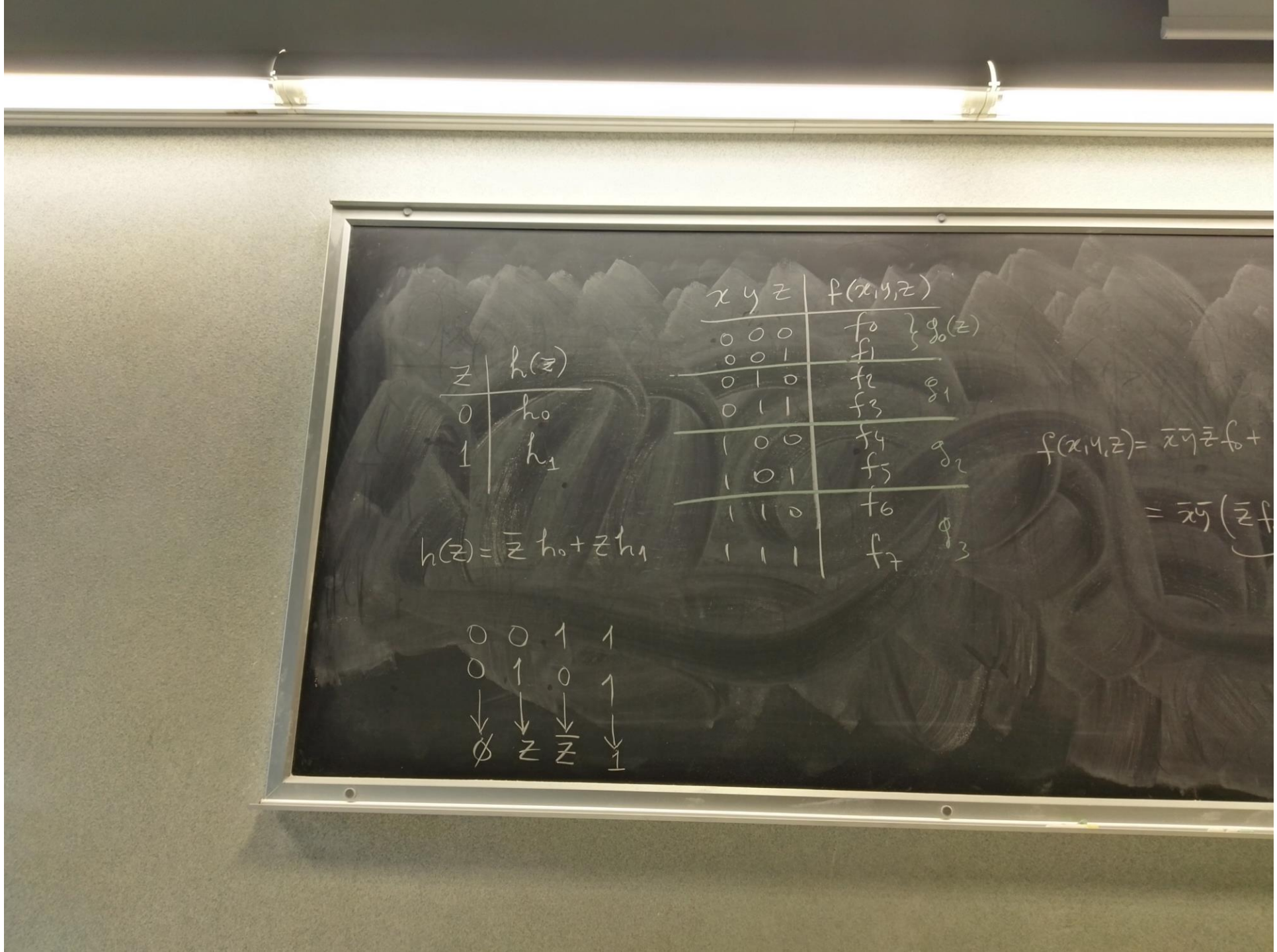
