

1- For a particular number of transistor, the IC area shrinks by half every 18 month.

$$1 \text{ year} = 12 \text{ month}$$

$$120 / 18 = 6.7$$

$$10 \text{ year} = 120 \text{ month}$$

$$10^9 \times 2^{6.7} = \underline{\underline{103 \text{ billions}}}$$

$$1 \text{ billions} = 10^9$$

2- a) $F = (1 \text{ AND } 1) \text{ OR } 1 \text{ OR } 0 = 1 \text{ OR } 1 \text{ OR } 0 = 1 \text{ OR } 0 = 1$

b) $F = (0 \text{ AND } 1) \text{ OR } 1 \text{ OR } 0 = 0 \text{ OR } 1 \text{ OR } 0 = 1 \text{ OR } 0 = 1$

c) $F = (1 \text{ AND } 1) \text{ OR } 0 \text{ OR } 0 = 1 \text{ OR } 0 \text{ OR } 0 = 1 \text{ OR } 0 = 1$

d) $F = (1 \text{ AND } 0) \text{ OR } 1 \text{ OR } 1 = 0 \text{ OR } 1 \text{ OR } 1 = 1$

3- a. "a,b,c,d" b. "And a, a', b, a, c, d, And c'" c. "a, a'b, acd, c'"

4- Only those whose results are 1 from the operations in the table are taken into account.

$$\Rightarrow F = a'b'c + a'bc' + a'bc + ab'c + abc' + abc$$

5-

$$F = a'b'c + a'bc' + a'bc + ab'c + abc' + abc$$

$$F = b'c(a'+a) + bc'(a'+a) + bc(a'+a)$$

$$F = b'c + bc' + bc$$

$$F = c(b'+b) + bc'$$

$$F = c + bc'$$

6- $F = (a+b)' * a$

$$G = a + b'$$

$$F = (a'b)' * a$$

$$F = (aa') * (ab)$$

$$F = 0 * (ab)$$

a	b	F	G
0	0	0	1
0	1	0	0
1	0	0	1
1	1	0	1

$\Rightarrow F \neq G$

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* Regardless of a and b F is always zero.

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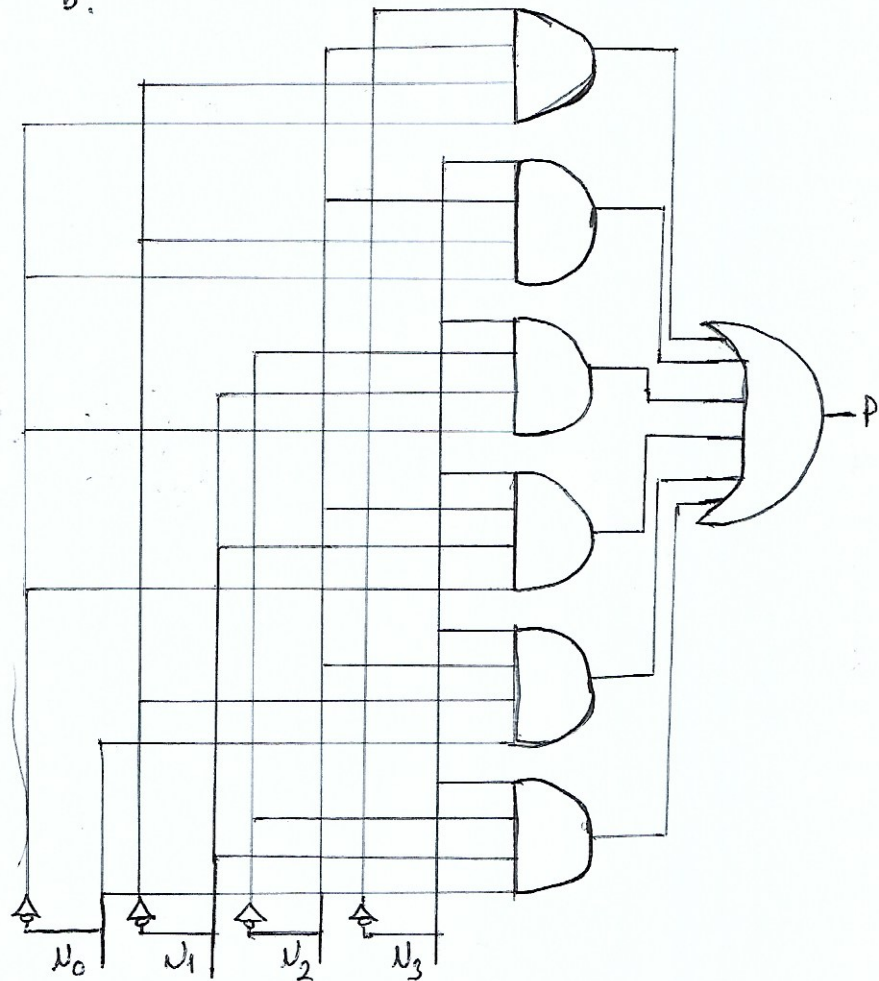
u_0	u_1	u_2	u_3	P
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

Step 1=)

Step 2=)

$$a. P = u_0' u_1' u_2' u_3' + u_0' u_1' u_2 u_3 + u_0' u_1 u_2' u_3' + u_0' u_1 u_2 u_3 + u_0 u_1' u_2 u_3 + u_0 u_1 u_2' u_3 + u_0 u_1 u_2 u_3'$$

b.



