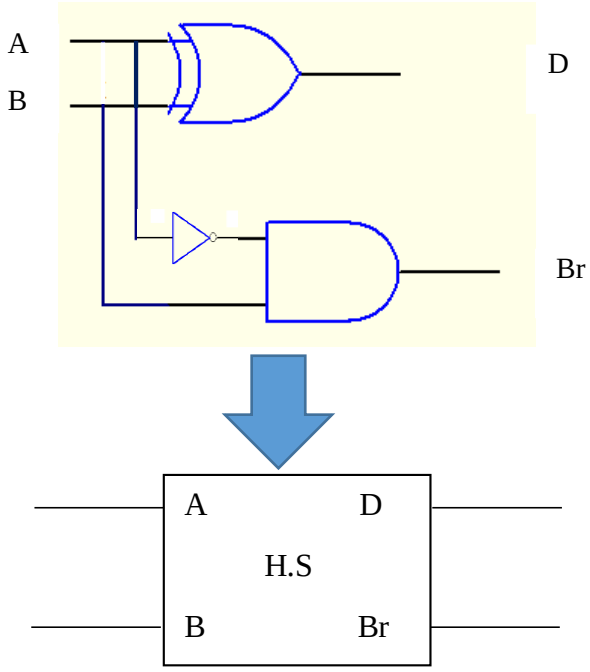
Half Subtractor:

H.S is used to subtract two bit numbers.

A	B	D	Br
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

$D = A \oplus B$

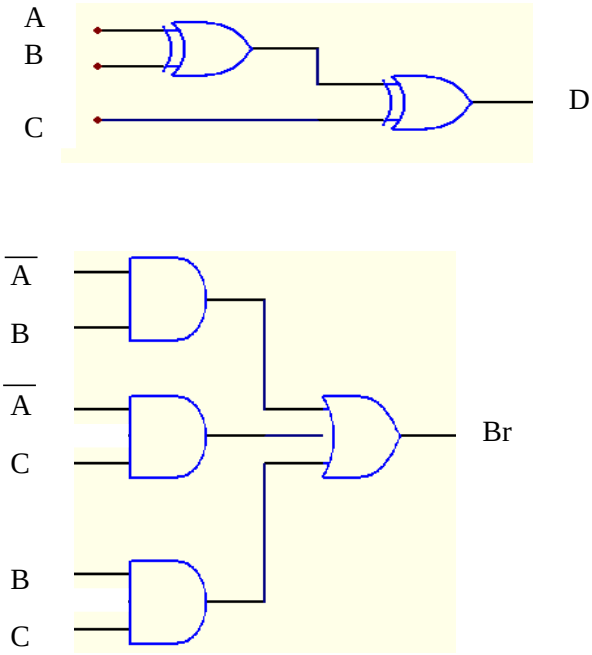
$Br = \overline{A}B$



Half Subtractor

Full subtractor:

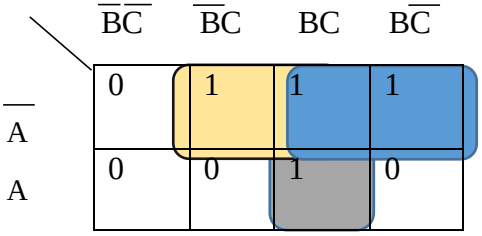
Full Subtractor is used to subtract three bits.