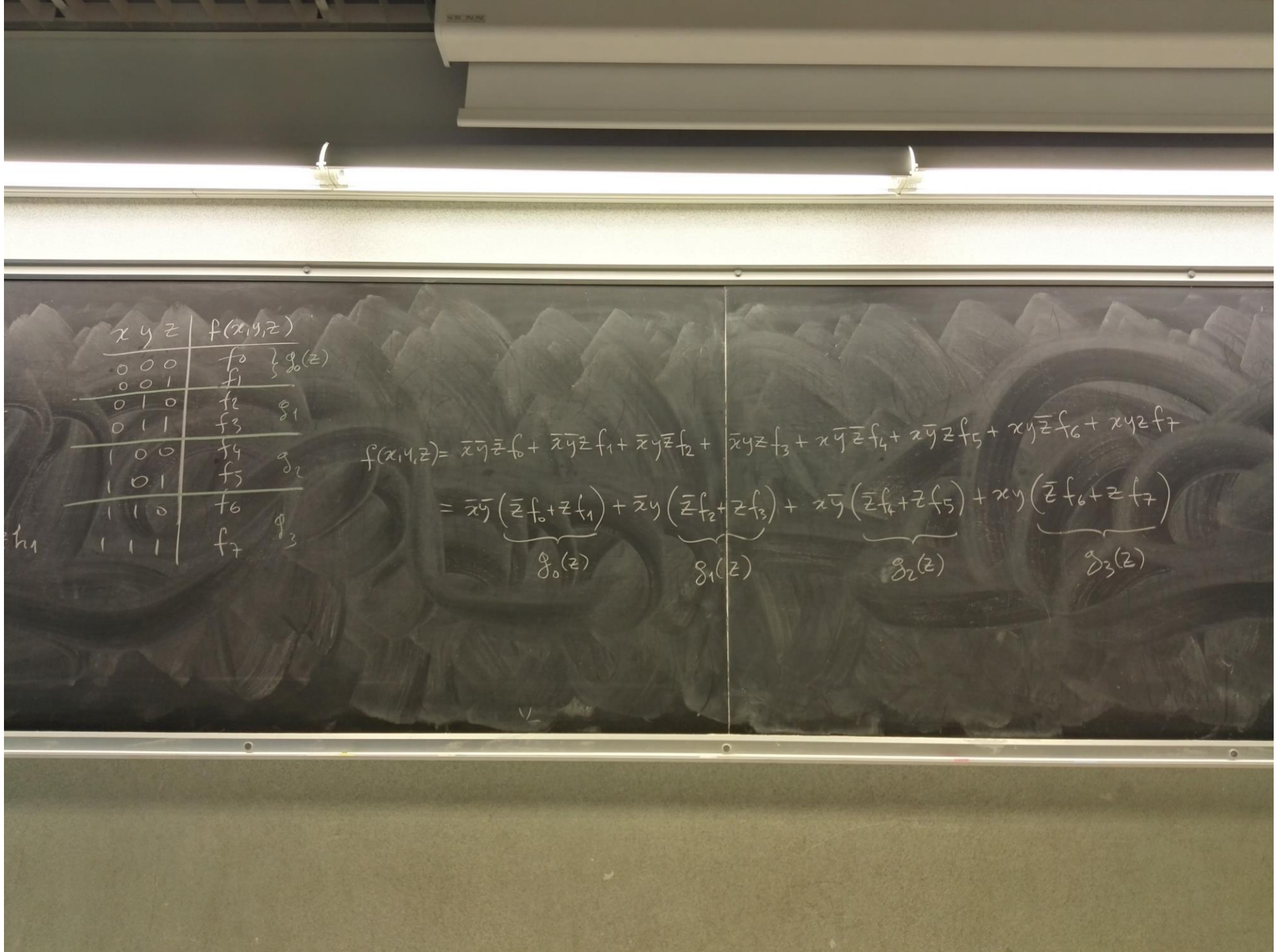
