(1)

$314,202_5$

$3\times5^2+1\times5^1+4\times5^0+2\times5^{-1}+2\times5^{-3}$

$3\times25+5+4+2\times0,2+2\times0,008$

$75+5+4+0,4+0,016 = \boxed{84,416_{10}}$

$84,416-2^6=20,416 \rightarrow 1$

$20,416-2^5=20,416 \rightarrow 0$

$20,416-2^4=4,416 \rightarrow 1$

$4,416-2^3=4,416 \rightarrow 0$

$4,416-2^2=0,416 \rightarrow 1$

$0,416-2^1=0,416 \rightarrow 0$

$0,416-2^0=0,416 \rightarrow 0$

$0,416-2^{-1}=0,416 \rightarrow 0$

$0,416-2^{-2}=0,166 \rightarrow 1$

$0,166-2^{-3}=0,041 \rightarrow 1$

$0,041-2^{-4}=0,041 \rightarrow 0$

$\boxed{1010100,0110_2}$

5 4 , 6

$\boxed{54,6_{16}}$

$84,416 - 1 \cdot 3^4 = 3,416 \rightarrow 1$

$3,416 - 0 \cdot 3^3 = 3,416 \rightarrow 0$

$3,416 - 0 \cdot 3^2 = 3,416 \rightarrow 0$

$3,416 - 1 \cdot 3^1 = 0,416 \rightarrow 1$

$0,416 - 0 \cdot 3^0 = 0,416 \rightarrow 0$

$0,416 - 1 \cdot 3^{-1} = 0,0\overline{826} \rightarrow 1$

$0,0\overline{826} - 0 \cdot 3^{-2} = 0,0\overline{826} \rightarrow 0$

$0,0\overline{826} - 2 \cdot 3^{-3} = 0,00\overline{3592} \rightarrow 2$

$$\boxed{10010,102_3}$$

(2)

$213_{10} - 147_{10}$

```
  0010 0001 0011
- 0001 0100 0111
-----------------
  0000 1100 1100
- 0000 0110 0110
-----------------
  0000 0110 0110 BCD   → 66_10
```

(3) $118_{10} - 145_{10}$

$118 = 64 + 32 + 16 + 4 + 2$

$= 2^6 + 2^5 + 2^4 + 2^2 + 2^1$

$= 01110110_2$ → con signo $= 0\ 0111\ 0110_2$

$145 = 128 + 16 + 1$

$= 2^7 + 2^4 + 2^0$

$= 10010001$ → con signo $01001\ 0001_2$

comp 2 → $1\ 0110\ 1111$ comp 2

$0\ 0111\ 0110$

$1\ 0110\ 1111$

$1\ 1110\ 0101$ comp 2 → -27_{10}

(4)

En BCD son 4 bits luego

$$2^k \geq 4 + k + 1$$

$$2^k \geq 5 + k \Rightarrow \boxed{k = 3} \rightarrow \text{3 bits de paridad}$$

Entradas d_4, d_3, d_2, d_1

Salidas

1	2	3	4	5	6	7
P_1	P_2	D_1	P_3	D_2	D_3	D_4

hay 4 salidas obvias

$$D_1 = d_1$$
$$D_2 = d_2$$
$$D_3 = d_3$$
$$D_4 = d_4$$

El resto de los salidos

d_4	d_3	d_2	d_1	P_1	P_2	P_3
0	0	0	0	1	1	1
0	0	0	1	0	0	1
0	0	1	0	0	1	0
0	0	1	1	1	0	0
0	1	0	0	1	0	0
0	1	0	1	0	1	0
0	1	1	0	0	0	1
0	1	1	1	1	1	1
1	0	0	0	0	0	0
1	0	0	1	1	1	0