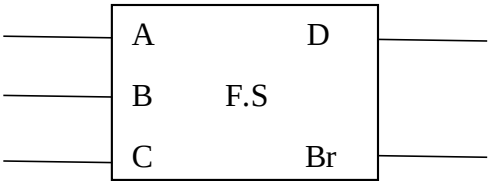


A	B	C	D	Br
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

D = A ⊕ B ⊕ C

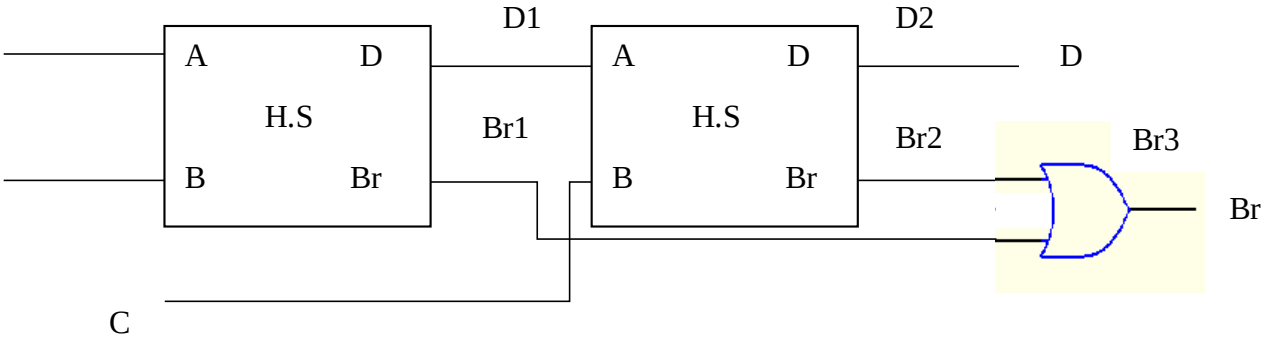
Br = $\overline{A}$B + $\overline{A}$C +BC





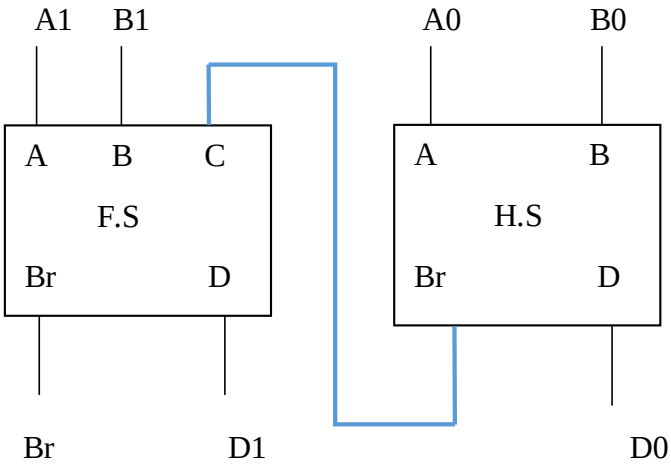
Full Subtractor

Ex1: Designing F.S using H.S's and OR gate



Ex2:

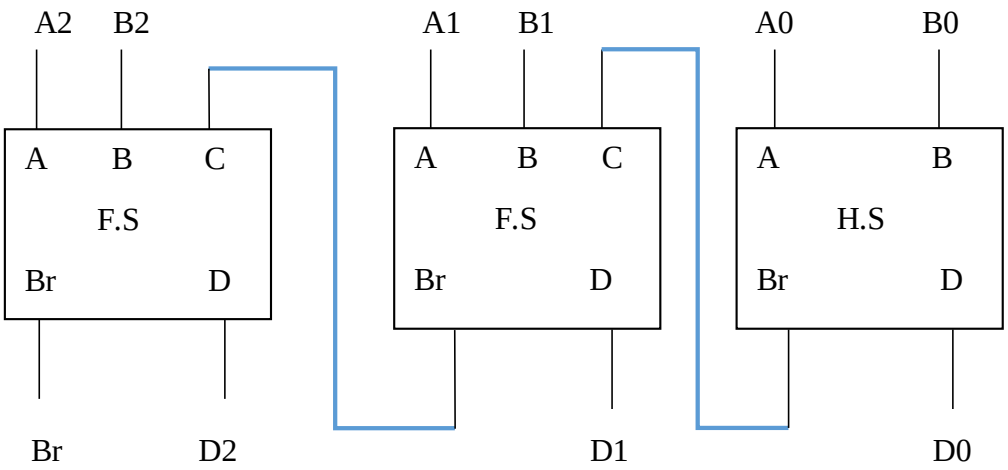
Design a logic circuit to subtract two 2-bit numbers using subtractions:



