# Relatório

# Projeto SAGUI

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Aluno: Athos Santos Scremin

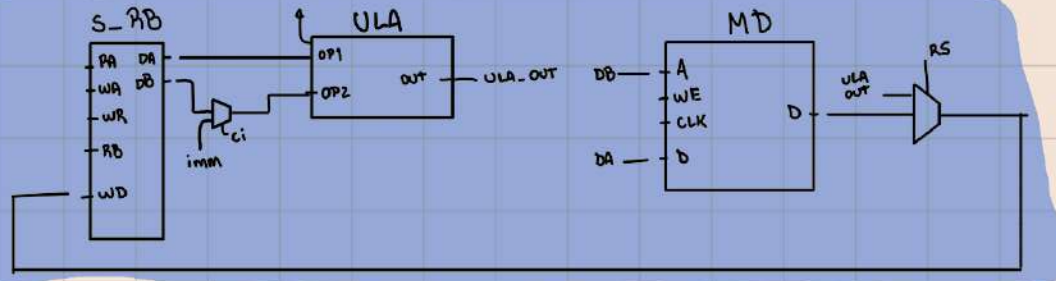
GRR: 20232332

# DATA - PATH SAGUI VETORIAL

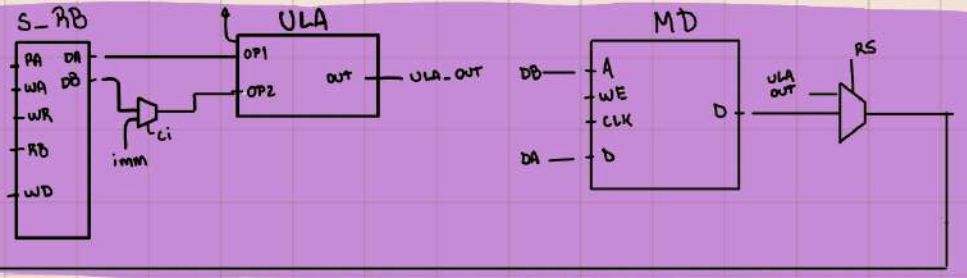
UC_V

UC_E

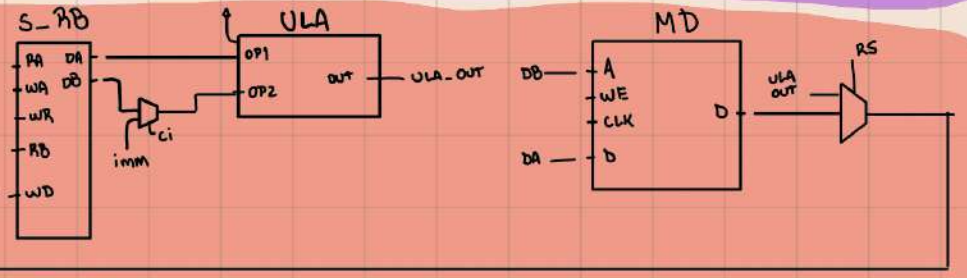
1° PE



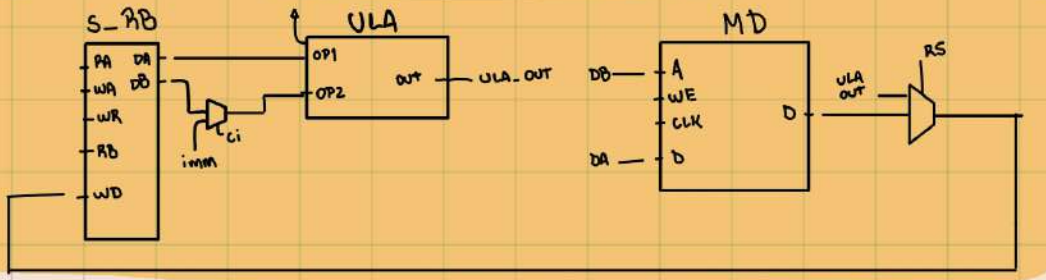

2ª PE

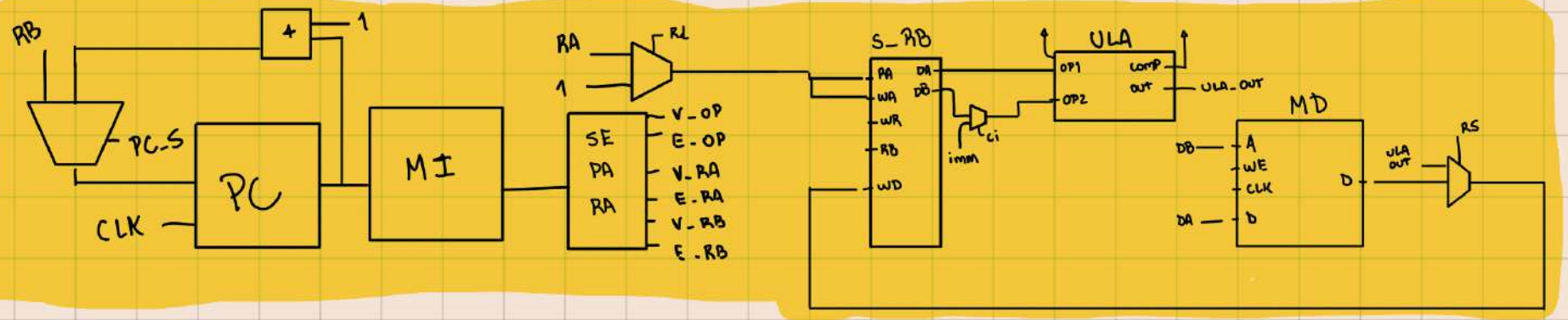


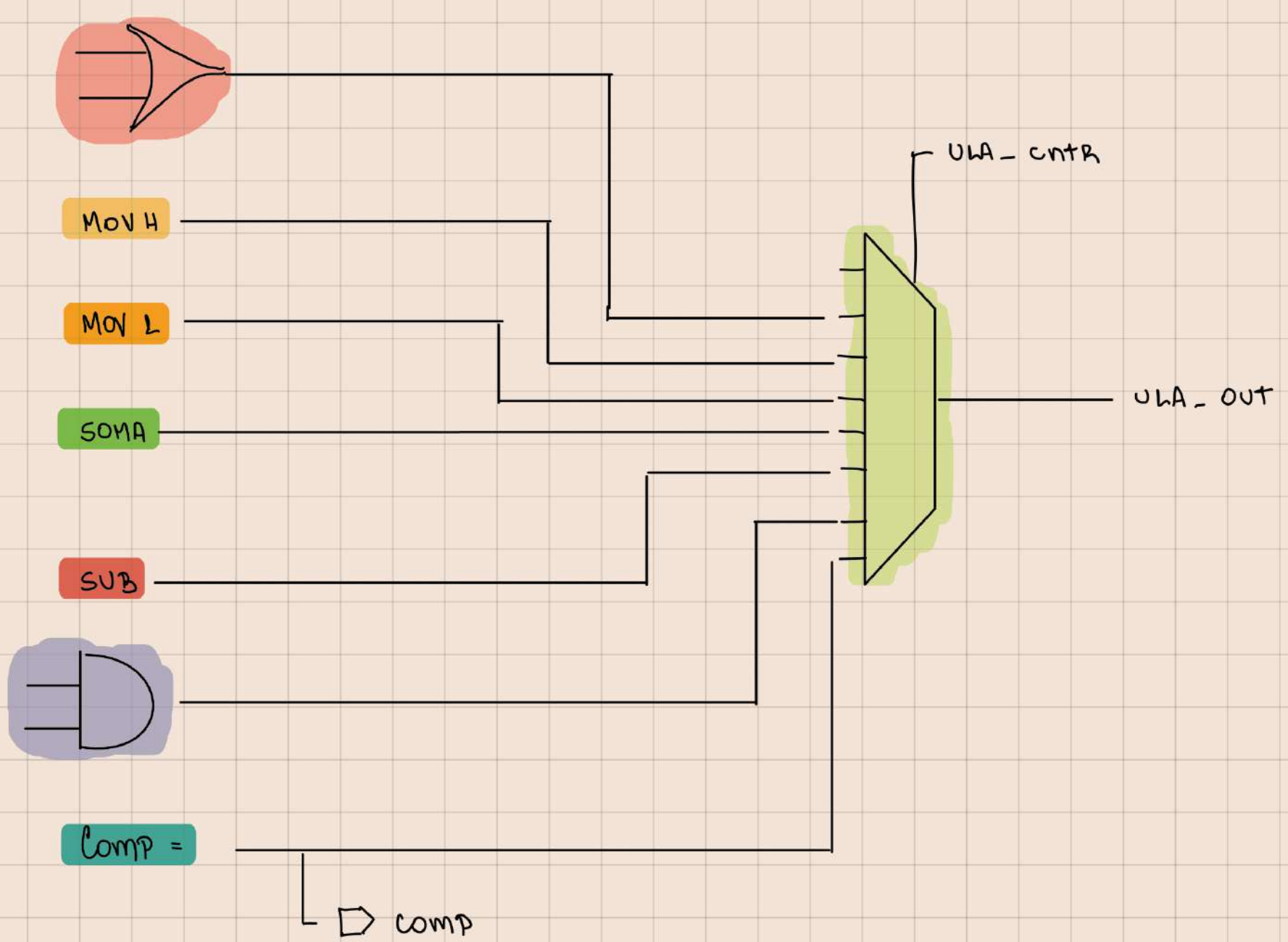

3º PE



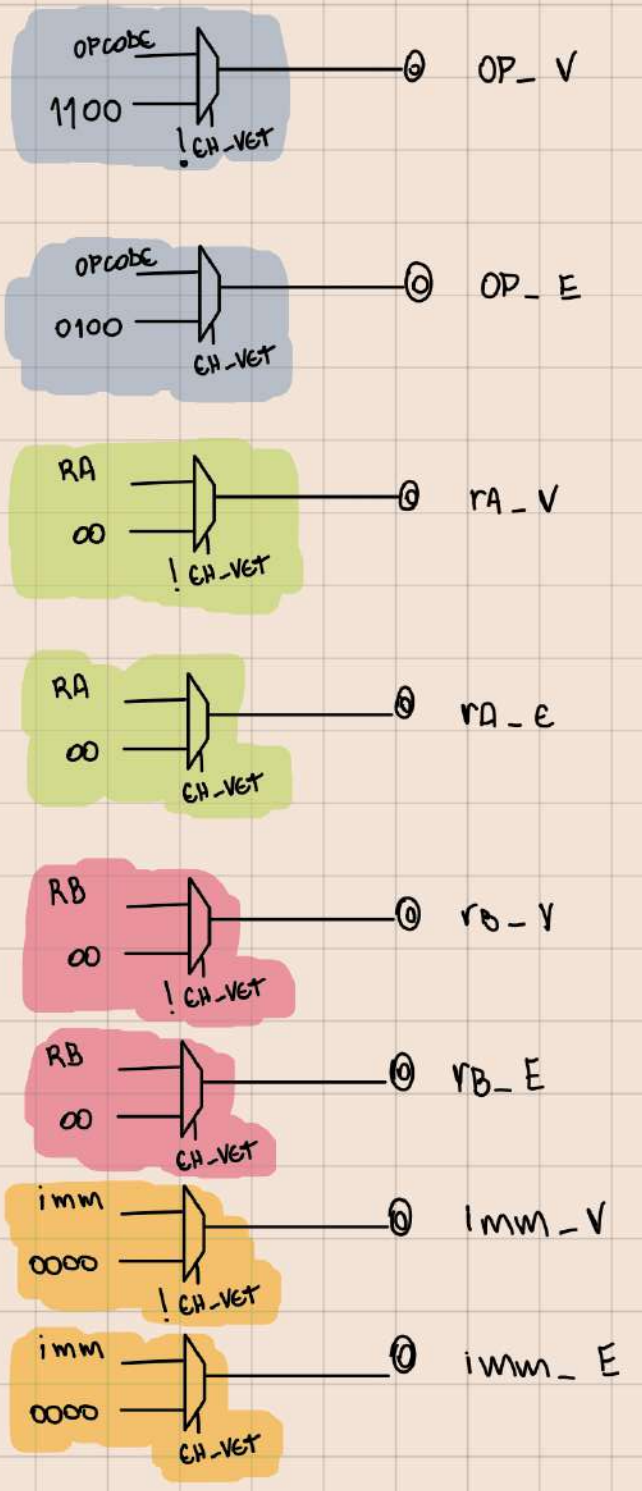

4º PE




ULA
ULA_ cntR
MOV H
MOV L
SOMA
SUB
Comp =
ULA_ OUT
comp


OPCODE [3] → EH_VET




SEPARA

# UC

## SPE

| | INST | WR | Ci | ULA_OP | RS | WM | PC_S | Mov i |
|---|---|---|---|---|---|---|---|---|
| LD | 0000 | 1 | X | X | 1 | 0 | 0 | 0 |
| ST | 0001 | 0 | X | X | X | 1 | 0 | 0 |
| MOVH | 0010 | 1 | L | 010 | 0 | 0 | 0 | 1 |
