ODVFR, 2023-11-29

$$f(x_1, \dots x_n) = \bigvee_{i=0}^{2^n-1} x_1^{w_{1i}} x_2^{w_{2i}} \cdots x_n^{w_{ni}} f(w_{1i}, w_{2i}, \dots, w_{ni})$$ DNO

MULTIPLEKSER: $y = (\vec{x} \,\&\!\Leftrightarrow D^T) \vee \& \,\vec{k}^T$

vhodi → dolžine a

↳ klasični dekoder ima matriko W

$$\begin{bmatrix} 0 & 0 \\ 0 & 1 \\ 1 & 0 \\ 1 & 1 \\ \vdots & \vdots \end{bmatrix}$$

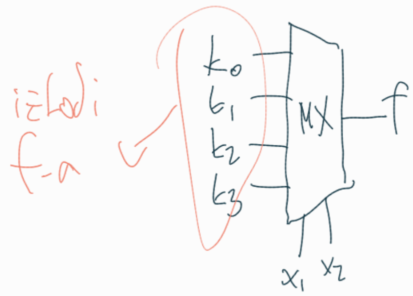
$$y = \bigvee_{i=0}^{2^a-1} x_1^{w_{1i}} x_2^{w_{2i}} \cdots x_a^{w_{ai}} k_i$$ } multiplekser reprezentira popolno P.F.

Primer za $a=1$

$$f(x_1,x_2) = \bigvee_{i=0}^{3} x_1^{w_{1i}} x_2^{w_{2i}} f(w_{1i}, w_{2i})$$

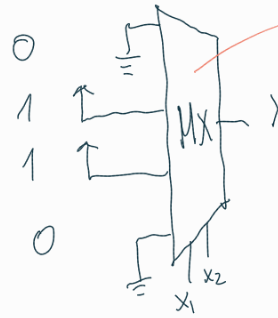
$$W = \begin{array}{c} \\ \\ \\ \\ \\ \end{array}\begin{array}{cc} 1 & 2 \\ \left[\begin{array}{cc} 0 & 0 \\ 0 & 1 \\ 1 & 0 \\ 1 & 1 \end{array}\right] & \end{array} \begin{array}{l} \\ -0 \\ -1 \\ -2 \\ -3 \end{array}$$

tedaj mora biti $\vec{k}_i = f(w_{1i}, w_{2i})$, da izdelamo MX, ki realizira P.F..



torej za realizacijo $XOR = \vee^2(1,2)$

ima matriko $D := W$



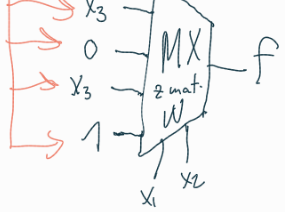
$XOR(x_1,x_2) = \vee^2(1,2)$

REALIZACIJA $\vee^3$ z MX velikosti 2^2:

$$f(x_1,x_2,x_3) = \bigvee_{i=0}^{3} x_1^{w_{i1}} x_2^{w_{i2}} f(w_{i1}, w_{i2}, x_3)$$ to gre na vhod.

$$\vec{k}_i = f(w_{1i}, w_{2i}, x_3) \in \{0, 1, x_3, \bar{x}_3\}$$

naj bo ta funkcija: $\vee^3(0,7,6,5)$



KAJ PA $f(x_1, x_2, x_3, x_4)$ z istim MXom?

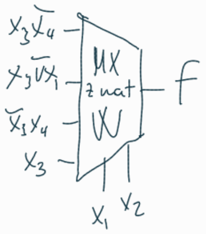
$$f = \bigcup_{i=0}^{3} x_1^{w_{i1}} x_2^{w_{i2}} f(w_{i1}, w_{i2}, x_3, x_4)$$

$$\vec{k}_i = f(w_{i1}, w_{i2}, x_3, x_4)$$

naj bo $f = \vee^4(2, 5, 6, 9, 14, 15)$:

