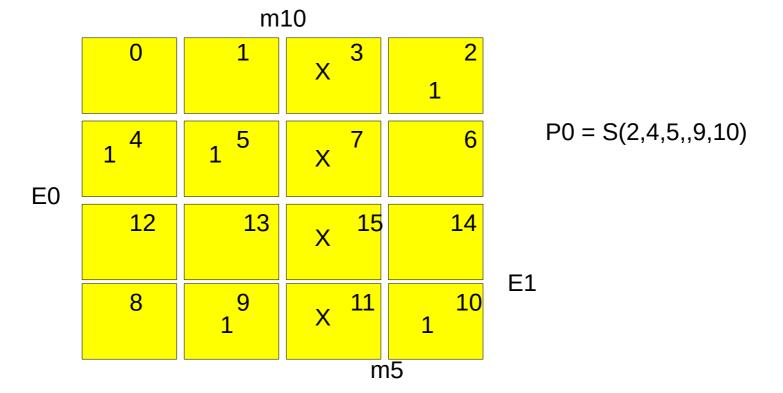
P1 = S(1,5,6,8,9,10)

P1 = E1!E0 + m10 !E1 + m5 E0 !E1

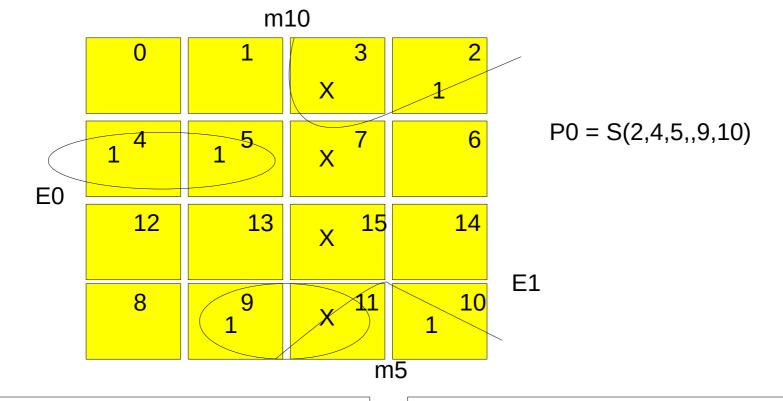
E1

Estrado Zero 00	M5 0	M10 0	Proximo zero 0	1
Zero	0	1	dez 1	0 0
Zero	1	0	cinc <mark>o 0</mark>	1 0
Zero	1	1	X	X X
Cinco	0	0	cinc <mark>o 0</mark>	1 0
Cinco	0	1	quin <mark>ze1</mark>	1 0
Cinco	1	0	dez 1	0 0
Cinco	1	1	X	XX

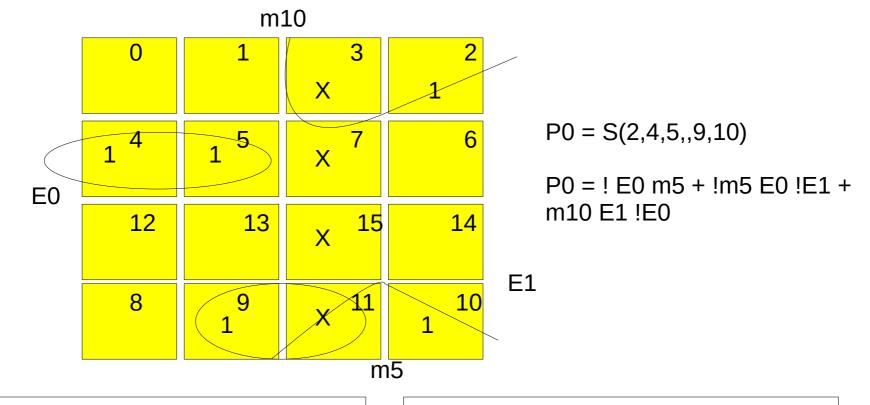
	0 0	Proximo dez 1 0	<b>1</b>
dez 0	1	quinze 1   1	
dez 1	0	quinz <mark>e 1</mark> 1	. 0
dez 1	1	XX	X
quinze (	0 0	zero 0 0	1
quinze (	0 1	zero 0 0	1
quinze 2	1 0	zero 0 0	1
quinze 2	1 1	XX	X



Estrado M5 M10	0 Proximo	S
dez 00 0 0	dez 10	0
dez 0 1	quinze 1 1	0
dez 1 0	quinze 1 1	0
dez 1 1	XX	X
quinze 0 0	zero 0 0	1
quinze 0 1	zero 0 0	1
quinze 1 0	zero 0 0	1
quinze 1 1	XX	X



dez quinze quinze	0 0 1 1 0	5 M10 0 1 0 1 0	Proxii dez quinz quinz zero zero	e 1 e 1 X 0 0	0 1 1 X 0	S 0 0 X 1 1	0
quinze	1	0	zero	0	0	1	
quinze	1	1		X	X	X	



Estrado	M5	M10	Proximo	S
Zero 00	0	0	zero 0 0	0
Zero	0	1	dez 10	0
Zero	1	0	cinco 0 1	0
Zero	1	1	XX	Χ
Cinco	0	0	cinco 0 1	0
Cinco	0	1	quinze11	0
Cinco	1	0	dez <b>10</b>	0
Cinco	1	1	XX	X

