DLD   LAB   10
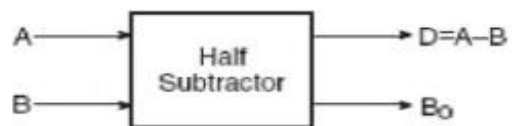
Topic: Binary Subtractors (Half and full Subtractor)
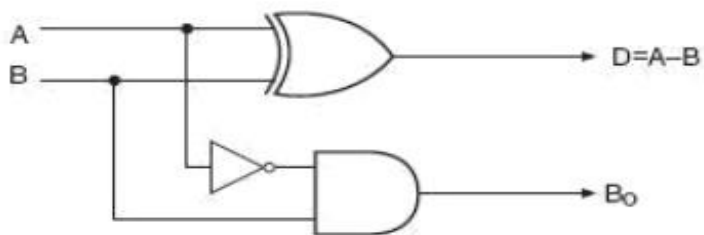
$$D = \overline{A}.B + A.\overline{B}$$

$$B_o = \overline{A}.B$$
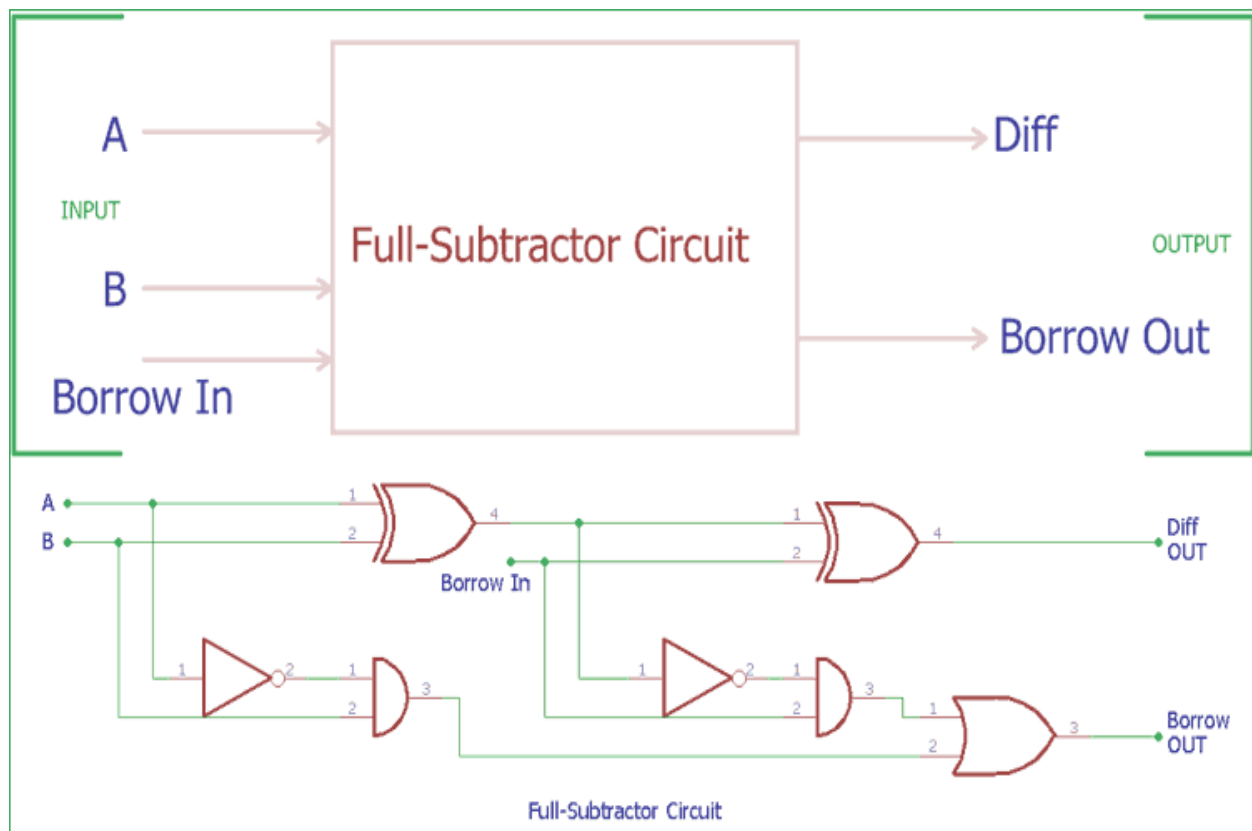

A	B	D	B$_O$
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

Half Subtractor

Full Subtractor-Truth Table				
Input			Output	
A	B	C	Difference	Borrow
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Full-Subtractor Circuit

$$Difference = \overline{A}\ \overline{B}\ C + \overline{A}\ B\ \overline{C} + A\ \overline{B}\ \overline{C} + ABC$$
$$= C\ (\overline{A}\ \overline{B} + AB) + \overline{C}\ (\overline{A}\ B + A\ \overline{B})$$
$$= C\ (A\odot B) + \overline{C}\ (A\oplus B)$$
$$= C\ (\overline{A\oplus B}) + \overline{C}\ (A\oplus B)$$
$$= C\ \oplus\ (A\oplus B)$$