0
0
1
0
0
1
1
0
0
1
0
0
0
0
1
1

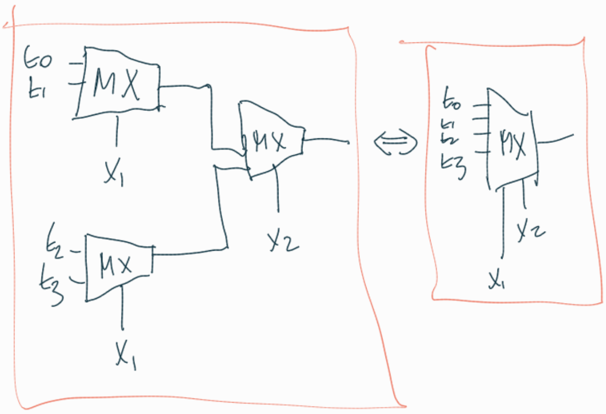
OPOMBA TULE:
PRI REALIZACIJI Z MX pride prav namesto vedno x_1 in x_2 uporabiti katerekoli druge spremenljivke (kot naslovni vhod). Število zahtevanih operatorjev na „levi strani" MX je seveda odvisno od tega, katere spremenljivke uporabimo za naslov in katere si pustimo ~~za~~ „levo stran".



KAJ PA MX s tremi vhodi:

$$f(x_1, x_2, x_3, x_4) = \bigcup_{i=0}^{7} x_1^{w_{1i}} x_2^{w_{2i}} x_3^{w_{3i}} f(w_{1i}, w_{2i}, w_{3i}, x_4)$$

Ista funkcija

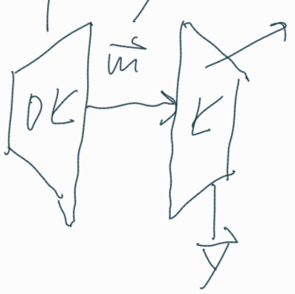


ROM: naslovni vektor $\vec{x}$ vhod
podatkovni vektor $\vec{y}$ izhod

ROM ima kapaciteto

$$2^{(\text{širina } \vec{x})} \cdot (\text{širina } \vec{y}) \text{ bitov.}$$

$\vec{x}$ širina $\vec{m}$ je $2^{(\text{širina } \vec{x})}$



ČAS V VEZJIH: SEKVENČNA VEZJA

ČASOVNI OPERATOR

$x \to \boxed{D^t} \to D^t x$ } zakasnitev, če je $t<0$.

$D^{-1}x \qquad D^{-1}x(t) = x(t-1)$

sledi: $D^0 x = x \qquad D^i D^j x = D^{i+j} x$

$D^i(x_1 * x_2) = D^i x_1 * D^i x_2 \qquad$ # je operator

definicija / oznaka: $\overline{D^t x} = \overline{D^t} x = D^t \overline{x}$

FRONTA := edge po angleško

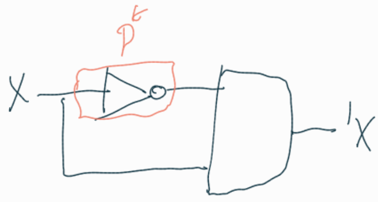
prva fronta := $0 \to 1$ (rising edge) oznaka $'x$

zadnja fronta := $1 \to 0$ (falling edge) oznaka x'

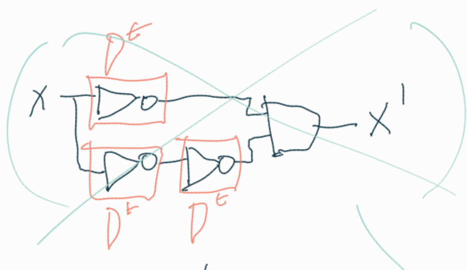
Zaznavanje prve fronte: $(D^{-1}\overline{x})x = {}'x$

$$(D^{-1}x)\overline{x} = x'$$

prva fronta:



t je majhen



ali

zadnja fronta:

$$x' = {}'(\overline{x})$$

$'(x_1 x_2) = {}'x_1 x_2 \vee x_1('x_2) \vee {}'x_1('x_2)$

x_1 x_2	$x_1 x_2$
0 0	0

x_1	x_2	
0	1	0
1	0	0
1	1	1

$x_1('x_2) \vee {}'x_1 x_2 \vee {}'x_1 \cdot ('x_2)$

x_1	x_2	$x_1 \vee x_2$
0	0	0
0	1	1
1	0	1
1	1	1

$$(x_1 \vee x_2)' = \overline{x_1}\, x_2' \vee (x_1')\, \overline{x_2} \vee x_1'\, x_2'$$

$$'(x_1 \to x_2) = (x_1')\,\overline{x_2} \vee x_1'' x_2 \vee x_1 ('x_2)$$

x_1	x_2	$\to$
0	0	1
0	1	1
1	0	0
1	1	1

DIAGRAM PREHAJANJA STANJ

(state machines)