

```

1  LIBRARY IEEE;
2  USE IEEE.STD_LOGIC_1164.ALL;
3
4  ENTITY TOP_LEVEL IS
5      PORT (
6          --CLK      :   IN STD_LOGIC;
7          REGWR      :   IN STD_LOGIC;
8          ALUCTR      :   IN STD_LOGIC_VECTOR(2 DOWNTO 0);
9          RS          :   IN STD_LOGIC_VECTOR(4 DOWNTO 0);
10         RT          :   IN STD_LOGIC_VECTOR(4 DOWNTO 0);
11         RD          :   IN STD_LOGIC_VECTOR(4 DOWNTO 0);
12         RESULT      :   OUT STD_LOGIC_VECTOR(31 DOWNTO 0) := "00000000000000000000000000000000";
13         ZERO        :   OUT STD_LOGIC;
14         CARRYOUT     :   OUT STD_LOGIC;
15         OVERFLOW     :   OUT STD_LOGIC);
16  END TOP_LEVEL;
17
18  ARCHITECTURE SIMPLE OF TOP_LEVEL IS
19
20      CONSTANT HOLD : TIME := 3 NS;
21
22      SIGNAL DATAA : STD_LOGIC_VECTOR(31 DOWNTO 0);
23      SIGNAL DATAB : STD_LOGIC_VECTOR(31 DOWNTO 0);
24      SIGNAL BUFF : STD_LOGIC_VECTOR(31 DOWNTO 0) := "00000000000000000000000000000000";
25      SIGNAL B_ZERO : STD_LOGIC;
26      SIGNAL B_OVER : STD_LOGIC;
27      SIGNAL B_CARRY : STD_LOGIC;
28
29  BEGIN
30
31      REG :
32          ENTITY WORK.REGISTER_FILE(BEHAVIOR)
33          PORT MAP(
34              REGWRITE => REGWR,
35              REGS      => RS,
36              REGT       => RT,
37              REGD       => RD,
38              WRITEDATA => BUFF,
39              READDATA1  => DATAA,
40              READDATA2  => DATAB);
41      --
42      ALU :
43          ENTITY WORK.ALU(STRUCTURAL)
44          PORT MAP(
45              ALUOP  => ALUCTR,
46              DATA1 => DATAA,
47              DATA2 => DATAB,
48              RESULT => BUFF,
49              ZERO   => B_ZERO,
50              CARRY  => B_CARRY,
51              OVER   => B_OVER);
52      --
53      RESULT <= BUFF WHEN BUFF'STABLE(HOLD) ELSE
54          "00000000000000000000000000000000" WHEN BUFF =
55          "UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU";
56      ZERO <= B_ZERO WHEN BUFF'STABLE(HOLD);
57      CARRYOUT <= B_CARRY WHEN BUFF'STABLE(HOLD);
58      OVERFLOW <= B_OVER WHEN BUFF'STABLE(HOLD);
59  END SIMPLE;

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