A	A1	A0
B	B1	B0
Br	D1	D0

Ex3:

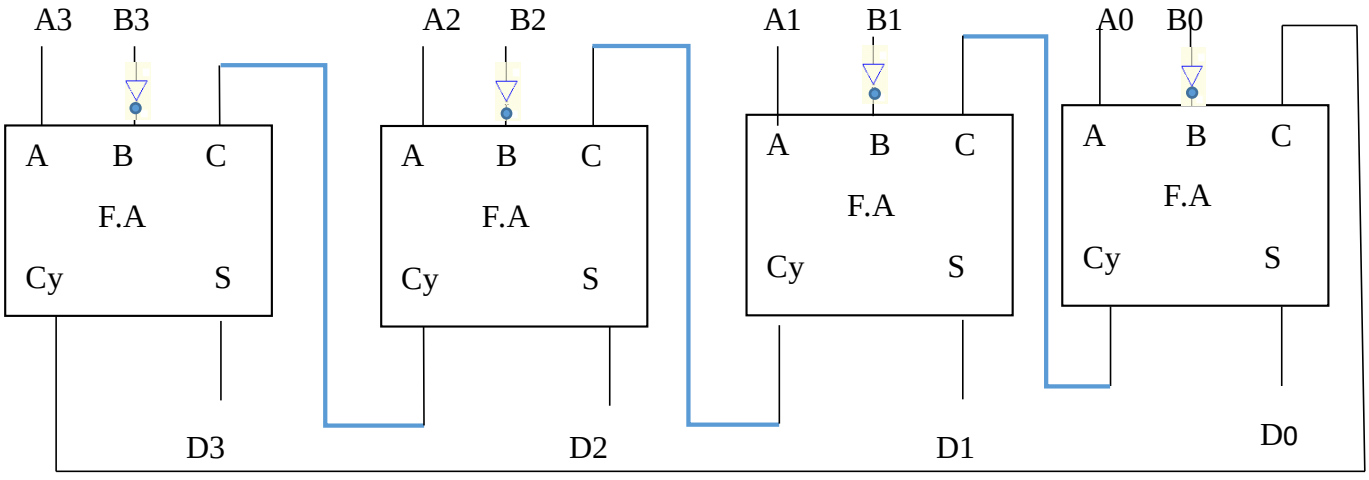
Design a logic circuit to subtract two 3-bit numbers using subtractors:

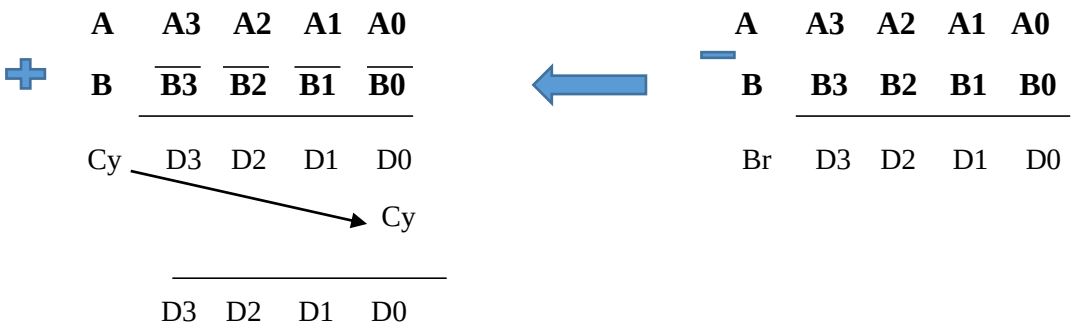


A	A2	A1	A0
B	B2	B1	B0
Br	D2	D1	D0

Ex4:

