Q1

Decimal Digit	Excess-3 Code				BCD Code			
	A	B	C	D	X	Y	Z	W
0	0	0	1	1	0	0	0	0
1	0	1	0	0	0	0	0	1
2	0	1	0	1	0	0	1	0
3	0	1	1	0	0	0	1	1
4	0	1	1	1	0	1	0	0
5	1	0	0	0	0	1	0	1
6	1	0	0	1	0	1	1	0
7	1	0	1	0	0	1	1	1
8	1	0	1	1	1	0	0	0
9	1	1	0	0	1	0	0	1
10	1	1	0	1	1	0	1	0
11	1	1	1	0	1	0	1	1
12	1	1	1	1	1	1	0	0
13	0	0	0	0	1	1	0	1
14	0	0	0	1	1	1	1	0
15	0	0	1	0	1	1	1	1

b.

$X = A \oplus (B'.(C.D)')$

$Y = B \oplus (C.D)'$

$Z = C \oplus D$

$W = 1 \oplus D$

C.
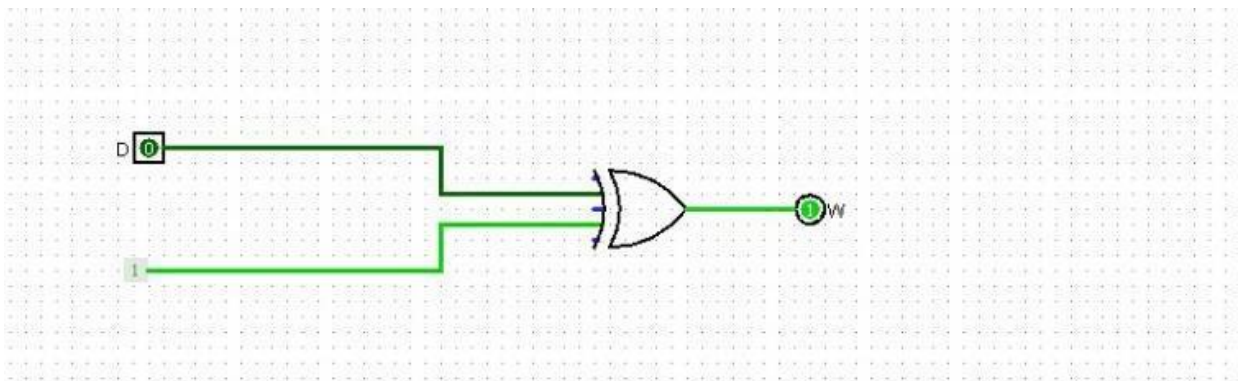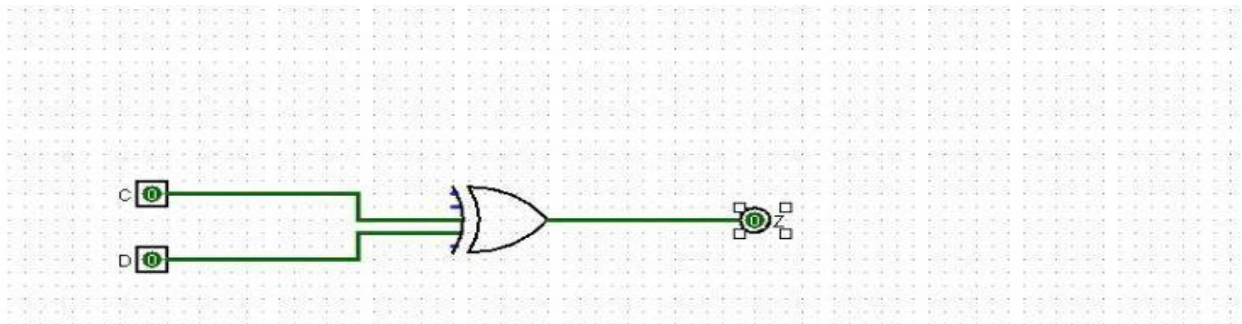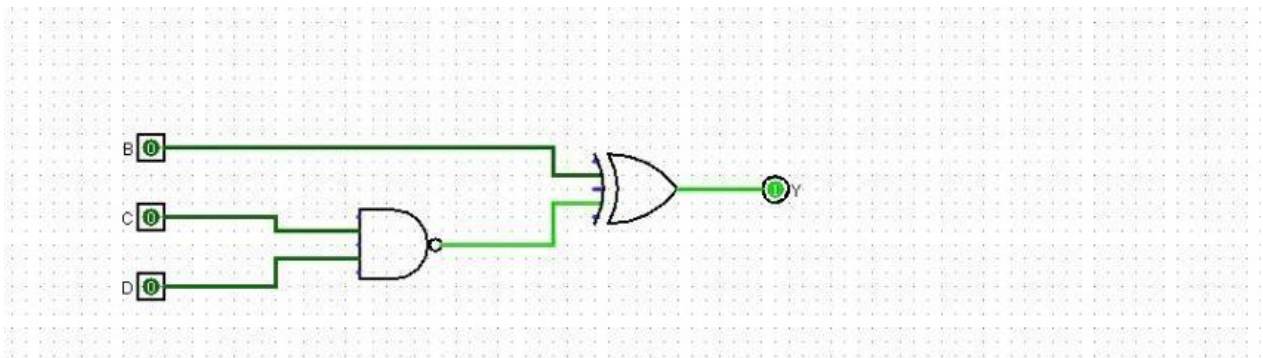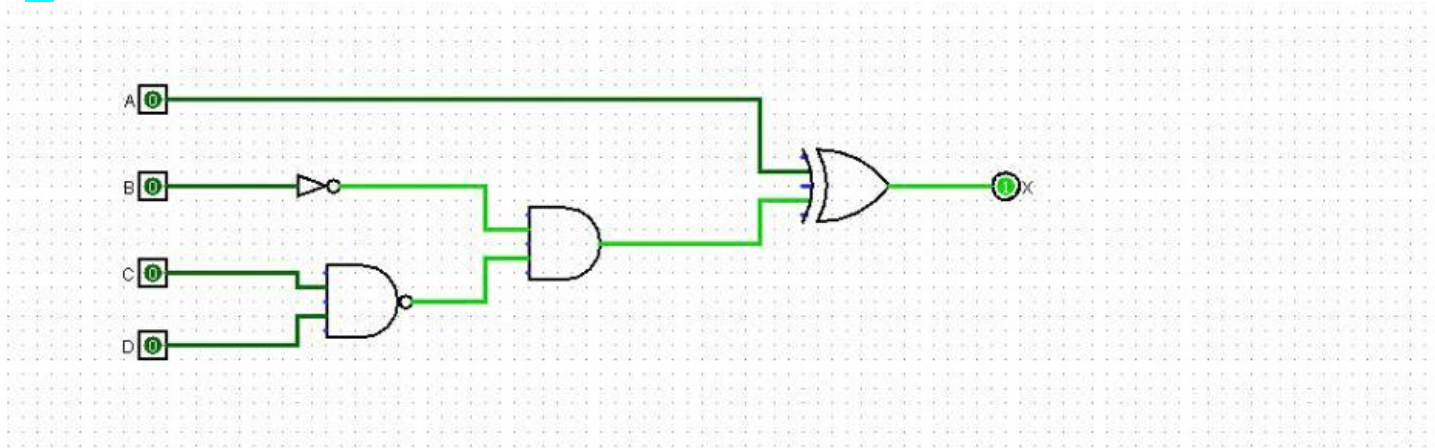
Decimal Digit	A	B	C	D	X	Y	Z	W
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	1	1	1
2	0	0	1	0	0	1	1	0
3	0	0	1	1	0	1	0	1
4	0	1	0	0	0	1	0	0
5	0	1	0	1	1	0	1	1
6	0	1	1	0	1	0	1	0
7	0	1	1	1	1	0	0	1
8	1	0	0	0	1	0	0	0
9	1	0	0	1	1	1	1	1

b.

$X = ((C+D).B) + A$

$Y = ((C'.D').B) + ((C+D).B')$

$Z = C \oplus D$

$W = D$

C.