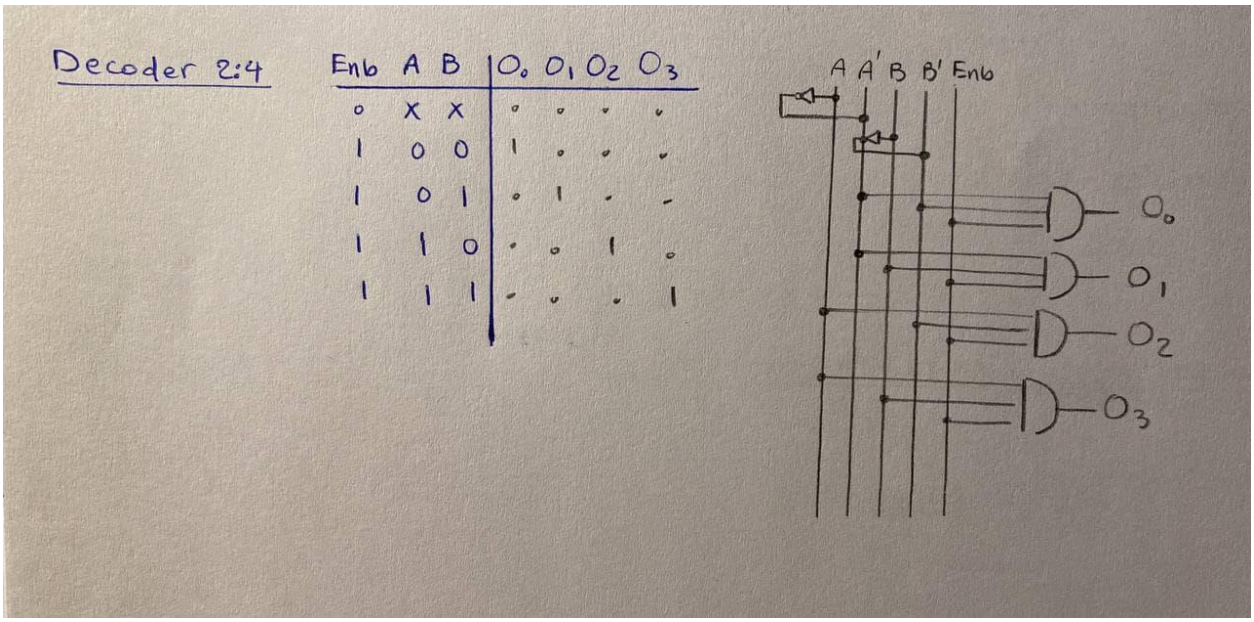
پیش گزارش 5 – کیمیا منتظری – 9931078

1) Decoder (2x4)




```
module decoder2x4(a,b,enb,O0,O1,O2,O3);
     input a,b,enb;
     output O0,O1,O2,O3;

     not g1(a_not, a);
     not g2(b_not, b);

     and g3(O0, a_not, b_not, enb);
     and g4(O1, a_not, b, enb);
     and g5(O2, a, b_not, enb);
     and g6(O3, a, b, enb);
endmodule
```

2) Priority Encoder(4x2)

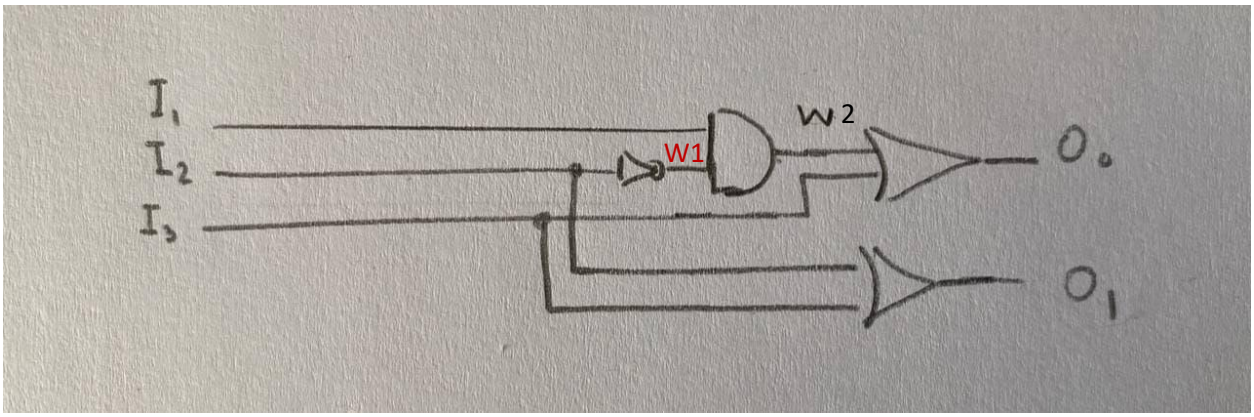
I3	I2	I1	I0	O_1	O_0
0	0	0	0	X	X
0	0	0	1	0	0
0	0	1	X	0	1
0	1	X	X	1	0
1	X	X	X	1	1

