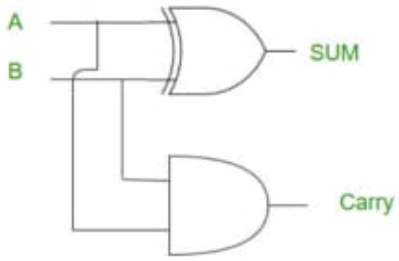
LAB-02

a)Aim: To verify half adder,full adder,full adder using half adders,half subtractor,full subtractor,full subtractor using half subtractors

HALF ADDER:

Description:-A half adder is a type of adder, an electronic circuit that performs the addition of numbers. The half adder is able to add two single binary digits and provide the output plus a carry value.

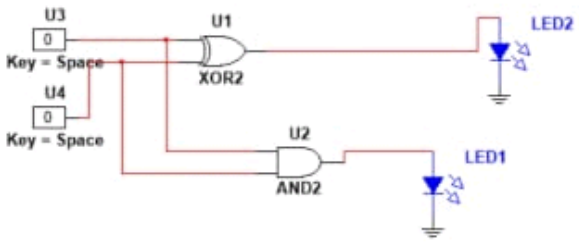
Circuit diagram:-



Truth table:-

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

Multisim circuit:-



Components required:-Two interactive digital constants,XOR gate,AND gate,two LEDs,Two grounds

Procedure:-

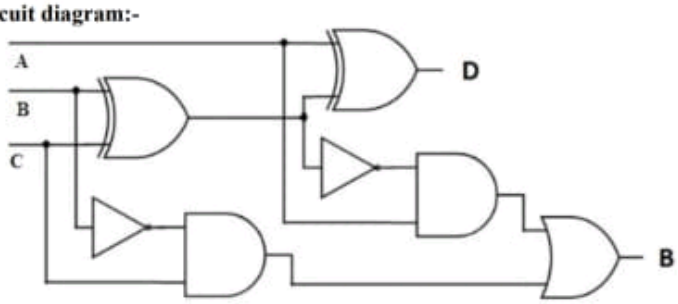
1)Open multisim software
2)Create new design
3)Place the components and connect them according to the circuit diagram
4)Verify the circuit diagram with the help of truth table

FULL ADDER:

Description:-A full adder adds three one-bit binary numbers, two operands and a carry bit. The adder outputs two numbers, a sum and a carry bit.

Circuit diagram:-

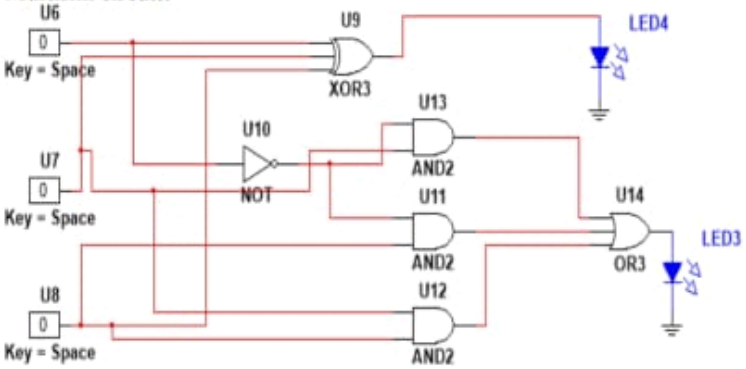
Circuit diagram:-



Truth table:-

A	B	C	DIFF	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

Multisim circuit:-



Components required:-Three interactive digital constants,XOR gate,3-AND gate,OR gate, two LEDs,Two grounds

Procedure:-

1)Open multisim software

2)Create new design

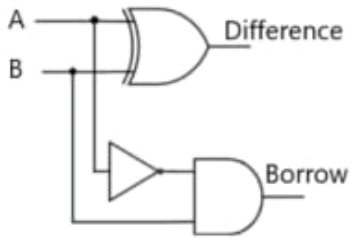
3)Place the components and connect them according to the circuit diagram

4)Verify the circuit diagram with the help of truth table

HALF SUBTRACTOR:

Description:-The half-subtractor is a combinational circuit which is used to perform subtraction of two bits. It has two inputs, A (minuend) and B (subtrahend) and two outputs Difference and Borrow.