d_4d_3 \ d_2d_1	00	01	11	10
00	1	0	1	0
01	1	0	1	0
11	X	X	X	X
10	0	1	X	X

$$P_1 = (\bar{d}_2 + d_1)(\bar{d}_4 + d_1)(d_4 + d_2 + \bar{d}_1)$$

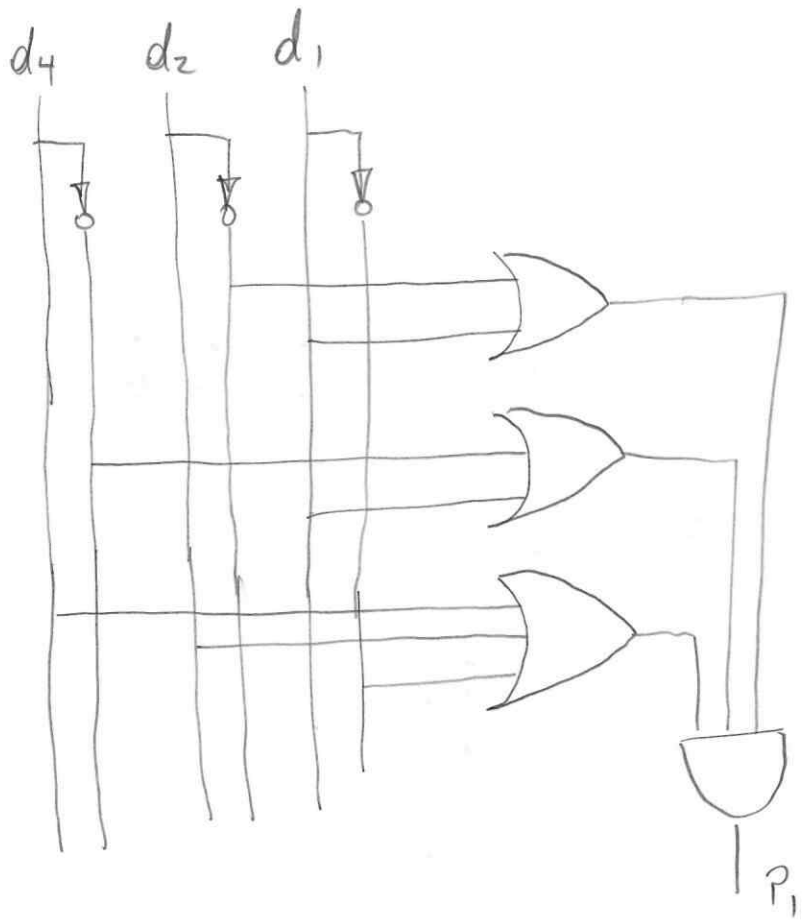
d_4d_3 \ d_2d_1	00	01	11	10
00	1	0	0	1
01	0	1	1	0
11	X	X	X	X
10	0	1	X	X

$$P_2 = (\bar{d}_3 + d_1)(\bar{d}_4 + d_1)(d_4 + d_3 + \bar{d}_1)$$

d_4d_3 \ d_2d_1	00	01	11	10
00	1	1	0	0
01	0	0	1	1
11	X	X	X	X
10	0	0	X	X

$$P_3 = \bar{d}_4(\bar{d}_3 + d_2)(d_3 + \bar{d}_2)$$

(4)



⑤ P_1 no verifica al dato d_3
por lo tanto depende sólo de d_4, d_2 y d_1

Un XOR de 3 entradas funciona así

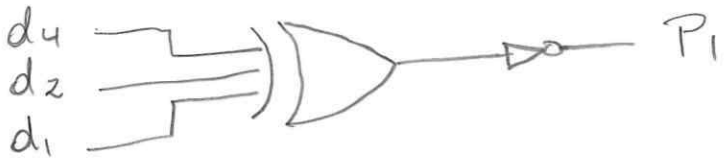
A B C	Y
0 0 0	0
0 0 1	1
0 1 0	1
0 1 1	0
1 0 0	1
1 0 1	0
1 1 0	0
1 1 1	1

$Y = A \oplus B \oplus C$

y nosotros queremos

d_4 d_2 d_1	P_1
0 0 0	1
0 0 1	0
0 1 0	0
0 1 1	1
1 0 0	0
1 0 1	1

entonces $P_1 = \overline{Y}$, luego el circuito óptimo es



(6) Mundial 1962

Partido Colombia v/s URSS resultado 4:4

arquero Lev Yashin

Autor del gol olímpico Marcos Coll

Unico gol olímpico en la historia de los mundiales

Estadio Carlos Dittborn de Arica

$A \longrightarrow 41_{16} \longrightarrow 100\,0001_2$ (código Ascii simple es de 7 bits)

$2^k \geq 7 + k + 1$

$2^k \geq 8 + k$

$\Rightarrow k \geq 4$

1	2	3	4	5	6	7	8	9	10	11
P_1	P_2	d_1	P_3	d_2	d_3	d_4	P_4	d_5	d_6	d_7
0	0	1	0	0	0	0	1	0	0	1