I2, I3 / I0, I1	00	01	11	10
00	X	1	1	0
01	1	1	1	1
11	1	1	1	1
10	0	0	0	0

$O_0 = I3 + I1I2'$

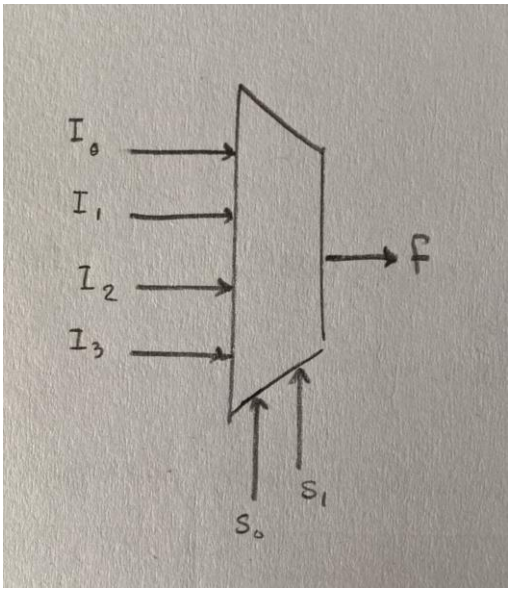
I2, I3 / I0, I1	00	01	11	10
00	X	0	0	0
01	1	1	1	1
11	1	1	1	1
10	1	1	1	1

$O_1 = I3 + I2$



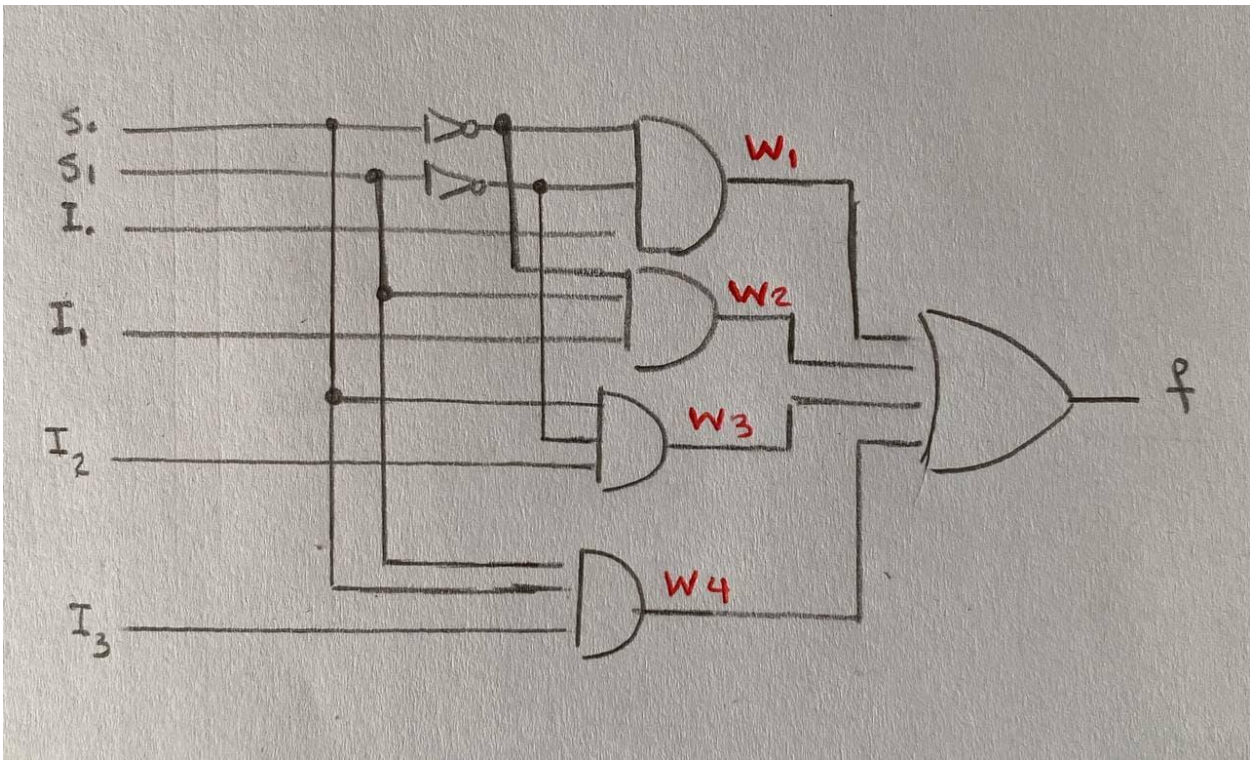

```
module encoder4x2(I0, I1, I2, I3, O0, O1);
     input I0, I1, I2, I3;
     output O0, O1;
     wire w1, w2;
     not g1(w1, I2);
     and g2(w2, I1, w1);
     or g3(O0, w2, I3);
     or g4(O1, I2, I3);
endmodule
```

3) Multiplexer(4x1)



S0	S1	f
0	0	I0
0	1	I1
1	0	I2
1	1	I3

f = (S0')(S1')(I0) + (S0')(S1)(I1) + (S0)(S1')(I2) + (S0)(S1)(I3)



```
module multiplexer4x1(s0,s1,I0,I1,I2,I3,f);
     input s0,s1,I0,I2,I3;
     output f;
     wire w1,w2,w3,w4;

     not g1(s0_not, s0);
     not g2(s1_not, s1);

     and g3(w1, s0_not, s1_not, I0);
     and g4(w2, s0_not, s1, I1);
     and g5(w3, s0, s1_not, I2);
     and g6(w4, s0, s1, I3);

     or g7(f, w1, w2, w3, w4);
endmodule
```