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Step 1 \Rightarrow

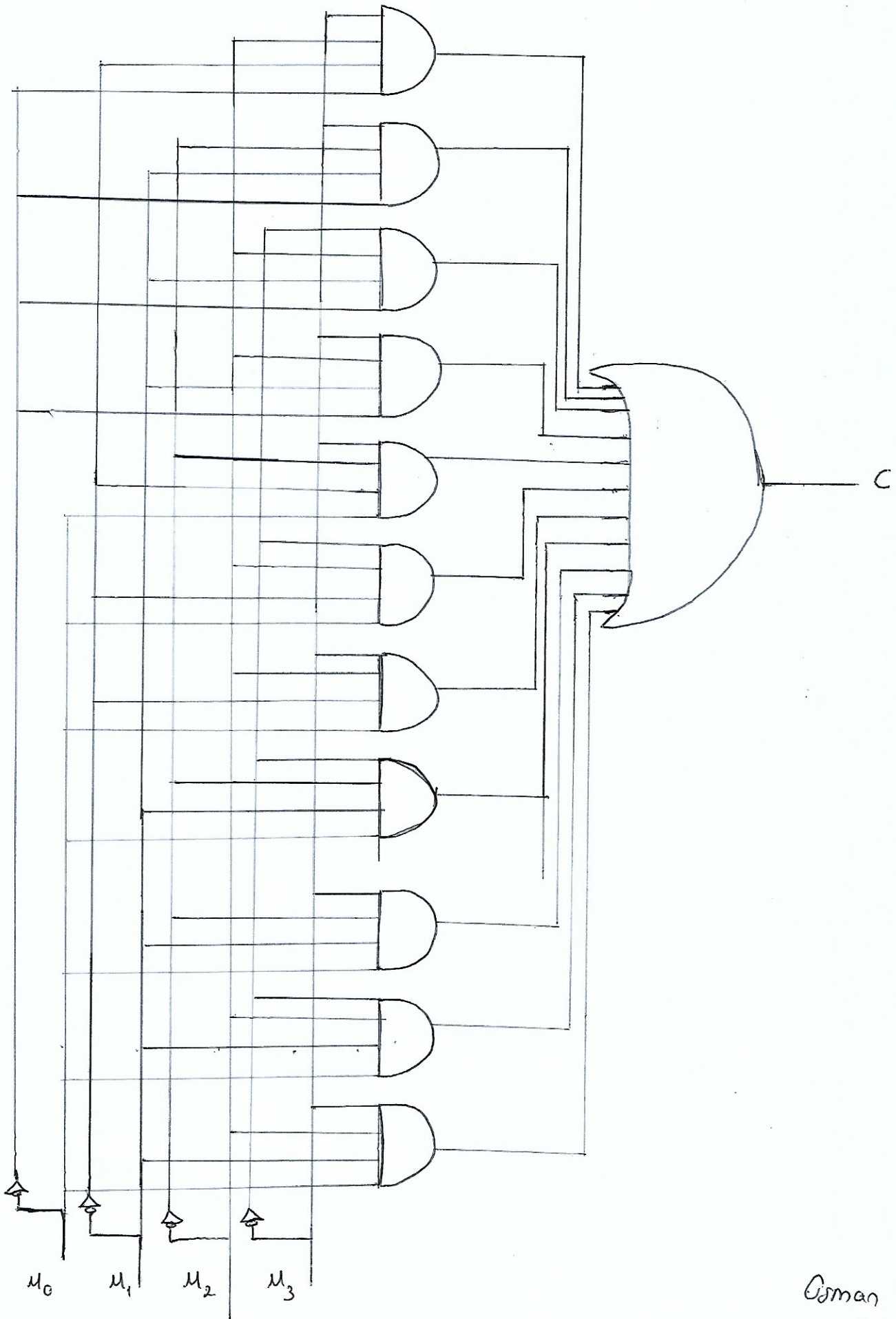
μ_0	μ_1	μ_2	μ_3	C
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	<u>1</u>
0	1	1	0	<u>1</u>
0	1	1	1	<u>1</u>
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Step 2 \Rightarrow

a. $C = \mu_0' \mu_1' \mu_2 \mu_3 + \mu_0' \mu_1 \mu_2' \mu_3 + \mu_0' \mu_1 \mu_2 \mu_3' +$
 $\mu_0' \mu_1 \mu_2 \mu_3 + \mu_0 \mu_1' \mu_2' \mu_3 + \mu_0 \mu_1' \mu_2 \mu_3' +$
 $\mu_0 \mu_1' \mu_2 \mu_3 + \mu_0 \mu_1 \mu_2' \mu_3' + \mu_0 \mu_1 \mu_2' \mu_3 +$
 $\mu_0 \mu_1 \mu_2 \mu_3' + \mu_0 \mu_1 \mu_2 \mu_3$

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b.



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