TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
PULCHOWK CAMPUS

A LAB REPORT
ON

Addition of two unsigned integers.

Lab No:
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Submitted To:
Department of
Electronics and
Computer
Engineering

TITLE: Addition of two Unsigned Integers (Binary)

OBJECTIVE

- To design n-bit (4-bit) adder for unsigned binary numbers

THEORY

An arithmetic full adder is an electronic circuit (combinational) which takes two numbers and a carry and returns the sum of them along with the carry. A binary adder is constructed using full adder circuits connected in series, with the output carry of one full adder connected to the input carry of another full adder.

The adder that takes in two inputs and gives their sum without caring the previous carry is known as half adder. The truth table of half adder is:

A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

From the table we can say that:

Sum = $A \oplus B$
Carry = $A \cdot B$

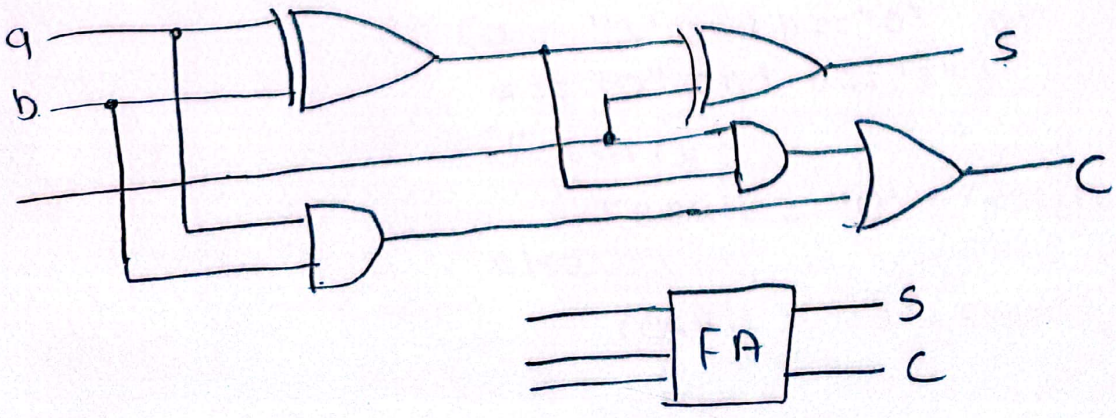
Similarly the truth table for full adder can be demonstrated as:

A	B	Carry in	Sum	Carry out
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

From the table we can say that:

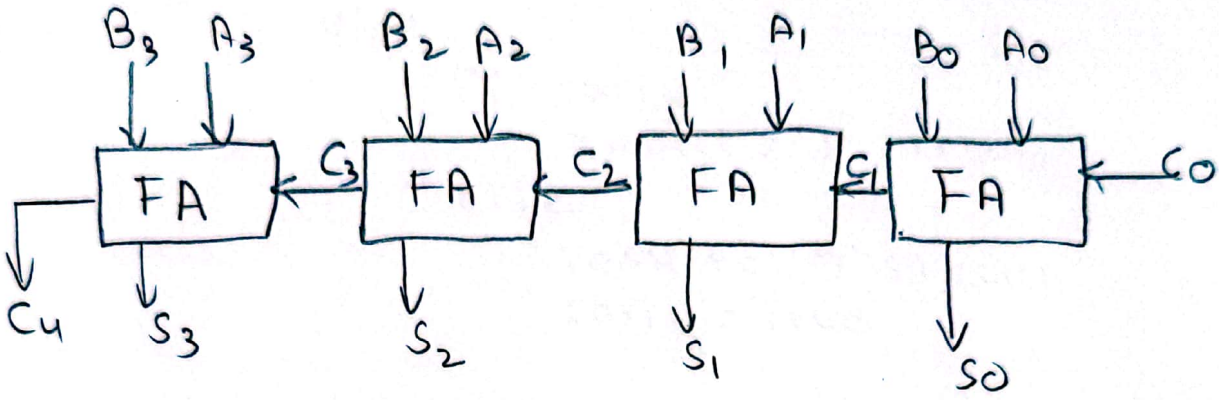
Sum = $A \oplus B \oplus C\text{-in}$
C-out = $A \cdot B + B \cdot cin + C\text{-in} \cdot A$

The logical diagram for full adder is:



n-bit binary adder is constructed with n-bit full adder connected in cascade with the output carry from one-full-adder connected to input carry of next full adder.

The diagram for the 4bit binary adder is:



Source Code:

The source code for the binary adder is:

```
def add(s1, s2, n):
    result = " "
    carry = False.

    for i in range(n-1, -1, -1):
        a = s1[i]
        b = s2[i]
        if (a == "1" and b == "0" or
            a == "0" and b == "1"):
            if carry:
                result = '0' + result
            else
                result = '1' + result.
```

```
        else:
            if (a=='0' and b=='0'):
                if carry:
                    result = '1' + result
                    carry = False
                else:
                    result = '0' + result
            else:
                if carry:
                    result = '1' + result
                else
                    result = '0' + result
                    carry = True.

    if carry:
        result = '1' + result

    return result

n = int(' Enter the number of bits: ')

n1 = input(" Enter the first number: ')
n2 = input("Enter the second number: ')

n1 = n1.zfill(n - len(n1) + 1)
n2 = n2.zfill(n - len(n2) + 1)

print("The sum is: ", add(n1, n2, n))
```

Output:

```
Enter the number of bits: 4
Enter the first number: 1010
Enter the second number: 0101

The sum is: 1111
```

Discussion.

In this lab, we programmed a n bit binary adder in python. It took the number of bits, and the two numbers from the user and returned the result (alog with the carry).

Conclusion:

Hence, two unsigned binary integer can be added through n bit full adder.