Practical-4

Aim :To design and construct half and full subtractor circuits and verify the truth table using logic gates.

Theory :

HALF SUBTRACTOR :

The half subtractor is constructed using X-OR and AND Gate. The half subtractor has two input and two outputs. The outputs are differences and borrow. The difference can be applied using X-OR Gate borrow output can be implemented using an AND Gate and an inverter.
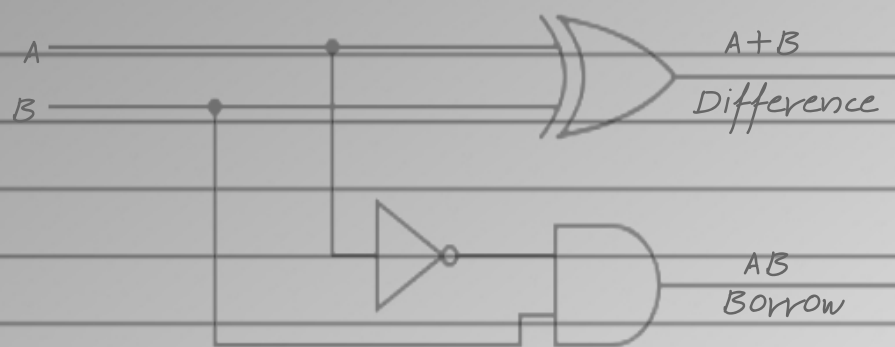
FULL SUBTRACTOR :

The full subtractor is a combination of X-OR, AND, OR, NOT Gates. In a full subtractor the logic circuit should have three inputs and two outputs. The two half subtractor will be C and AB. The output will be difference output of full

the borrow output of the half subtractor and
the second term is the inverted difference
output of first X-OR.

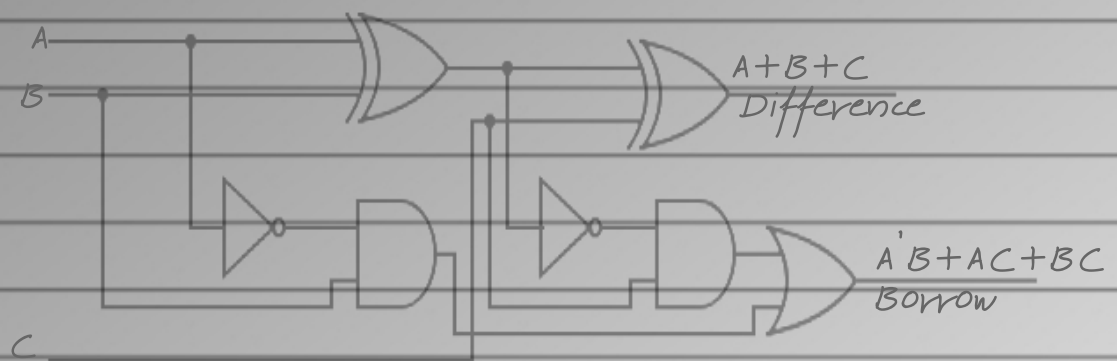Logic Diagram :

HALF   SUBTRACTOR :

A $\overline{}$ A+B
B $\overline{}$ Difference

AB
Borrow

Truth table :

A	B	Borrow	Difference
0	0	0	0
0	1	1	1
1	0	1	1
1	0	0	

0

Full subtractor using two half subtractor.

A
B

$A+B+C$
Difference

$A'B+AC+BC$
Borrow

C

Truth table :

A	B	C	Borrow	Difference
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	1	0
1	0	0	0	1
1	0	1	0	0
1	1	0	0	