| MOVL | 0011 | 1 | L | 011 | 0 | 0 | 0 | 1 |
| ADD | 0100 | 1 | 0 | 100 | 0 | 0 | 0 | 0 |
| SUB | 0101 | 1 | 0 | 101 | 0 | 0 | 0 | 0 |
| AND | 0110 | 1 | 0 | 110 | 0 | 0 | 0 | 0 |
| BZ | 0111 | 0 | x | 111 | X | 0 | 1 | 0 |

## VTE

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LD | 1000 | 1 | x | x | 1 | 0 | 0 | 0 |
| ST | 1001 | 0 | X | X | X | 1 | 0 | 0 |
| MOVH | 1010 | 1 | 1 | 010 | 0 | 0 | 0 | 1 |
| MOVL | 1011 | 1 | 1 | 011 | 0 | 0 | 0 | 1 |
| ADD | 1100 | 1 | 0 | 100 | 0 | 0 | 0 | 0 |
| SUB | 1101 | 1 | 0 | 101 | 0 | 0 | 0 | 0 |
| AND | 1110 | 1 | 0 | 110 | 0 | 0 | 0 | 0 |
| OR | 1111 | 1 | 0 | 001 | 0 | 0 | 0 | 0 |

# ULA_OP

| | INST | ULA_OP |
|---|---|---|
| OR | 1111 | 001 |
| MOVH | 0010 | 010 |
| MOVH | 1010 | 010 |
| MOVL | 0011 | 011 |
| MOVL | 1011 | 011 |
| ADD | 0100 | 100 |