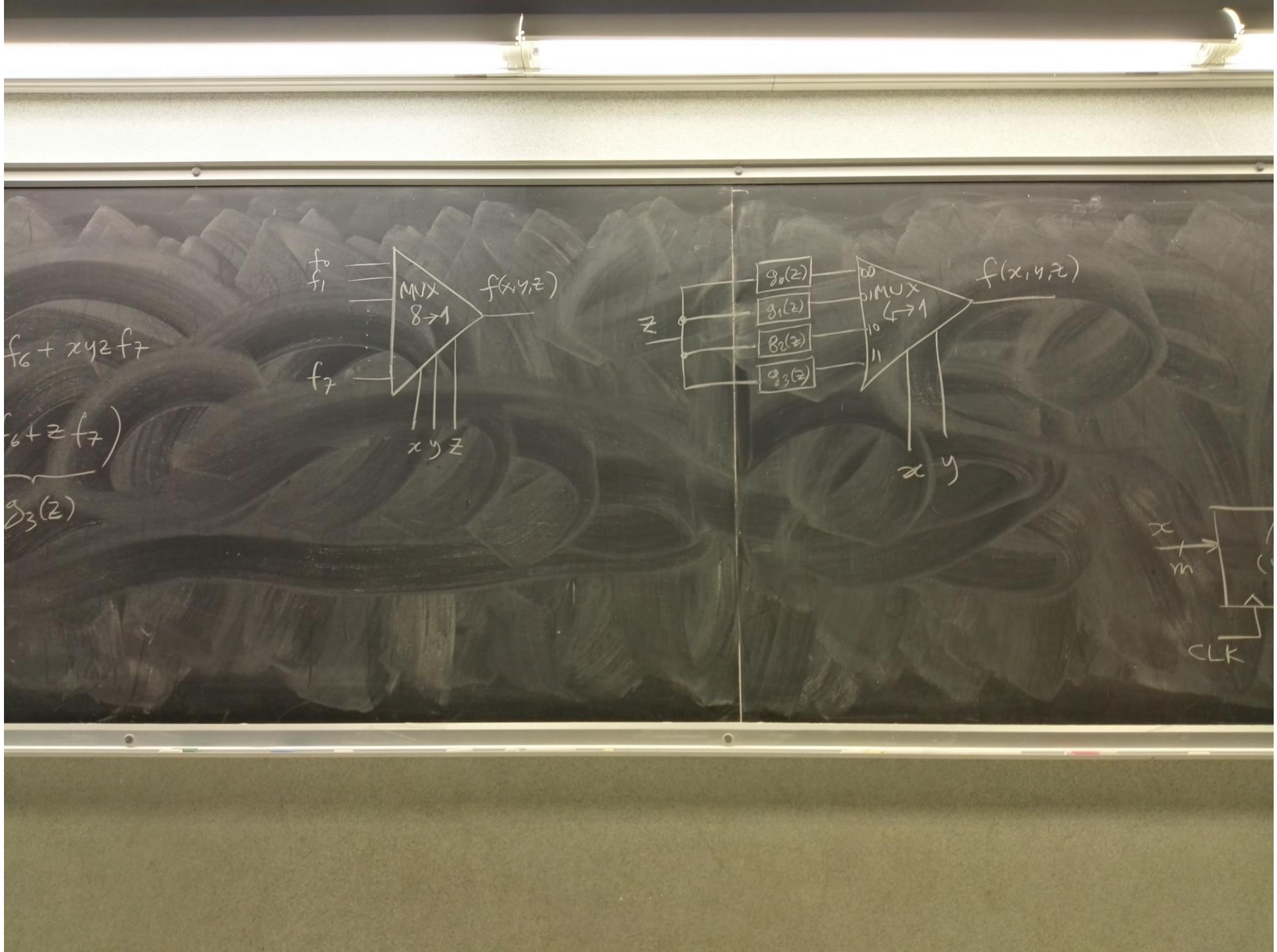