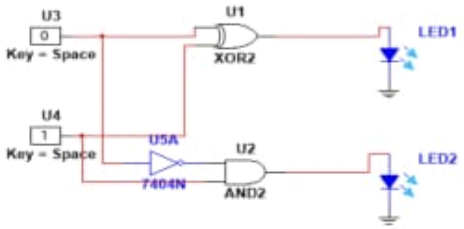
Circuit diagram:-



Truth table:-

A	B	DIFF	BORROW
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

Multisim circuit:-



Components required:-Two interactive digital constants,XOR gate,AND gate,NOT gate,two LEDs,Two grounds

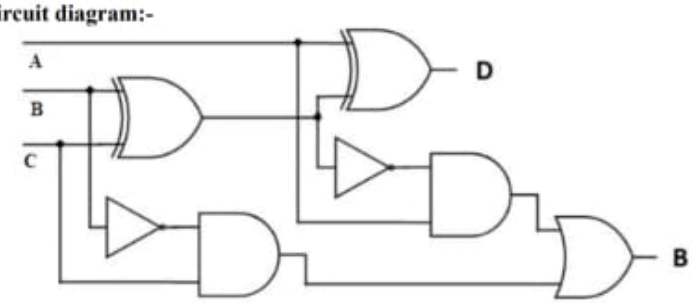
Procedure:-

1)Open multisim software
2)Create new design
3)Place the components and connect them according to the circuit diagram
4)Verify the circuit diagram with the help of truth table

FULL SUBTRACTOR:

Description:-The full subtractor is used to subtract three 1-bit numbers A, B, and C, which are minuend, subtrahend, and borrow, respectively.

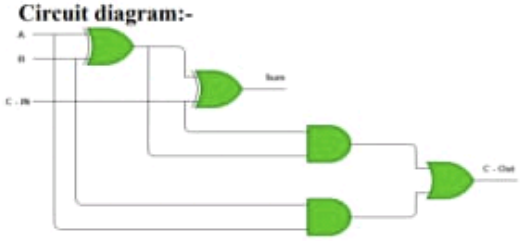
Circuit diagram:-



FULL ADDER:

Description:-A full adder adds three one-bit binary numbers, two operands and a carry bit. The adder outputs two numbers, a sum and a carry bit.

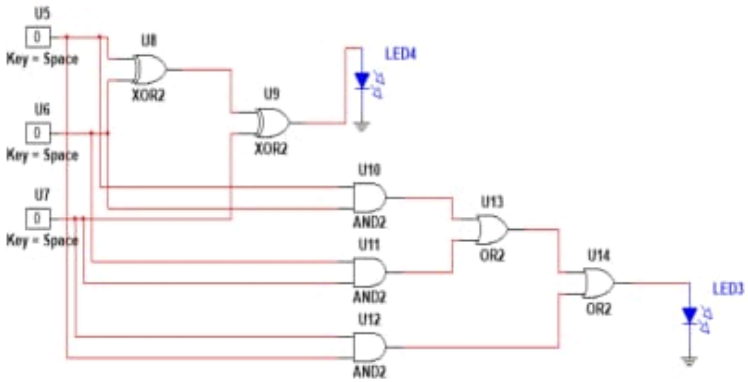
Circuit diagram:-



Truth table:-

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

Multisim circuit:-



Components required:-Three interactive digital constants,2-XOR gate,3-AND gate,2-OR gates, two LEDs,Two grounds

Procedure:-

1)Open multisim software
2)Create new design
3)Place the components and connect them according to the circuit diagram
4)Verify the circuit diagram with the help of truth table