Albert Comas Grup: 20

Exercicis en Paler

T. 12

①

LD, LDB, ST, STB => anul·lats

PC (100 u.t) => I-Mem (800 u.t) => Control Logic =>

=> Regfile (@B → B) (120 u.t) => Mux (40 u.t) =>

=> ALU (860 u.t) => Mux 4-1 (80 u.t) => Regfile (D → Reg) (40 u.t)

T_P = 2050 u.t

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②

$\frac{264.000}{198.750} = 1,328 \cdot 100 = 132,8 \Rightarrow$ 32,8 % més ràpid

a)

	Unicicle		Multicicle	
MOVI R0, 0x00	1		3	
MOVHI R0, 0x10	1		3	
LD R1, 0(R0)	1		4	
MOVI R3, 0	1		3	
MOVI R4, 0x01	1		3	
MOVI R5, 16	1		3	
MOVI R6, -1	1		3	(8 → x3 ; 750 x)
b - AND R2, R1, R4	16	88 x 3000 u.t	16x3	+
ADD R3, R3, R2	16	= 264.000 u.t	16x3	(1 x4 ; 750 x)
SHL R1, R1, R6	16		16x3	= 198.750 u.t
ADDI R5, R5, -1	16		16x3	
BNZ R5, -5	16		16x3	
OUT 3, R3	1		3	
	88 cicles		8 → de 3 ; 1 de 4	

$\underbrace{11}_{SE}1000 \Rightarrow SHL$ { 111000, 011100, 001110, 000111, 000011, 000001, 000000 } 6

b)

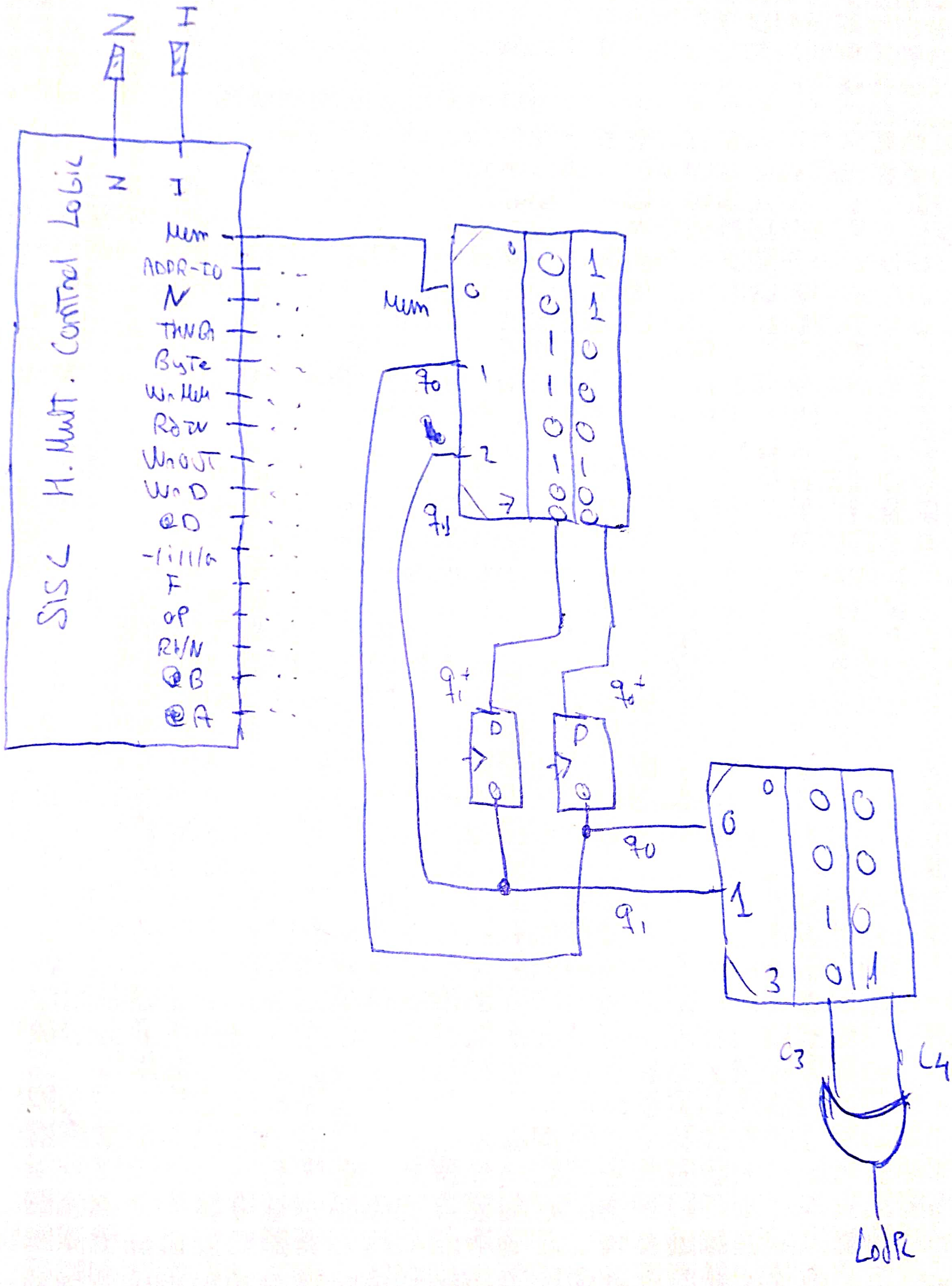
	Unicicle	Multicicle
MOVI R0, 0x00	1	3
MOVHI R0, 0x10	1	3
LD R1, 0(R0)	1	4
MOVI R3, 0	1	3
MOVI R4, 0x01	1	3
MOVI R6, -1	1	3
B- AND R2, R1, R4	6	6x3
ADD R3, R3, R2	6	6x3
SHL R1, R1, R6	6	6x3
BNZ R1, -4	6	6x3
OUT 3, R3	1	3
	31 c.	30 de 3 1 de 4

$31 \times 3000 = 93.000$ u.t

$1 \times 4 \times 750 + 30 \times 3 \times 750 = 70.500$ u.t

$\frac{93000}{70500} \cdot 100 = 131,91 \Rightarrow 31,91\%$ més ràpid

③



Z
I
SISC H.MULT. Control Logic
Mem
ADDR-IO
N
Byte
WrMem
RdIN
WrOUT
WrD
@D
F
OP
@B
@A
q_0
q_1
q_1^+
q_0^+
D
c_3
c_4
LdPC