Esercizi pag 35

1) a)

$110011_2 \rightarrow$ DECIMALE: $2^0+2^1+2^4+2^5 =$ $= 51_{10}$

OTTALE: $110011 =$ (110 = 6, 011 = 3) $= 63_8$

ESADECIMALE: $110011 =$ (0011 = 3, 0011 = 3) $= 33_{16}$

b)

$10101011 \rightarrow$ DECIMALE: $2^0+2^1+2^3+2^5+2^7 =$ $= 171_{10}$

OTTALE: $10101011 =$ (10 = 2, 101 = 5, 011 = 3) $= 253_8$

ESADEC.: $10101011 =$ (1010 = A, 1011 = B) $= AB_{16}$

c)

$101011110_2 \rightarrow$ DECIMALE: 350_{10}

OTTALE: $101011110 =$ (101 = 5, 011 = 3, 110 = 6) $= 536_8$

ESADECIMALE: $101011110 =$ (1010 = A, 1111 = F) $= 15E_{16}$

d)

$1001011011101_2 \rightarrow$ DECIMALE: 2413

OTTALE: $1001011011101 =$ (001 = 1, 011 = 3, 011 = 3, 101 = 5) $= 11335_8$

ESADEC.: $1001011011101 =$ (1001 = 9, 0111 = 7, 0101 = 5) $= 975_{16}$

$= 4555_8$ | $56D_{16}$

2)

a) $23_8 \rightarrow$ BINARIO | DECIMALE | ESADECIMALE

2 3

010 101

010101_2 | 21_{10} | 15_{16}

b) $43_8 \rightarrow$ BINARIO | DECIMALE | ESADECIMALE

4 3

100 011

100011_2 | 35_{10} | 23_{16}

3)

a) $13_{10} \rightarrow$ BINARIO | OTTALE | ESADECIMALE

1101_2 | 15_8 | D_{16}

b) $64_{10} \rightarrow$ BINARIO | OTTALE | ESADECIMALE

1000000_2 | 100_8 | 40_{16}

4)

a)

17_{10} → BINARIO

1 7

0001 0111$_2$

OTTALE

27_8

DECIMALE

$2^0+2^1+2^2+2^4 =$

$1+2+4+16 =$

$= 23_{10}$

FA_{16} → BINARIO

F A

1111 1010$_2$

OTTALE

372_8

DECIMALE

$2^1+2^3+2^4+2^5+2^6+2^7 =$

$= 250_{10}$

ESERCIZIO PAG 35

1)

$$F(A,B) = A \cdot \overline{\bar{A} \cdot B} + \bar{B}$$

A	B	$\bar{A}$	$\bar{A} \cdot B$	$\overline{\bar{A} \cdot B}$	$A \cdot \overline{\bar{A} \cdot B}$	$\bar{B}$	F
0	0	1	0	1	1	1	1
0	1	1	1	0	0	0	0
1	0	0	0	1	0	1	1
1	1	0	0	1	0	0	0

$$F(A,B) = \bar{B}$$

$$G(A,B) = \bar{A} + B + A \cdot \bar{B} + \overline{A + \bar{B}}$$

A	B	$\bar{A}$	$A \cdot \bar{B}$	$A + \bar{B}$	$\overline{A + \bar{B}}$	G
0	0	1	0	1	0	1
0	1	1	0	0	1	1
1	0	0	1	1	0	1
1	1	0	0	1	0	1

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

$G(A,B) = TRUE - TAUTOLOGIA$

$$H(A,B) = \overline{\overline{A \cdot \overline{B} \cdot B}}$$

A	B	$\overline{B}$	$A \cdot \overline{B}$	$\overline{A \cdot \overline{B}}$	$\overline{A \cdot \overline{B} \cdot B}$	H
0	0	1	0	1	0	1
0	1	0	0	1	1	0
1	0	1	1	0	0	1
1	1	0	0	1	1	0

$H(A,B) = \overline{B}$

$$I(A,B) = \overline{A} + \overline{A + \overline{AB}}$$

A	B	$\overline{A}$	$\overline{AB}$	$\overline{A+\overline{AB}}$	$\overline{I}$
0	0	1	1	0	1
0	1	1	1	0	1
1	0	0	1	0	0
1	1	0	0	0	0

$I(A,B) = \overline{A}$

2) $\overline{\quad}$

$F(A,B,C) = CB + A + B$

A	B	C	CB	F
0	0	0	0	0
0	0	1	0	0
0	1	0	0	1
0	1	1	1	1
1	0	0	0	1
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

