p292 Digital Electronics As submitted February 2000

IML Typos 2000

maximum is 2^{n-1}

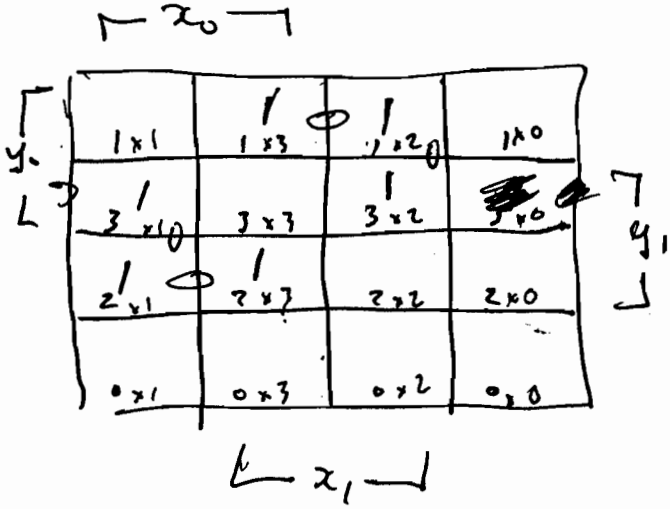
$Z = Y \times X$

y_1	y_0	x_1	x_0	z_3	z_2	z_1	z_0
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	1	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	0	0	0	0	0
0	1	0	1	0	0	0	1
0	1	1	0	0	0	1	0
0	1	1	1	0	0	1	1
1	0	0	0	0	0	0	0
1	0	0	1	0	0	1	0
1	0	1	0	0	1	0	0
1	0	1	1	0	1	1	0
1	1	0	0	0	0	0	0
1	1	0	1	0	0	1	1
1	1	1	0	0	1	1	0
1	1	1	1	1	0	0	1

$$z_3 = y_1 y_0 x_1 x_0$$

$$z_2 = y_1 \bar{y}_0 x_1 + y_1 x_1 \bar{x}_0$$

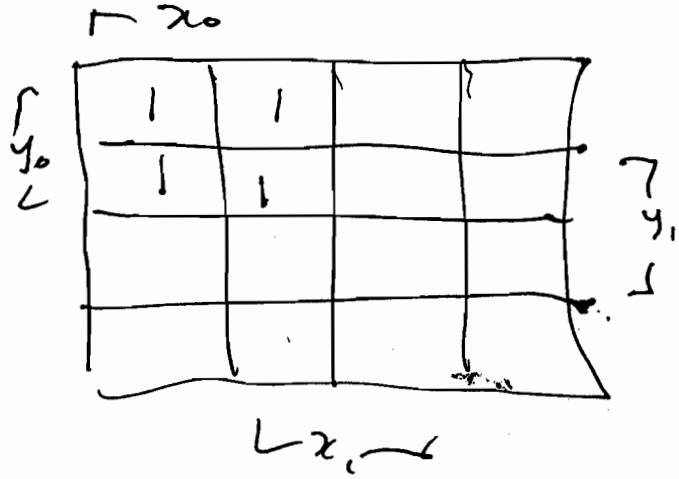
z_1



~~$z_1 = y_0 \bar{y}_1 x_1 + y_1 y_0 \bar{x}_1 + y_1 \bar{y}_0 x_0$~~

$$z_1 = \bar{y}_1 y_0 x_1 + y_1 \bar{y}_0 x_0 + x_1 \bar{x}_0 y_0 + \bar{x}_1 x_0 y_1$$

z_0



$$z_0 = x_0 y_0$$

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8 bit multiplier $\Rightarrow$ 16 eqns in 16 variables

$\sim 2^{15}$ complexity

An other way is with two bit multipliers and adders

An other way is with shift and add.