

```
1  library ieee;
2  use ieee.std_logic_1164.all;
3  use ieee.std_logic_arith.all;
4  use ieee.std_logic_unsigned.all;
5  use ieee.numeric_std.all;
6
7  entity alu8 is
8      port(
9          a, b: in std_logic_vector(7 downto 0);
10         op: in std_logic_vector(2 downto 0);
11         result: inout std_logic_vector(7 downto 0);
12         cout, zero: out std_logic);
13 end alu8;
14
15 architecture description of alu8 is
16     component adder8 is
17         port(
18             cin, mode: in std_logic;
19             x, y: in std_logic_vector(7 downto 0);
20             s : out std_logic_vector(7 downto 0);
21             cout: out std_logic);
22     end component adder8;
23     signal addd: std_logic_vector(7 downto 0);
24     signal coutplus: std_logic;
25     signal shift: std_logic_vector(7 downto 0);
26     begin
27         muxadd: adder8 port map (op(2), op(2), a, b, addd, coutplus);
28         process (op)
29             begin
30                 if op = "000" then
31                     result <= a and b;
32                 elsif op = "001" then
33                     result <= a or b;
34                 elsif op = "010" then
35                     result <= addd;
36                     cout <= coutplus;
37                 elsif op = "110" then
38                     result <= addd;
39                     cout <= coutplus;
40                 elsif op = "100" then
41                     shift(0) <= a(7);
42                     shift(7 downto 1) <= a(6 downto 0);
43                     result <= shift;
44                 elsif op = "101" then
45                     shift(7) <= a(0);
46                     shift(6 downto 0) <= a(7 downto 1);
47                     result <= shift;
48                 else
49                     result <= (others => '0');
50                 end if;
51
52                 if result = "00000000" then
53                     zero <= '1';
54                 else
55                     zero <= '0';
56                 end if;
57             end process;
58         end description;
59
60 end description;
```