| ADD | 1100 | 100 |
| SUB | 0101 | 101 |
| SUB | 1101 | 101 |
| AND | 0110 | 110 |
| AND | 1110 | 110 |
| BZ | 0111 | 111 |

# PC_SOURCE

| BZ | COMP | PC_S |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |

# CARREGA 1º VETOR

```
0  E  MOVH  0000   }
1  E  MOVL  0010   }  E_RL = 2
2  E  ADD   R2, RL    E_R2 = 2
3  V  ST    R0, R0    M[R0] = R0
4  V  MOVH  0000   }
5  V  MOVL  0100   }  V_RL = 4
6  E  MOVH  0001   }
7  E  MOVL  0111   }  RL = 23
8  E  BR    R2, RL
9  V  ADD   RL, R0    V_RL = 4 + id
A  V  ST    RL, AL    M[RL] = RL
B  E  MOVH  0000   }
C  E  MOVL  0001   }  E_RL = 1
D  E  SUB   R2, RL    R2 = R2 - 1
E  V  SUB   RL, R0    V_RL = 4 - id
F  V  SUB   R3, R3    R3 = 0
10 V  ADD   R3, RL    R3 = RL
11 V  MOVH  0       }
12 V  MOVL  4       }  V_RL = 4
13 V  ADD   RL, R3    RL = R3 + 4
14 E  MOVH  0000    }