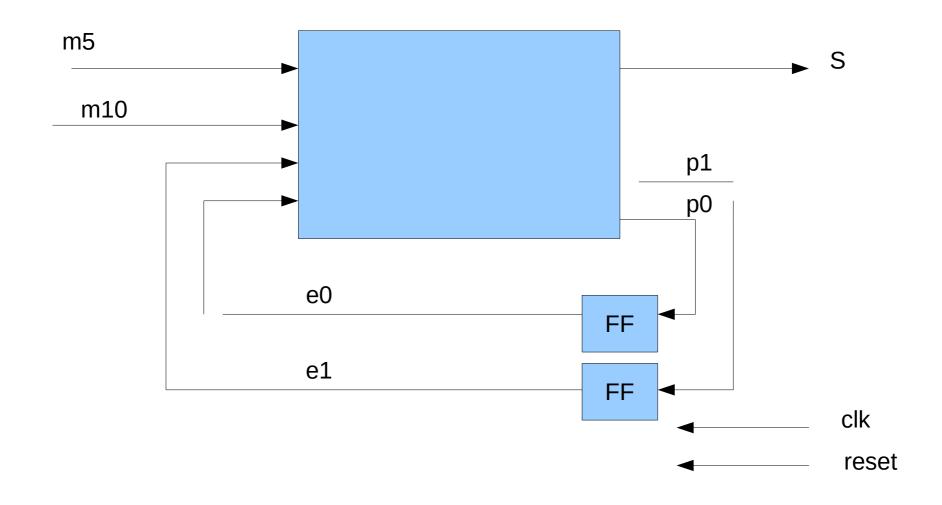
Fotrodo ME M10 - Drovinso - C						
Estrado M5	MITO	Proxi	HO		S	
dez 00 0	0	dez	1	. 0		0
dez 0	1	quinz	e 1	1	0	
dez 1	0	quinz	e 1	. 1	0	
dez 1	1		X	X	X	
quinze 0	0	zero	0	0	1	
quinze 0	1	zero	0	0	1	
quinze 1	0	zero	0	0	1	
quinze 1	1		X	X	X	

#### S = E1 E0 - estado quinze

Estrado Zero 00 Zero Zero Zero Cinco Cinco		M10 0 1 0 1 0	Proximo zero 0 0 dez 1 0 cinco 0 1 XX cinco 0 1 quinze1 1 dez 1 0	S 0 0 0 X 0 0
Cinco Cinco	1	0	dez 10 XX	-

dez quinze quinze quinze	0 0 1 1 0 0	5 M10 0 1 0 1 0 1	zero 0 0	0 X 1 1	O
quinze	1	1	XX	X	

### Estrutural em VHDL



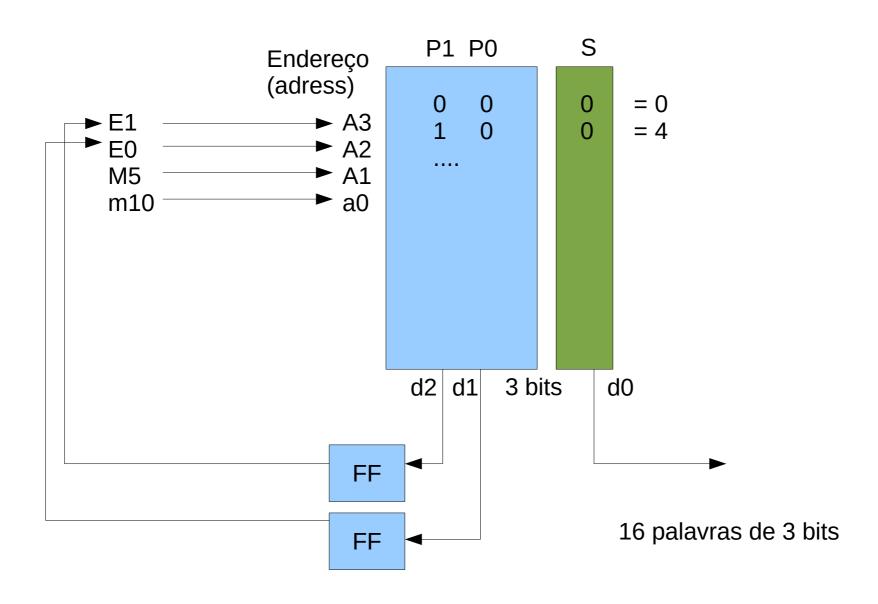
# código

```
entity dff is
q: out std_logic
end dff;
architecture Behavioral of dff is
begin
    process(reset, clk)
       begin
    -- clock rising edge
       if (reset = '1') then q <='0';
       elsif (clk='1' and clk'event) then
           q \le d;
       end if;
end process;
end Behavioral;
```

# código

```
entity mag vendas is
port ( m5,m10 : in std logic;
                       clk, reset : in std_logic;
              s:out std_logic);
end mag vendas;
architecture Behavioral of mag vendas is
signal p1,p0,e1,e0 : std logic;
begin
p1 \le (e1 \text{ and (not e0)}) \text{ or (m10 and (not e1))}
              or (m5 and e0 and (not e1));
p0 \le (\text{(not e0) and m5) or ((not m5) and e0 and (not e1))}
              or (m10 and e1 and (not e0));
s \le e1 and e0:
ff0: entity work.dff port map (p0, clk, reset, e0);
ff1: entity work.dff port map (p1, clk, reset, e1);
end Behavioral:
```

#### Modelo com Memoria



#### **VHDL**

```
Begin
    if(reset = '1') then
         Moore_state <= ZERO;
    elsif (clk = '1' and clk'event) then
         case Moore_state is
    when zero =>
    if M10 = '1' then Moore_state <= ten;</pre>
    elsif M5 = '1' then Moore_state <= five;</pre>
    Else Moore_state <= zero;
end if:
when five=>
end case;
end if;
End process;
s <= '1' when Moore_state = three else '0';
```