```vhdl
1    library ieee;
2    use ieee.std_logic_1164.all;
3
4    entity encoder32to5 is
5    port( R0out: in std_logic;
6          R1out: in std_logic;
7          R2out: in std_logic;
8          R3out: in std_logic;
9          R4out: in std_logic;
10         R5out: in std_logic;
11         R6out: in std_logic;
12         R7out: in std_logic;
13         R8out: in std_logic;
14         R9out: in std_logic;
15         R10out: in std_logic;
16         R11out: in std_logic;
17         R12out: in std_logic;
18         R13out: in std_logic;
19         R14out: in std_logic;
20         R15out: in std_logic;
21         HIout: in std_logic;
22         LOout: in std_logic;
23         Zhighout: in std_logic;
24         Zlowout: in std_logic;
25         PCout: in std_logic;
26         MDRout: in std_logic;
27         InPortout: in std_logic;
28         Cout:  in std_logic;
29         Sin: out std_logic_vector(4 downto 0)
30       );
31   end entity encoder32to5;
32
33   architecture behavior of encoder32to5 is
34   begin
35
36
37             Sin <= "00001" when R0out = '1' else
38                    "00010" when R1out = '1' else
39                    "00011" when R2out = '1' else
40                    "00100" when R3out = '1' else
41                    "00101" when R4out = '1' else
42                    "00110" when R5out = '1' else
43                    "00111" when R6out = '1' else
44                    "01000" when R7out = '1' else
45                    "01001" when R8out = '1' else
46                    "01010" when R9out = '1' else
47                    "01011" when R10out = '1' else
48                    "01100" when R11out = '1' else
49                    "01101" when R12out = '1' else
50                    "01110" when R13out = '1' else
51                    "01111" when R14out = '1' else
52                    "10000" when R15out = '1' else
53                    "10001" when HIout = '1' else
54                    "10010" when LOout = '1' else
55                    "10011" when Zhighout = '1' else
56                    "10100" when Zlowout = '1' else
57                    "10101" when PCout = '1' else
58                    "10110" when MDRout = '1' else
59                    "10111" when InPortout = '1' else
60                    "11000" when Cout = '1' else
61                    "11111";
62
```

```
63    end behavior;
```