①

MOVHI R5, A4

1001 | 101 1 | 1010 | 0100
  9   B   A   4

②

0FCF

0000 1111 0100 1111 => SUL R1, R7, R4

③ PC: 00AE

PC+2 + N·2   PC-10   00A4

SUL R7, R7, R2

0001
0000

LD R2, 30(R5)

            31   0000 0000 0001 1111 = 31

001F => imparell (Trion d 1) => 0001 1110 => 001E

00 1F1E

001E
001F

4

e)
```
ADDI  R7, R2, -1
BNZ   R2, 1
ADD   R3, R5, R5

SUB   R7, R4, R5
```

5

c) $V[10] = V[R4+3]$

d) WB
```
CMPLEU R7, R3, R1
ADDI   R3, R1, -1
```

e)
```
CMPLTUI R1, R1, 320
BZ R1, 2
ADD R7, R2, R2

ADD R5, R7, R7
```

Albert Comar

```
MOVI   R5, 0
MOVI   R2, 16
MOVI   R1, 1
MOVI   R3, -1
AND    R4, R7, R1
BZ     R4, 1
ADD    R5, R5, R6
SHL    R6, R6, R1
SHL    R7, R7, R3
ADDI   R2, R2, -1
BNZ    R2, 80T
```

7

		PC	R0	R1	R2	R3	R4	R5	R6	R7
			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	~~0003~~	~~0005~~
0	MOVI R5,0	000C						0000		
3	MOVI R2,16	000E								
6	MOVI R1,1	0010	~~XXXX~~		0010					
9	MOVI R3,-1	0012		0001						
12	AND R4,R7,R1	0014				FFFF				
15	BZ R4,1	0016					0001			
18	ADD R5,R5,R6	0018						~~0005~~ 0003		
21	SHL R6,R6,R1	001A								
24	SHL R7,R7,R3	001C							0006	
27	ADDI R2,R2,-1	001E								0002
30	BNZ R2,23	0020			000F					
33	AND R4,R7,R1	0014					~~0000~~ 0000			
36	BZ R4,23	0016								
39	SHL R6,R6,R1	001A								
42	SHL R7,R7,R3	001C							000C	
45	ADDI R2,R2,-1	001E								0001
48	BNZ R2,23	0020			000E					
51	AND R4,R7,R1	0014								
54	BZ R4,23	0016					0001			
57	ADD R5,R5,R6	0018						000F		

a) 60 Ciclos Fetch (21)

b) PC=0020 R0=XXXX R1=0001
   R3=FFF R2, R4-R57 =0000

8

MOVI R5,0
MOVI R1,1
MOVI R3,-1
AND R4,R7,R1
BZ R4,ondig
ADD R5,R5,R6
SHL R6,R6,R1
SHL R7,R7,R3
BNZ R7,8on

(9)

Ciclo	Instrucción	PC	R0	R1	R2	R3	R4	R5	R6	R7
			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
0	MOVI R5,0	000C						0000		
3	MOVI R1,1	000E		(xxxx)						
6	MOVI R3,1	0010		0001		FFFF				
9	AND R4,R3,R1	0012					0001			
12	BZ R4, endW	0014								
15	ADD R5,R5,R6	0016							0081	
18	SHL R6,R6,R1	0018							0102	
21	SHL R7,R7,R3	001A								0002
24	DNZ R3, loop	001C								
27	AND R4,R3,R1	0012								
30	BZ R4, endW	0014					0000			
33	SHL R6,R6,R1	0018							0204	
36	SHL R7,R7,R7	001A								0001
39	DNZ R7, loop	001C								
42	AND R4,R7,R1	0012					0001			
45	BZ ,R4, endW	0014								
48	ADD R5,R5,R6	0016						0285		
51	SHL R6,R6,R1	0018							0408	
54	SHL R7,R7,R7	001A								0000
57	BNZ R7, loop	001C								

a) 20 ciclos

b) PC = 001C   R0 = xxxx =R2   R1 = 0001 =R4

R3 = FFFF   R5 = 0285   R6 = 0408   R7 = 0000

⑩ Emsamblador	Maquina	Hexa
IN R6, h-STATUS	1010 110 0 0000 0001	AC 01
BZ R6, -2	1000 110 0 1111 1110	8C FE
IN R6, h-data	1010 110 0 0000 0000	AC 00
IN R7, h-STATUS	1010 111 0 0000 0001	AE 01
BZ R7, -2	1000 111 0 1111 1110	8E FE
IN R7, h-data	1010 111 0 0000 0000	AE 00
MOVI R5, 0	1001 101 0 0000 0000	9A 00
MOVI R1, 1	1001 001 0 0000 0001	92 01
MOVI R3, -1	1001 011 0 1111 1111	96 FF
AND R4, R7, R1	0000 111 001 100 000	0E 60
BZ R4, 1	1000 100 0 0000 0001	88 01
ADD R5, R5, R6	0000 101 110 101 100	0B AC
SHL R6, R6, R1	0000 110 001 110 111	0C 77
SHL R7, R7, R3	0000 111 011 111 111	0E FF
BNZ R7, -6	1000 111 1 1111 1010	8F FA
IN R0, P-STATUS	1010 000 0 0000 0010	A0 02
BZ R0, -2	1000 000 0 1111 1110	80 FE
OUT P-data, R5	1010 101 1 0000 0000	AB 00
BZ R7, -19	1000 111 0 1110 1101	8E ED