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Class:	T. Y. B.Tech (Computer Engineering)
Course:	Processor Organization and Architecture (POA)
Course Code:	DJ19CEL502
Experiment No.:	01

AIM: To implement Booth's Multiplication Algorithm.

CODE:

```
def twosComplement(num):
   onesComp=""
   for i in num:
      if i == "0":
         onesComp += "1"
      else:
         onesComp +="0"
   return bin(int(onesComp,2) + int("1",2)).replace('0b',"")
num1 = int(input('Enter number: '))
num2 = int(input('Enter 2nd number: '))
binNum1 = bin(abs(num1)).replace("0b",'')
binNum2 = bin(abs(num2)).replace("0b",'')

if len(binNum1) >= len(binNum2):
   maxlen = len(binNum1)
else:
   maxlen = len(binNum2)
maxlen +=1
binNum1 = binNum1.zfill(maxlen)
binNum2 = binNum2.zfill(maxlen)
if num2 < 0:
   binNum2 = twosComplement(binNum2)
if num1 < 0:
   binNum1 = twosComplement(binNum1)
binCompNum1 = twosComplement(binNum1)
binCompNum1 = binCompNum1.zfill(maxlen)
print('Number 1 binary:',binNum1)
print('Number 2 binary:',binNum2)
print('Number 1 complement:',binCompNum1)
count = maxlen
m = binNum1
minusm = binCompNum1
q = binNum2
q1 = '0'
```

```
a = "0"
a = a.zfill(maxlen)
rightshift=""
while count > 0:
    if q1 == '1' and q[maxlen-1] == '0':
        a = bin(int(a,2) + int(m,2)).replace('0b','')
        if(len(a) > maxlen):
            a = a[1:]
        a = a.zfill(maxlen)
    elif q1=='0' and q[maxlen-1] == '1':
        a = bin(int(a,2) + int(minusm,2)).replace('0b','')
        if(len(a) > maxlen):
            a = a[1:]
        a = a.zfill(maxlen)
    merged = a+q+q1
    rightshift = merged[0]
    for i in range(len(merged)-1):
        rightshift += merged[i]
    a = rightshift[:maxlen]
    q = rightshift[maxlen:maxlen*2]
    q1 = rightshift[-1]
    count -=1
ans = a+q
minus = False
if ans[0] == '1':
    ans = twosComplement(ans)
    minus = True
print(ans)

if minus:
    print(int(ans,2) * -1)
else:
    print(int(ans,2))
```

OUTPUT:

```
PS C:\Users\Jadhav\Documents\BTech\Docs\5th Sem\POA\Prac\CODE> & C:/msys64/mingw64/bin/python.exe "
c:/Users/Jadhav/Documents/BTech/Docs/5th Sem/POA/Prac/CODE/booth.py"
Enter number: 20
Enter 2nd number: 11
Number 1 binary: 010100
Number 2 binary: 001011
Number 1 complement: 101100
000011011100
220
```