TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
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A LAB REPORT
ON

Multiplication of two unsigned integers. by partial product method

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TITLE: MULTIPLICATION OF TWO UNSIGNED NUMBER BY PARTIAL PRODUCT METHOD

OBJECTIVE

- To simulate binary multiplication by partial product.

THEORY

In this process of partial multiplication, it involves the multiplication of two digits and the addition of digits with or without carry. After the multiplication of each bit of multiplicand, partial products are generated, and then these products are ~~added~~ generated, and then these products are added to produce the total sum which represents the binary multiplication value.

Partial product is first initialized to 0. The multiplicand A is added to the content of P for each bit of the multiplier that is 1. The value of A is shifted left after checking each bit of the ~~number~~ multiplier. The final value in P gives the products of two unsigned integers.

~~A~~ Let us consider an example.

A = 1001
B = 1101
P = 0000.

Step 1 :

P = 1001 (0000 + 1001 = 1001)
B = 1110
P = 0100.

Step 2 :

P = 0100 (0100 + 0000 = 0100)
B = 0111.
P = 0010.

Step 3 :

P = 0010 + 1001 = ~~1101~~ 1011
B = 1011
P = ~~0110~~. 0101

Step 4 :

P = ~~0110 + 1001 = 10111~~ = 1110
0101 + 1001
B = 0101
P = 0111

So the result is 01110101

SOURCE CODE

```
from sum import add

def shift(char, original):
    return char + original[:len(original)-1]

def product(n1,n2,n):
    sum = ''.zfill(n)
    for i in range(n):
        if (n2[len(n2)-1]='1'):
            sum = add(sum,n1,n)
        n2= shift(sum[len(sum)-1],n2)
        Sum = sum[:len(sum)-1].zfill(n)
    return sum,n2


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

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


print(" The product is", product(n1,n2,n))
```

Output:

```
Enter the number of bits: 4
Enter the first number: 1111
Enter the Second number: 1111

The product is ('11100001')
```

DISCUSSION:

THus, In this lab, we performed multiplication of two unsigned binary numbers using the concept of ~~bin~~ partial product. This process is fast and memory efficient.

CONCLUSION

Hence, two unsigned binary numbers were multiplied with the help of partial product algorithm