x y z | f(x,y,z)
0 0 0 | f0 } g0(z)
0 0 1 | f1
0 1 0 | f2 g1
0 1 1 | f3
1 0 0 | f4 g2
1 0 1 | f5
1 1 0 | f6 g3
1 1 1 | f7
z | h(z)
0 | h0
1 | h1
h(z) = z̄ h0 + z h1
0 0 1 1
0 1 0 1
∅ z z̄ 1
f(x,y,z) = x̄ȳ z f0 +
= x̄ȳ (z f

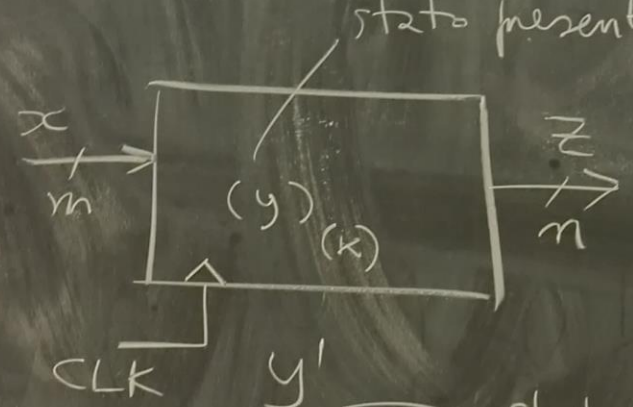

x y z | f(x,y,z)
0 0 0 | f0 } g0(z)
0 0 1 | f1
0 1 0 | f2 g1
0 1 1 | f3
1 0 0 | f4 g2
1 0 1 | f5
1 1 0 | f6
1 1 1 | f7 g3
f(x,y,z) = x̄ȳz̄f0 + x̄ȳzf1 + x̄yz̄f2 + x̄yzf3 + xȳz̄f4 + xȳzf5 + xyz̄f6 + xyzf7
= x̄ȳ(z̄f0 + zf1) + x̄y(z̄f2 + zf3) + xȳ(z̄f4 + zf5) + xy(z̄f6 + zf7)
g0(z) g1(z) g2(z) g3(z)


$f_6 + xyz f_7$
$f_6 + z f_7$
$g_3(z)$
f_0
f_1
MUX
8→1
$f(x,y,z)$
f_7
x y z
z
$g_0(z)$
$g_1(z)$
$g_2(z)$
$g_3(z)$
00
01
10
11
MUX
4→1
$f(x,y,z)$
x y
x
m
CLK

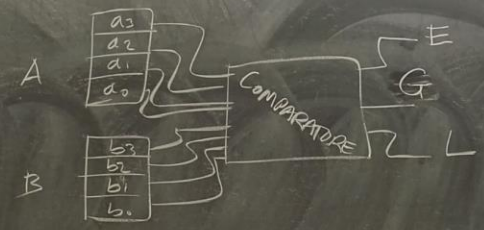
$f(x,y,z)$

Reti Sequenziali

$x_{m-1}\, x_{m-2} \ldots x_0$ (m)	$y_{k-1}\, y_{k-2} \ldots y_0$ (k)	$z_{n-1}\, z_{n-2} \ldots z_0$ (n)



