Ex. No : 04	BOOLEAN IMPLEMENTATION OF HALF ADDER AND FULL ADDER CIRCUITS
Date:	

AIM:

To design, implement and verify the truth table of binary adder circuits.

APPARATUS REQUIRED:

1. Digital IC trainer board
2. IC 7404 (NOT)
3. IC 7432 (OR)
4. IC 7408(AND)
5. IC 7400 (NAND)
6. IC 7486 (EX-OR)
7. Connecting wires

THEORY:

Half adder

A logic circuit used for the addition of two 1 bit signals is known as half adder. There are two inputs and two outputs. The tow outputs are sum and carry. Sum is equal to the output of EX-OR gate. Carry is equal to the output of AND gate. So a single Ex-OR and AND gate can be used to design a Half-Adder circuit.

Full adder

A logic circuit used for the addition of three 1 bit signal is known as full adder. Full adder can be used to add the previous carry with an augend and an addend. In this the third input is considered as previous carry. It has two outputs namely sum and carry. The carry output is 1 whenever two of the inputs are 1.

CIRCUIT DIAGRAM:

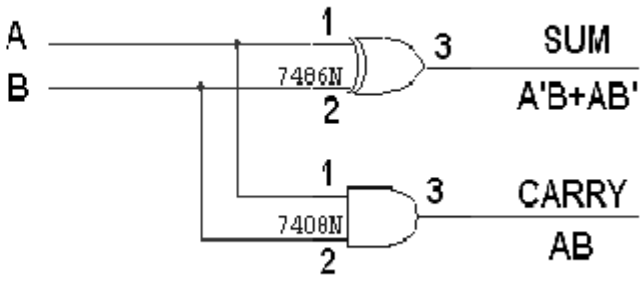
HALF ADDER

TRUTH TABLE:

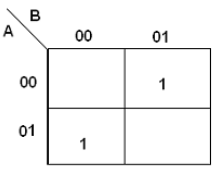
A	B	CARRY	SUM
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

SUM = A'B + AB' **CARRY = AB**

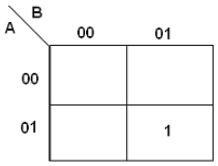
LOGIC DIAGRAM:



K-Map for SUM:



K-Map for CARRY:

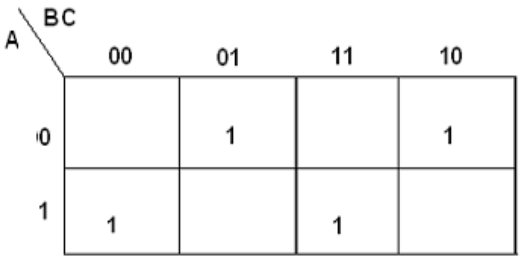


FULL ADDER

TRUTH TABLE:

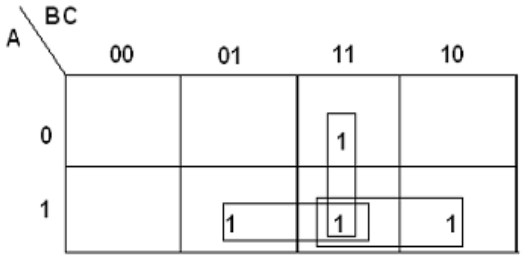
A	B	C	CARRY	SUM
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

K-Map for SUM:



SUM = A'B'C + A'BC' + ABC' + ABC

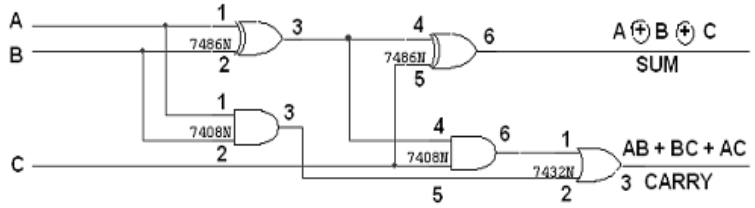
K-Map for CARRY:



CARRY = AB + BC + AC

LOGIC DIAGRAM:

FULL ADDER USING TWO HALF ADDER



PROCEDURE:

1. The connections are given as per the logic diagram.
2. The supply voltage and the ground are connected to the appropriate pins.
3. The inputs are given by switches. If the switch is ON, input is 1 otherwise 0
4. The output is obtained from LED. When LED glows output is 1else 0.
5. For various combinations of input and output are verified.

RESULT: Thus the half adder, full adder circuits were designed and their truth tables were verified.