```
1   `timescale 1ns / 1ns // `timescale time_unit/time_precision
2
3   //SW[3:0] data inputs
4   //HEX0 output display
5
6   module HEXdecoder(HEX0, SW);
7       input [3:0] SW;
8       output [6:0] HEX0;
9
10      HEXdefinition hex0(
11          .x1(SW[0]),
12          .x2(SW[1]),
13          .x3(SW[2]),
14          .x4(SW[3]),
15          .y0(HEX0[0]),
16          .y1(HEX0[1]),
17          .y2(HEX0[2]),
18          .y3(HEX0[3]),
19          .y4(HEX0[4]),
20          .y5(HEX0[5]),
21          .y6(HEX0[6])
22          );
23
24  endmodule
25
26  module HEXdefinition (x1, x2, x3, x4, y0, y1, y2, y3, y4, y5, y6);
27      input x1; //input1
28      input x2; //input2
29      input x3; //input3
30      input x4; //input4
31      output y0; //output0
32      output y1; //output1
33      output y2; //output2
34      output y3; //output3
35      output y4; //output4
36      output y5; //output5
37      output y6; //output6
38
39      assign y0 = ((~x1 & ~x2 & ~x3 & x4) | (~x1 & x2 & ~x3 & ~x4) | (x1 & ~x2 & x3 & x4) | (
    x1 & x2 & ~x3 & x4)); //eq0
40      assign y1 = ((~x1 & x2 & ~x3 & x4) | (~x1 & x2 & x3 & ~x4) | (x1 & ~ x2 & x3 & x4) | (x1
     & x2 & ~x3 & ~x4) | (x1 & x2 & x3 & ~x4) | (x1 & x2 & x3 & ~x4) | (x1 & x2 & x3 & x4));
    //eq1
41      assign y2 = ((~x1 & ~x2 & x3 & ~x4)|(x1 & x2 & ~x3 & ~x4)|(x1 & x2 & x3 & ~x4)|(x1 & x2
    & x3 & x4)); //eq2
42      assign y3 = ((~x1 & ~x2 & ~x3 & x4) | (~x1 & x2 & ~x3 & ~x4) |(~x1 & x2 & x3 & x4) |(x1
    & ~x2 & x3 & ~x4) | (x1 & x2 & x3 & x4)); //eq3
43      assign y4 = ((~x1 & ~x2 & ~x3 & x4) |(~x1 & ~x2 & x3 & x4) |(~x1 & x2 & ~x3 & ~x4) |(~x1
     & x2 & ~x3 & x4) |(~x1 & x2 & x3 & x4) |(x1 & ~x2 & ~x3 & x4)); //eq4
44      assign y5 = ((~x1 & ~x2 & ~x3 & x4)|(~x1 & ~x2 & x3 & ~x4)|(~x1 & ~x2 & x3 & x4)|(~x1 &
    x2 & x3 & x4)|(x1 & x2 & ~x3 & x4)); //eq5
45      assign y6 = ((~x1 & ~x2 & ~x3 & ~x4)|(~x1 & ~x2 & ~x3 & x4)|(~x1 & x2 & x3 & x4)|(x1 &
    x2 & ~x3 & ~x4)); //eq6
46
47  endmodule
48
```