**COA ASSIGNMENT.NO. :- 2**

**AIM:-**Perform division of following numbers using restoring division algorithm dividend (A,Q)=+11; Divisor (M)=-6.

**OBJECTIVE:-** We have to perform division of two signed numbers using an algorithm rather than actually doing it manually.

**THEORY:-**

**ALGORITHM:**

* Load the divisor into M register and the dividend into A and Q registers. The dividend must be expressed as 2n-bits 2’s complement number.
* Shift A, Q left one bit position.
* If M and A registers have same signs, perform (A-M) and store the result in A register; otherwise perform (A+M) and store it in A register.
* The preceding operation is successful if the sign of A is same before and after the operation.
* If the operation is successful or A=0, then set Q0=1.
* If the operation is unsuccessful and A is not equal to zero, then set Q0=0 and restore the previous value of A.
* Repeat step 2 through and as many times as there are bit positions in Q.
* The remainder is in A register. If the sign of the divisor and dividend were the same, then the quotient is in Q ; otherwise the current quotient is in 2’s complement of Q register,

**NOTE:**

(-7) % (3) and (7) % (-3)

Remainder in both cases is different

Therefore, D=Q\*V+R

* **Restoring Division Operation:**

Given : M =(-6)

(+6)=0110

(-6)=1010

(A, Q) = (+11)=1011

**A Q M**

1111 1011 1010 INITIAL VALUES

1111 0110 1010 SHIFT LEFT

0101 0110 1010 A<-A-M CYCLE 1

1111 0110 1010 Q0=0

1110 1100 1010 SHIFT LEFT

0100 1100 1010 A<-A-M CYCLE 2

1110 1100 1010 Q0=0

1101 1000 1010 SHIFT LEFT

0011 1000 1010 A<-A-M CYCLE 3

1101 1000 1010 Q0=0

1011 0000 1010 SHIFT LEFT

0001 0000 1010 A<-A-M CYCLE 4

1011 0000 1010 Q0=0

**OUTPUT:-**

Remainder (A) =1011

Quotient(Q)=0000