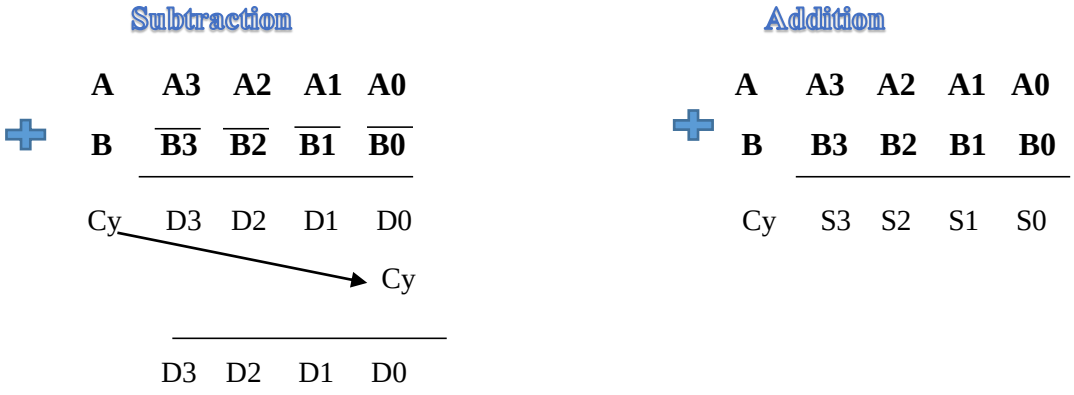
Design a logic circuit to subtract two 4-bit numbers using adders with 1's complement:





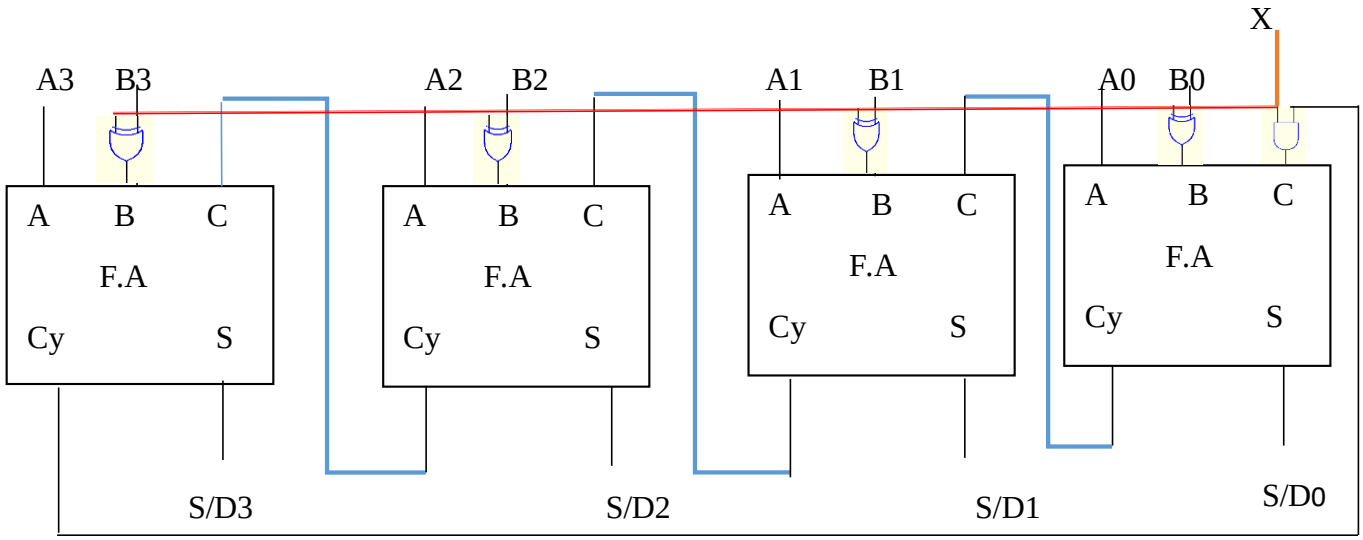
Ex5:

Design a logic circuit to Add/subtract two 4-bit numbers using Adders and logic gates:



X = 0 Addition A +B

X = 1 Subtraction A+$\overline{B}$ (1's complement Subtraction)



Ex6:

Convert a subtraction of 4-bit numbers to comparator: