Example- A Boolean function is defined as-

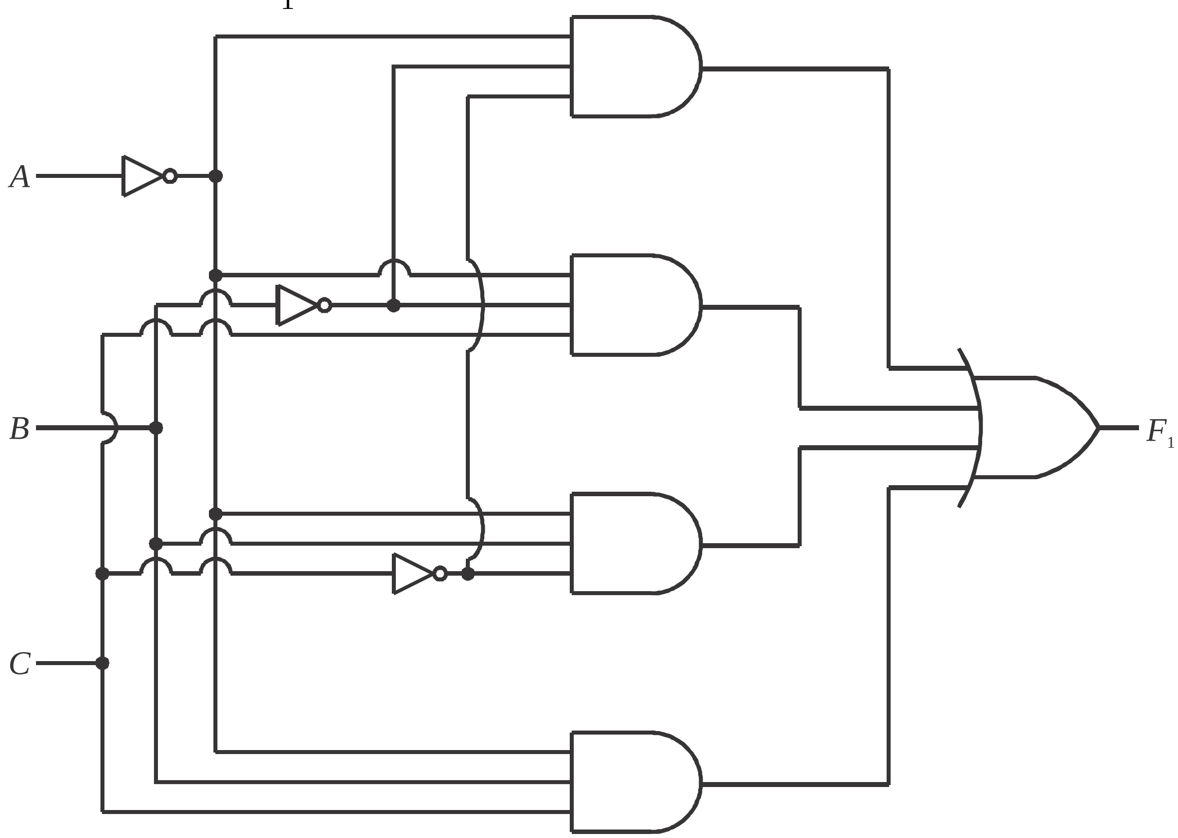
$$F_1 = A'B'C' + A'B'C + A'BC' + A'BC$$

- F_1 has <u>4 terms</u> and <u>12 literals</u>
- F_1 has a Truth Table

A	B	C	A'	B'	C'	$A'B'C'$	$A'B'C$	$A'BC'$	$A'BC$	$\boldsymbol{F_1}$
0	0	0	1	1	1	1	0	0	0	**1**
0	0	1	1	1	0	0	1	0	0	**1**
0	1	0	1	0	1	0	0	1	0	**1**
0	1	1	1	0	0	0	0	0	1	**1**
1	0	0	0	1	1	0	0	0	0	**0**
1	0	1	0	1	0	0	0	0	0	**0**
1	1	0	0	0	1	0	0	0	0	**0**
1	1	1	0	0	0	0	0	0	0	**0**

- F_1 has a logic-circuit diagram with 8 logic gates and three inputs-

$$F_1 = A'B'C' + A'B'C + A'BC' + A'BC$$



- Can F_1 be simplified using Basic Theorems & Postulates for Boolean algebra?

$F_1 = A'B'C' + A'B'C + A'BC' + A'BC$

$= A'[B'C' + B'C + BC' + BC]$ used Postulate 4(a) distributive

$= A'[B'(C' + C) + B(C' + C)]$ used Postulate 4(a) distributive

$= A'[B'(1) + B(1)]$ used Postulate 5(a)

$= A'[B' + B]$ used Postulate 2(b)

$= A'[1]$ used Postulate 5(a)

$\underline{F_1 = A'}$ used Postulate 2(b)

Note that inputs *B* and *C* are unnecessary.

- Check that the simplified F_1 has same Truth Table → **Yes!**

A	*B*	*C*		$F_1 = A'$
0	0	0		**1**
0	0	1		**1**
0	1	0		**1**
0	1	1		**1**
1	0	0		**0**
1	0	1		**0**
1	1	0		**0**
1	1	1		**0**

- Note that the simplified F_1 has much simpler logic-circuit diagram with 1 input & logic gate

$$F_1 = A'$$