$G(A,B,C) = A\bar{B} \cdot \overline{A\bar{B}C}$

A	B	C	$A\bar{B}$	$A\bar{B}C$	$\overline{A\bar{B}C}$	G
0	0	0	0	0	1	0
0	0	1	0	0	1	0
0	1	0	0	0	1	0
0	1	1	0	0	1	0
1	0	0	1	0	1	1
1	0	1	1	1	0	0
1	1	0	0	0	1	0
1	1	1	0	0	1	0

$H(A,B,C) = \overline{\bar{A} + \overline{A + C \cdot B} \cdot A} = A$

A	B	C	CB	A+CB	$\overline{A+CB}$	$\overline{A+CB} \cdot A$	G
0	0	0	0	0	1	0	0
0	0	1	0	0	1	0	0
0	1	0	0	0	1	0	0
0	1	1	1	1	0	0	0
1	0	0	0	1	0	0	0
1	0	1	0	1	0	0	0
1	1	0	0	1	0	0	0
1	1	1	1	1	0	0	0

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

ESERCIZIO 4 PAG 39

L = SE È APERTA ALMENO 1 PORTA

A = SE SONO APERTE ALMENO 2 PORTE ADIACENTI

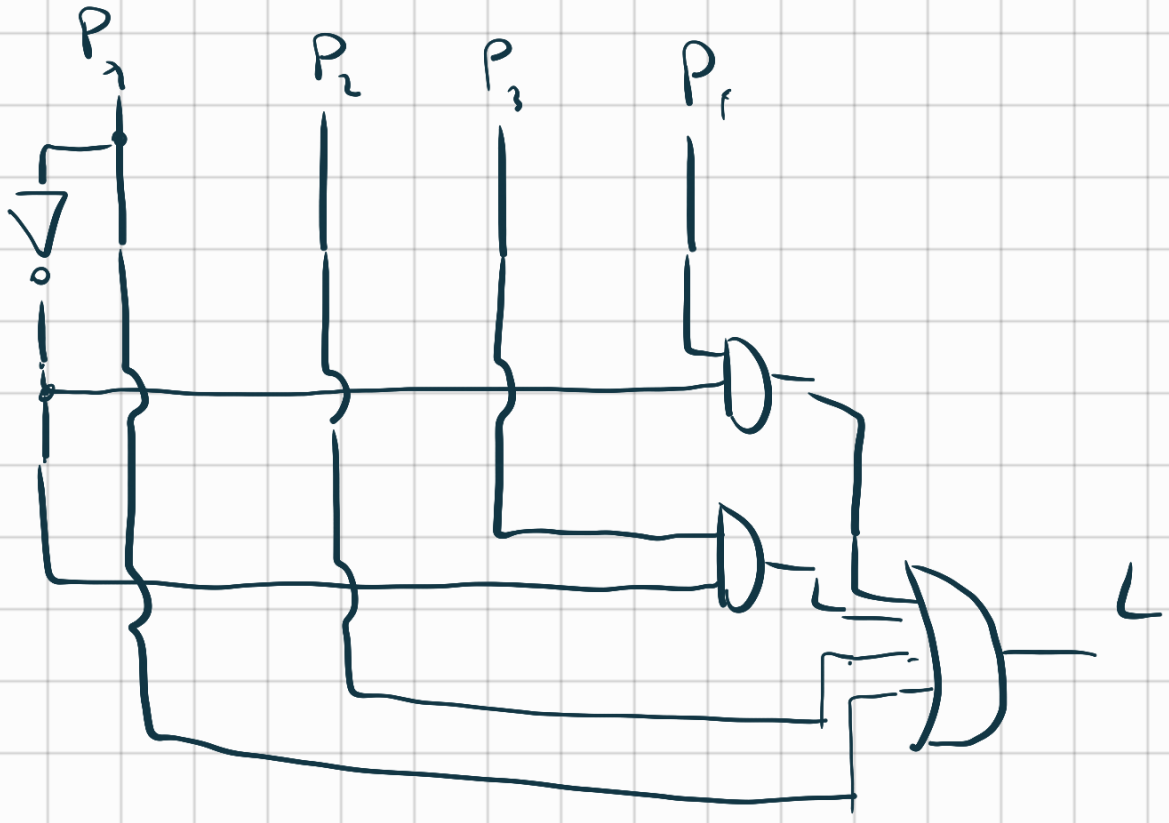
B = SE SONO APERTE ALMENO 3 PORTE:

