TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
PULCHOWK CAMPUS

A LAB REPORT
ON

Subtraction of two unsigned integers.

Lab No: 3
Experiments Date:
Submission Date:

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Submitted To:
Department of
Electronics and
Computer
Engineering

TITLE: SUBTRACTION OF UNSIGNED BINARY NUMBERS

OBJECTIVE:

To design n-bit subtractor for two unsigned binary numbers.

THEORY:-

Subtraction of two numbers is performed using 2's complement method in binary number system. 2's complement method is used because the negative numbers can be easily represented in 2's complement form. In this method, the two's complement of the ~~minuthend~~ subtrahend is calculated, then its added to the minuend. If there is carry, we neglect the carry and the remaining is our answer.

The 2's complement of a number can be calculated as

For n bit number (a).

2's complement of $a = 2^n - a$

For example:

let us consider the following subtraction:

$$\begin{array}{r} 1010 \\ -0110 \\ \hline \end{array}$$

The 2's complement of 0110 is 1010

$$\begin{array}{r} 1010 \\ +1010 \\ \hline (1)0100 \end{array}$$

carry is neglected.

So the result is:

$$\begin{array}{r} 1010 \\ -0110 \\ \hline 0100 \end{array}$$

Another example:

$$\begin{array}{r} 1010 \\ -1111 \\ \hline \end{array}$$

The 2's complement of 1111 is 0001

$$\begin{array}{r} 1010 \\ +0001 \\ \hline 1011 \end{array}$$

$\therefore$

$$\begin{array}{r} 1010 \\ -1111 \\ \hline 1011 \end{array}$$

or negative 101

The logic diagram for the 4 bit subtractor can be drawn as:

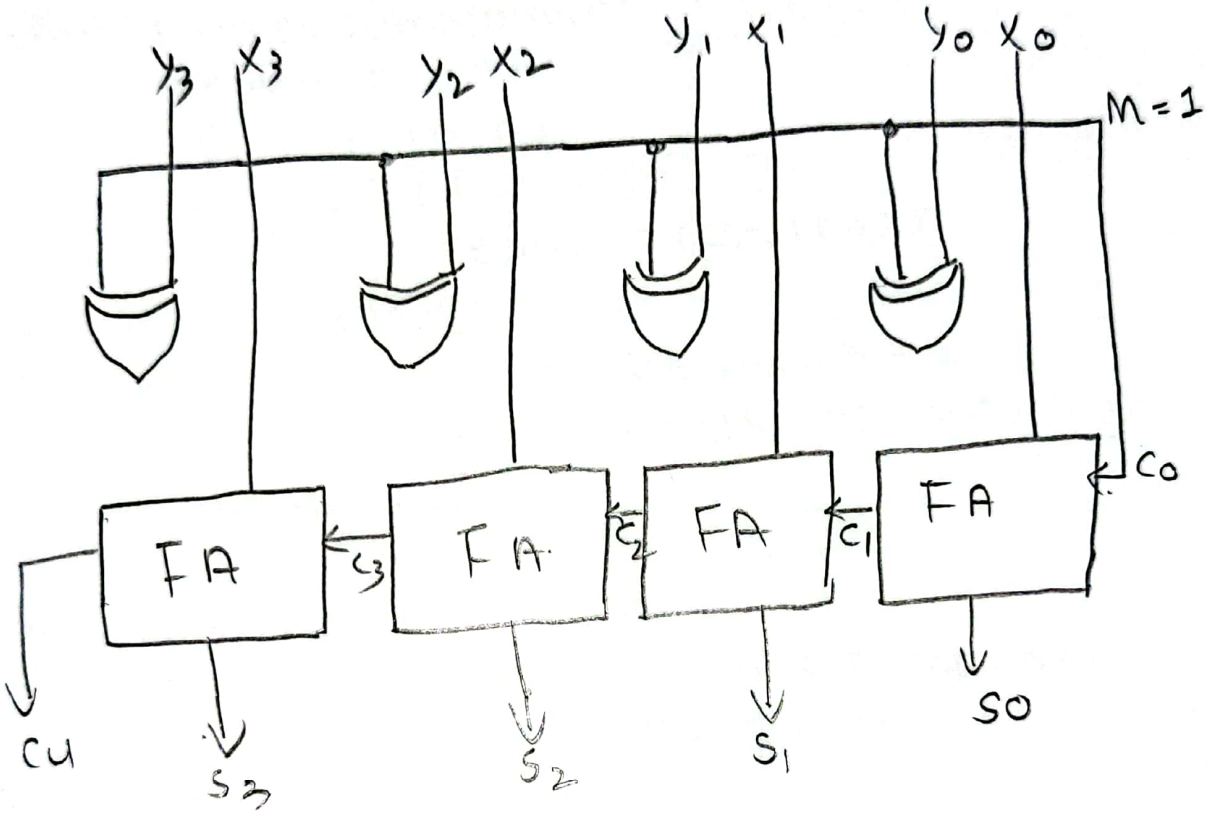

Fig 3.1 : 4-bit subtractor

Source Code:

```
# the function for addition of two
# numbers is defined in #Lab1 code

from sum import add

def twos_complement(n1,n):
    result = ""
    for i in n1:
        if (i=="1"):
            result=result+'0'
        else:
            result = result + 1
    result = add(result, "1".zfill(n),n)
    return result

def subtract(s1, s2, n):
    result = add(s1, twos_complement
                 (s2,n),n)
    return result

n= int(input("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 result is:",subtract(n1,n2))
```

Output:

```
Enter the number of bits: 4

Enter the first number: 1111
Enter the second number: 0101

The result is: 1010
```

~~Conclusio~~
DISCUSSION

Thus in the lab, we programmed a n bit binary subtractor using 2's complement method in python programming language.

Conclusion:

Hence two unsigned numbers were subtracted with the help of n bit subtractor.