x	y	e(x,y)	g(x,y)	l(x,y)
0	0	1	0	0
0	1	0	0	1
1	0	0	1	0
1	1	1	0	0

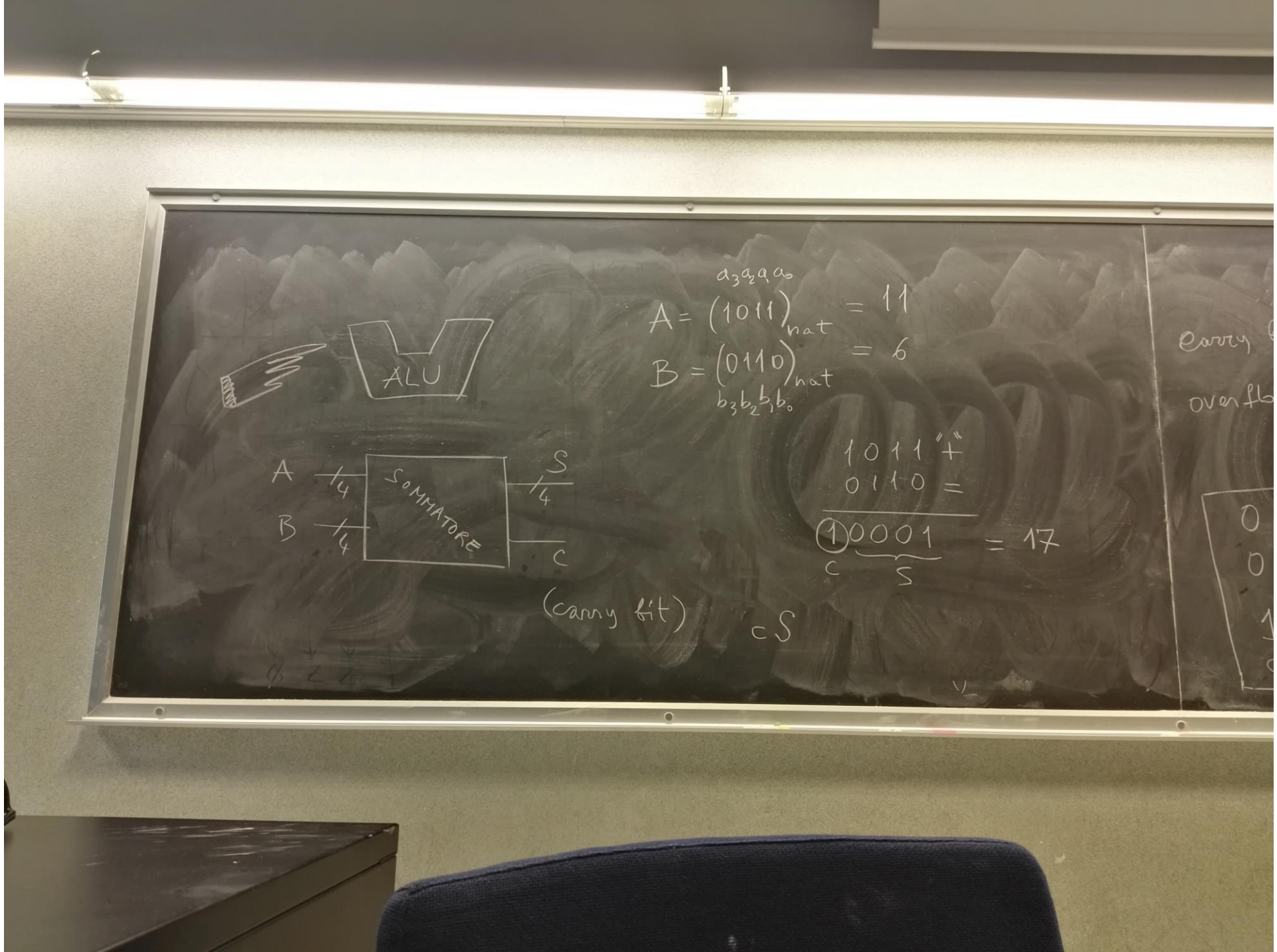


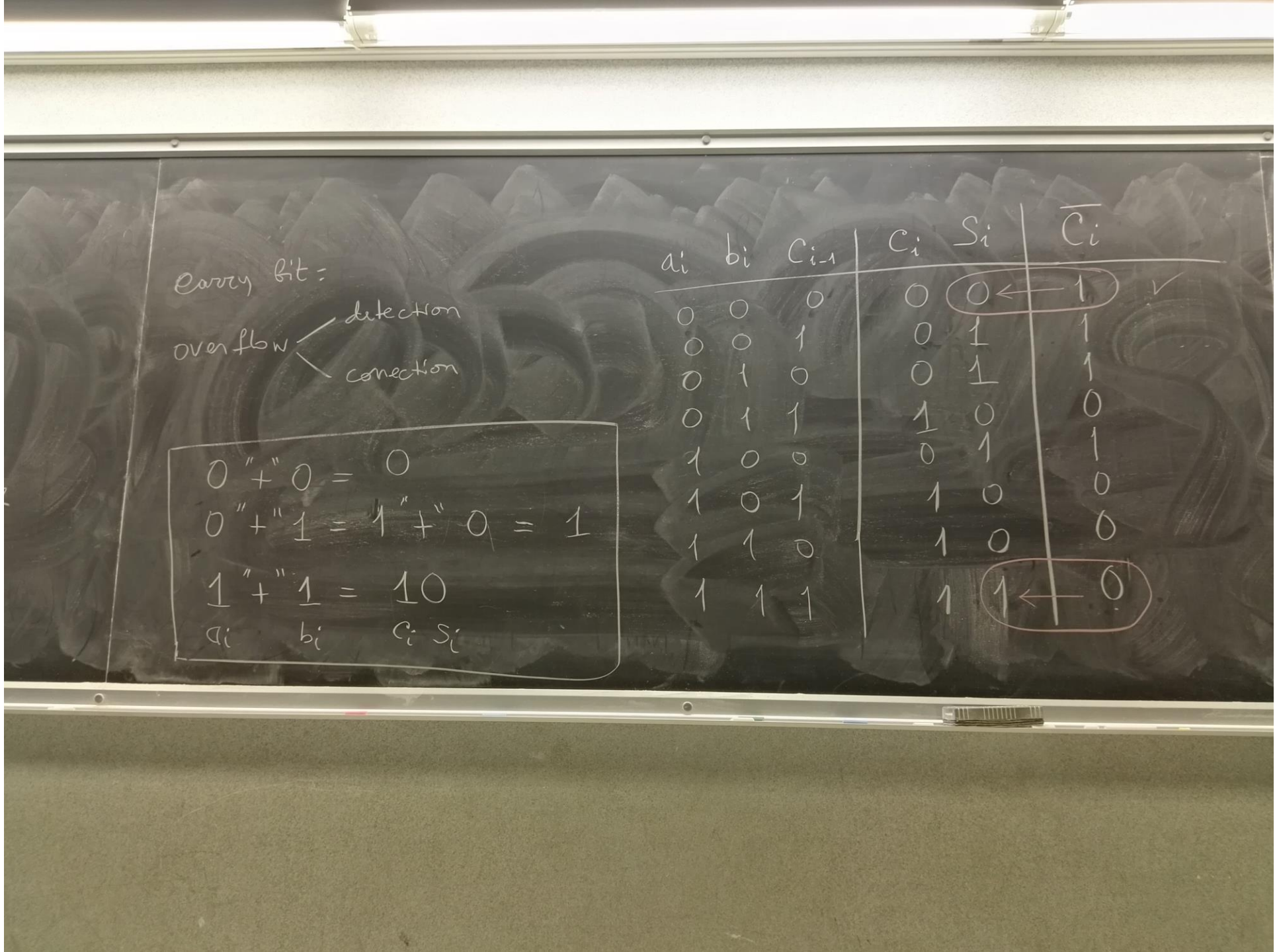
$E = e_3 \cdot e_2 \cdot e_1 \cdot e_0$

$G = g_3 + e_3 g_2 + e_3 e_2 g_1 + e_3 e_2 e_1 g_0$

110 724

101 578


ALU
A
B
4
4
SOMMATORE
S
4
C
(carry bit)
cS
$a_3a_2a_1a_0$
$A = (1011)_{nat} = 11$
$B = (0110)_{nat} = 6$
$b_3b_2b_1b_0$
1011 "+"
0110 =
10001 = 17
C S
carry
overflo


Carry Bit:
overflow
detection
correction
0 "+" 0 = 0
0 "+" 1 = 1 "+" 0 = 1
1 "+" 1 = 10
ai bi ci Si
ai bi ci-1 | ci Si | Ci
0 0 0 | 0 0 | 1
0 0 1 | 0 1 | 1
0 1 0 | 0 1 | 1
0 1 1 | 1 0 | 0
1 0 0 | 0 1 | 0
1 0 1 | 1 0 | 0
1 1 0 | 1 0 | 0
1 1 1 | 1 1 | 0

"full adder"

$$c_i = a_i b_i + a_i c_{i-1} + b_i c_{i-1}$$

$$s_i = \bar{a}_i \bar{b}_i c_{i-1} + \bar{a}_i b_i \bar{c}_{i-1} + a_i \bar{b}_i \bar{c}_{i-1} + a_i b_i c_{i-1}$$

$$s_i(a_i, b_i, c_{i-1}, \bar{c}_i) = \bar{c}_i (a_i + b_i + c_{i-1}) + a_i b_i c_{i-1}$$