P_1	P_2	P_3	P_4	L	A	B
0	0	0	0	0	0	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	1	0
0	1	0	0	1	0	0
0	1	0	1	1	0	0
0	1	1	0	1	1	0
0	1	1	1	1	1	1
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	1	0	0
1	0	1	1	1	1	1
1	1	0	0	1	1	0
1	1	0	1	1	1	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

$L =$

P_3P_4 / P_1P_2	00	01	11	10
00	0	1	1	1
01	1	1	1	1
11	1	1	1	1
10	1	1	1	1

$$L = \bar{P}_1 \cdot P_4 + \bar{P}_1 \cdot P_3 + P_2 + P_1$$

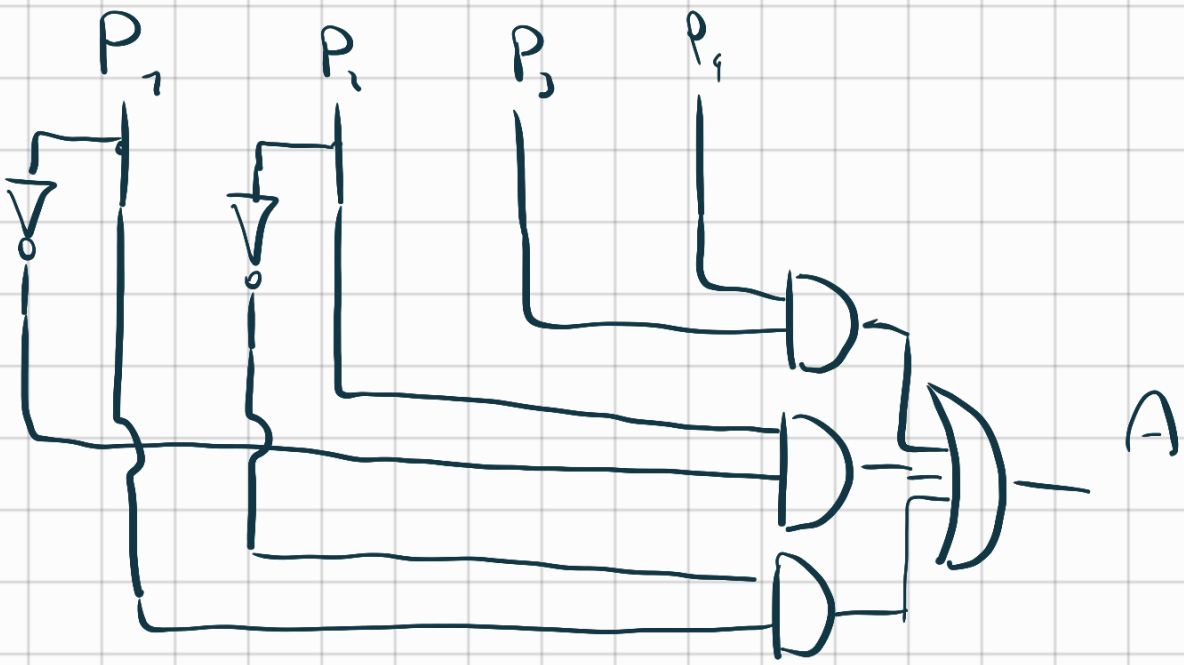


$A =$

P_3P_4 / P_1P_2	00	01	11	10
00	0	0	1	0
01				

01	0	0	1	1
11	0	0	1	0
10	1	1	1	1

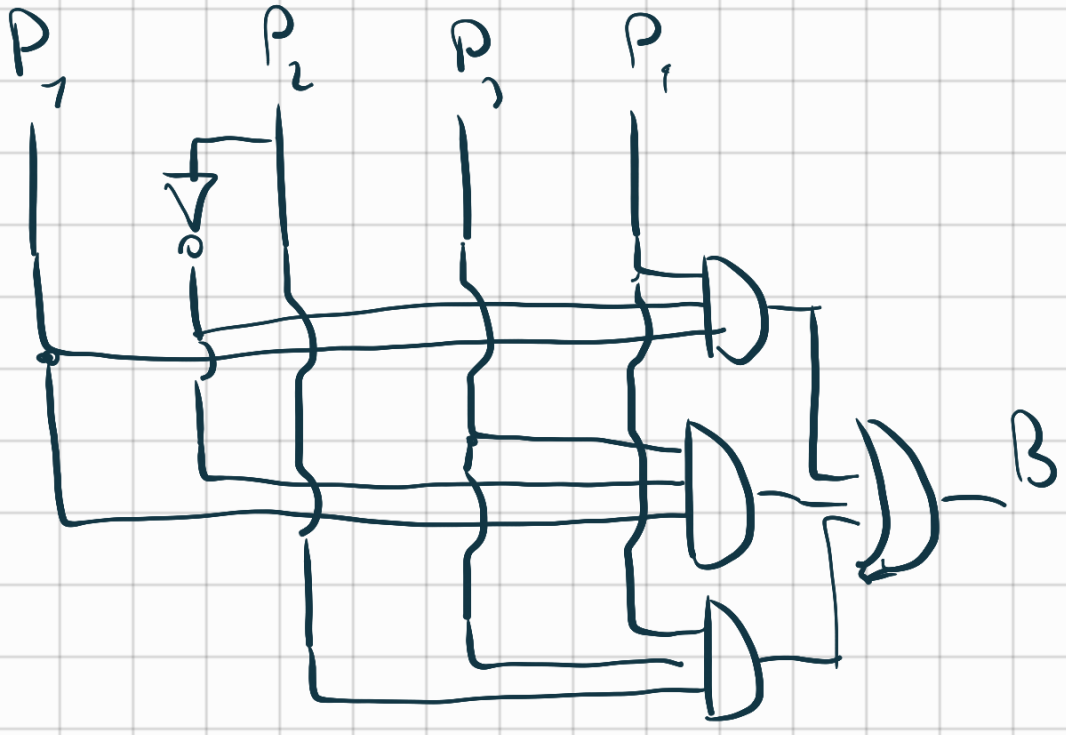
$$A = P_3 \cdot P_4 + \overline{P_1} \cdot P_2 + P_1 \cdot \overline{P_2}$$



$B =$

P_1P_2 \ P_3P_4	00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	0	0	1	0
10	0	1	1	1

$$B = P_1 \cdot \bar{P}_2 \cdot P_1 + P_1 \cdot \bar{P}_2 \cdot P_3 + P_2 \cdot P_3 \cdot P_1$$



PAG 84

1) $W = 1A_H = (0001\ 1010)_2$

$R_1 = DD3_H = (1001\ 1101\ 0011)_2$

$R_2 = 1D3_H = (0001\ 1101\ 0011)_2$

I BIT DI CONTROLLO DA ACCLUDERE A W SONO 4 (b_3, b_2, b_1, b_0), OTTENENDO UNA PAROLA DA 12 BIT

12	11	10	9	8	7	6	5	4	3	2	1
0	0	0	1	b_3	1	0	1	b_2	0	b_1	b_0

W:

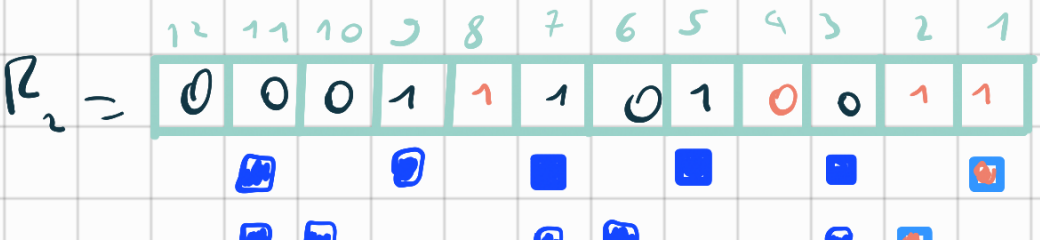
$b_0 = 0 \oplus 1 \oplus 1 \oplus 1 \oplus 0 = 1$
$b_1 = 0 \oplus 0 \oplus 1 \oplus 0 \oplus 0 = 1$
$b_2 = 0 \oplus 1 \oplus 0 \oplus 1 = 0$
$b_3 = 0 \oplus 0 \oplus 0 \oplus 1 = 1$

QUINDI

$W = (0\,0\,0\,1\;1\,1\,0\,1\,0\,0\,1\,1) = (1\,D.\,3)$

$b_0 = 0 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 1 = 0$
$b_1 = 0 \oplus 0 \oplus 1 \oplus 0 \oplus 0 \oplus 1 = 0$
$b_2 = 1 \oplus 1 \oplus 0 \oplus 1 \oplus 0 = 1$
$b_3 = 1 \oplus 0 \oplus 0 \oplus 0 \oplus 1 \oplus 1 = 1$

C'È UN ERRORE NEL BIT $1100_2 = 12$



$b_0 = 0 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 1 = 0$
$b_1 = 0 \oplus 0 \oplus 1 \oplus 0 \oplus 0 \oplus 1 = 0$
$b_3 = 0 \oplus 1 \oplus 0 \oplus 1 \oplus 0 = 0$
$b_7 = 0 \oplus 0 \oplus 0 \oplus 1 \oplus 1 = 0$

IL MESSAGGIO NON PRESENTA ERRORI

2) $W = FF_H = (1111\ 1111)_2$

IL MESSAGGIO HA BISOGNO DI 4 BIT DI CONTROLLO

12	11	10	9	8	7	6	5	4	3	2	1
1	1	1	1	b_8	1	1	1	b_4	1	b_2	b_1

$b_0 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 1$
$b_1 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 1$
$b_2 = 1 \oplus 1 \oplus 1 \oplus 1 = 0$
$b_4 = 1 \oplus 1 \oplus 1 \oplus 1 = 0$

QUINDI

12	11	10	9	8	7	6	5	4	3	2	1
1	1	1	1	0	1	1	1	0	1	1	1

ORA

$R_1 = EF_H = (1110\ 0111\ 0111)$

$R_1 =$

$b_0 = 1 \oplus 0 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 1$

$b_1 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 0$

$b_2 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 = 0$

$b_3 = 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 = 1$

L'ERRORE SI TROVA NEL BIT $(1001)_2 = 9$

$R_2 = FF7_4 = (1111\ 1111\ 0111)_2$

$R_2 =$

$b_0 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 0$

$b_2 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 0$

$b_3 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 = 0$

$b_4 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 1$

L'ERRORE SI TROVA SUL BIT $(1000)_2 = 8$

(BIT DI CONTROLLO)

PAG 83

1) $w = FF00_H = (1111\ 1111\ 0000\ 0000)_2$

IL MESSAGGIO HA BISOGNO DI 5 BIT DI CONTROLLO

$b_0 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 = 1$

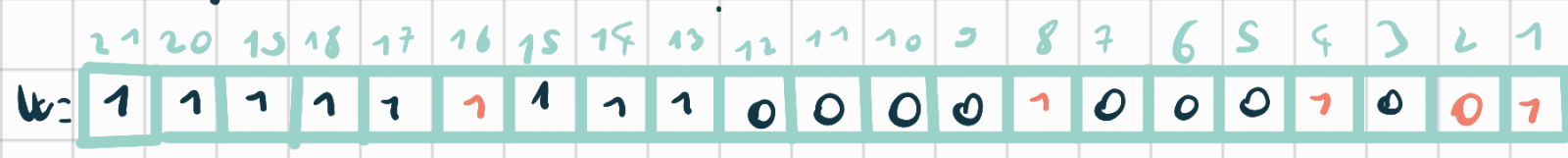
$b_1 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 = 0$

$b_2 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 = 1$

$b_3 = 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 = 1$

$b_4 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 1$

QUINDI



ORA

$R_1 = 0FF089_H = (0000\ 1111\ 1110\ 0000\ 1000\ 1001)_2$

b_0
b_1
b_2
b_3
b_4

$b_0 = 0 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 1$
$b_1 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 = 0$
$b_2 = 0 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 1$
$b_3 = 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 0$
$b_4 = 0 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 = 1$

L'ERRORE SI TROVA SUL BIT $(10101)_2 = 21$

$R_1 = 1F7089_H = (0001\ 1111\ 0111\ 0000\ 1000\ 1001)_2$

21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	1	1	1	1	0	1	1	1	0	0	0	0	1	0	0	0	1	0	0	1

b_0
b_1
b_2
b_3
b_4

$b_0 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 0$
$b_1 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 = 0$
$b_2 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 0$
$b_3 = 1 \oplus 1 \oplus 1 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 0 \oplus 1 = 0$
$b_4 = 1 \oplus 1 \oplus 1 \oplus 1 \oplus 1 \oplus 0 = 1$

L'ERRORE SI TROVA SUL BIT $(10000)_2 = 16$