15 E  MOVL  0110    }  E_RL = 6
16 E  BR    R0, RL
```

```
23 E MOVH 0000   } E_RL = 3
24 E MOVL 0011   }
25 E ADD  R2, RL   E_R2 = 3
26 V MOVH 0000   } V_RL = 12
27 V MOV  1100   }
28 V SUB  R2, R2   R2 = 0
29 V ADD  R2, RL   R2 = 12
30 V SUB  R3, R3   R3 = 0
31 V MOVH 0001   } V_RL = 20
32 V MOVL 0100   }
33 V ADD  R3, RL   R3 = 20
34 E MOVH 0011   } RL = 52
35 E MOVL 0100   }
36 E BR   R2, RL
37 V ADD  R3, R0   R3 = R3 + id
38 V ADD  R2, R0   R2 = R2 + id
39 V ST R3, R2     M[R2] = R3
40 V MOVH 0000   } V_RL = 4
41 V MOVL 0100   }
42 V SUB  R3, R0   R3 = R3 - id
43 V ADD  R3, RL   R3 = R3 + 4
44 V SUB  R2, R0   R2 = R2 - id
45 V ADD  R2, RL   R2 = R2 + 4
46 E MOVH 0000   } E_RL = 1
47 E MOVL 0001   }
48 E SUB  R2, RL   R2 = R2 - 1
49 E MOVH 0010   } E_RL = 34
50 E MOVL 0010   }
51 BR R0, RL
```

