```
1
2   ------------------Leading Zeros detector(Finds any zeros between binary point and first 1--------------
3
4   library IEEE;
5   use IEEE.STD_LOGIC_1164.ALL;
6   use IEEE.NUMERIC_STD.ALL;
7
8   entity LeadZeroDet is
9       Port ( M : in  UNSIGNED (9 downto 0) :="0000000000";
10             Carry : in STD_LOGIC;
11             X : out  INTEGER := 0;
12             ShiftDirection : out  STD_LOGIC);
13  end LeadZeroDet;
14
15  architecture Behavioral of LeadZeroDet is
16
17  begin
18  process(M,Carry)
19     variable LeadZeros : INTEGER := 0;
20     variable TempM : UNSIGNED (9 downto 0) :="0000000000";
21     begin
22     TempM := M;
23     if Carry = '1' then --1.Ma + 1.Mb case
24        X <= 1;
25        Shiftdirection <= '1';
26     else
27        if M(9 downto 0) = "0000000000" then
28           LeadZeros := 10;
29        elsif M(9 downto 1) = "000000000" then
30           LeadZeros := 9;
31        elsif M(9 downto 2) = "00000000" then
32           LeadZeros := 8;
33        elsif M(9 downto 3) = "0000000" then
34           LeadZeros := 7;
35        elsif M(9 downto 4) = "000000" then
36           LeadZeros := 6;
37        elsif M(9 downto 5) = "00000" then
38           LeadZeros := 5;
39        elsif M(9 downto 6) = "0000" then
40           LeadZeros := 4;
41        elsif M(9 downto 7) = "000" then
42           LeadZeros := 3;
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43          elsif M(9 downto 8) = "00" then
44             LeadZeros := 2;
45          elsif M(9) = '0' then
46             LeadZeros := 1;
47          else
48             LeadZeros := 0;
49          end if;
50          X <= LeadZeros;
51          Shiftdirection <= '0';
52       end if;
53       end process;
54    end Behavioral;
55
56
```