CARREGA 2º VETOR

```
52  E  MOVH  0000
53  E  MOVL  0011
54  E  ADD   R2, R1
55  V  MOVH  0001
56  V  MOV   1000
57  V  SUB   R2, R2
58  V  ADD   R2, R1
59  V  SUB   R3, R3
60  E  MOVH  0100
61  E  MOVL  1011
62  E  BR    R2, R0
63  V  ADD   R2, R0
64  V  ST    R3, R2
65  V  MOVH  0
66  V  MOVL  4
67  V  SUB   R2, R0
68  V  ADD   R2, R1
69  E  MOVH  0
70  E  MOVL  1
71  E  SUB   R2, R1
72  E  MOVH  0011
73  E  MOVL  1100
74  E  BR    R0, R1
```

E_R1 = 3

E_R2 = 3

V_R1 = 24

R2 = 0

R2 = 24

R3 = 0

E_R1 = JUMP

R2 = R2 + id

M[R2] = R3

V_R1 = 4

R2 = R2 - id

R2 = R2 + 4

E_R1 = 1

R2 = R2 - 1

E_R1 = JUMP

INICIALIZA R com 0

```
75  E  MOVH  0000   }
76  E  MOVL  00LL   }  E_RL = 3
77  E  ADD   R2, RL    E_R2 = 3
78  V  MOVH  00OL   }
79  V  MOV   LOOO   }  V_RL = 24
80  V  SUB   R2, R2    R2 = 0
81  V  ADD   R2, R0    R2 = R2 + id
82  E  MOVH  OLLO   }
83  E  MOVL  LOOL   }  E_R1 = JUMP
84  E  BR    R2, R0
85  V  LD    R3, R2    R3 = [R2]
86  V  MOVH  0000   }
87  V  MOVL  LLOO   }  V_RL = 12
88  V  ADD   R2, RL    R2 = R2 + 12
89  V  LD    RL, R2    RL = [R2]
90  V  ADD   R3, RL    R3 = R3 + RL
91  V  MOVH  0000   }
92  V  MOVL  LLOO   }  V_RL = 12
93  V  ADD   R2, RL    R2 = R2 + 12
94  V  ST    R3, R2    M[R2] = R3
95  V  SUB   R2, RL    R2 = R2 - 12
96  V  MOVH  0000   }  V_RL = 8
97  V  MOVL  LOOO   }
98  V  SUB   R2, RL    R2 = R2 - 8
99  E  MOVH  0000   }  E_RL = L
100 E  MOVL  000L   }
101 E  SUB   R2, RL    R2 = R2 - L
102 E  MOVH  OLOL   }
103 E  MOVL  OOLO   }  E_RL = JUMP
104 E  BR    R0, RL
```

SALVA VETOR DA SOMA

```
105 E  MOVH  OLLO   }  RL = 107
106 E  MOVL  LOLL   }
107 E  BR    R0, RL
```

# TESTES INDIVÍDUAIS

## VPE

| | | |
|---|---|---|
| 0 | V. MOVH 0 | RL = 4 |
| 1 | V. MOVL 4 | |
| 2 | V. ST RL, R2 | M[R2] = RL |
| 3 | V. LD R2, R2 | R2 = M[R2] |
| 4 | V. ADD R2, RL | R2 = R2 + 4 |
| 5 | V. SUB R2, R3 | R2 = R2 - 0 |
| 6 | V. AND R2, RL | 1000 & 0100 |
| 7 | V. OR R2, R3 | 0000 ou 0000 |

## SPE

| | | |
|---|---|---|
| 8 | MOV H 0 | RL = 6 |
| 9 | MOV L 6 | |
| 10 | ST RL, R0 | M[R0] = RL |
| 11 | ADD RL, RL | RL = RL + RL |
| 12 | LD R2, R0 | R2 = M[R0] |
| 13 | SUB RL, R2 | RL = RL - R2 |
| 14 | AND RL, R2 | RL & RL |
| 15 | MOVH 1 | RL = 1 |
| 16 | MOVL 1 | |
| 17 | BR R0, RL | ACABA |