Experiment 8

Aim: To implement Restoring division algorithm using c-programming.

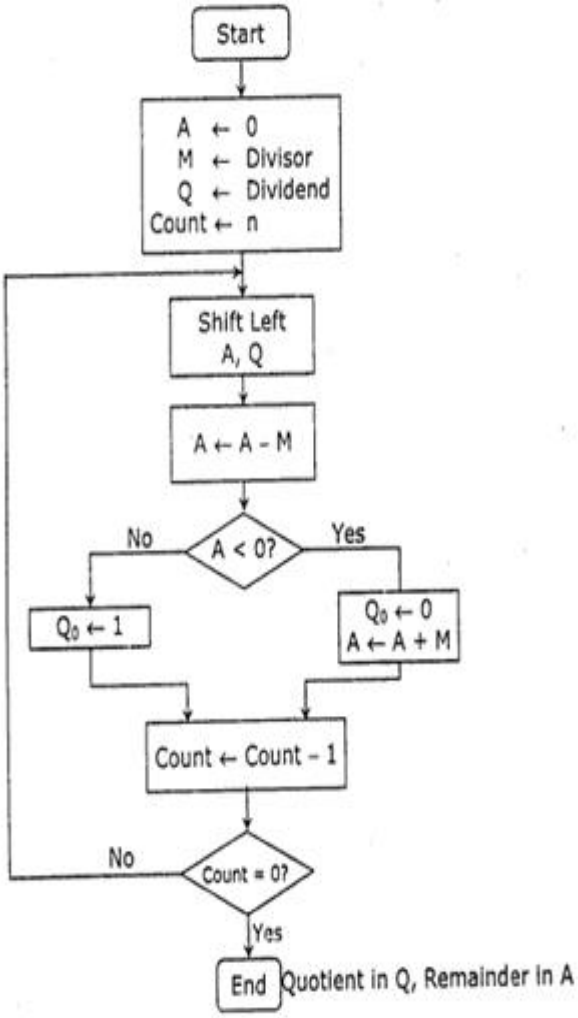
Objective -

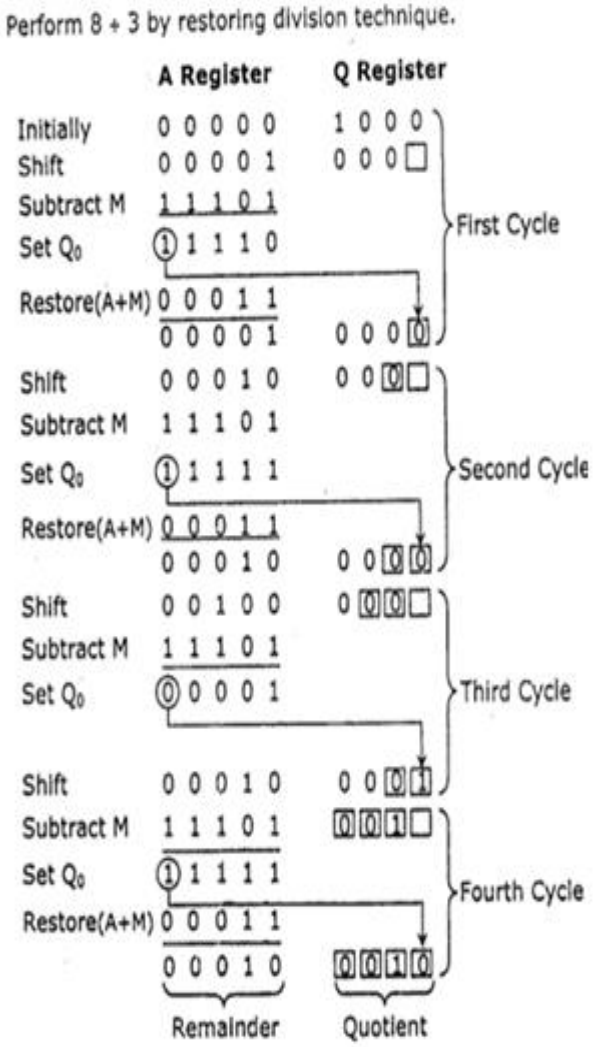
1. To understand the working of Restoring division algorithm.
2. To understand how to implement Restoring division algorithm using c-programming.

Theory:

1) The divisor is placed in M register, the dividend placed in Q register.
2) At every step, the A and Q registers together are shifted to the left by 1-bit
3) M is subtracted from A to determine whether A divides the partial remainder. If it does, then Q0 set to 1-bit. Otherwise, Q0 gets a 0 bit and M must be added back to A to restore the previous value.
4) The count is then decremented and the process continues for n steps. At the end, the quotient is in the Q register and the remainder is in the A register.

Flowchart





Program-

```
#include<stdlib.h>
#include<stdio.h>
int acum[100]={0}          ;
void add(int acum[],int b[],int n);
int q[100],b[100];
int main()
{
int x,y;
printf("Enter the Number :");
scanf("%d%d",&x,&y);
int i=0;
while(x>0||y>0)
{
if(x>0)
{
q[i]=x%2;
x=x/2;
}
else
{
q[i]=0;
}
if(y>0)
{
b[i]=y%2;
y=y/2;
}
else
{
b[i]=0;
}
i++;
}

int n=i;
int bc[50];
printf("\n");
for(i=0;i<n;i++)
{
if(b[i]==0)
{
bc[i]=1;
}
else
{
bc[i]=0;
}
}
bc[n]=1;
for(i=0;i<=n;i++)
```

```
{
if(bc[i]==0)
{
bc[i]=1;
i=n+2;
}
else
{
bc[i]=0;
}
}
int l;
 b[n]=0;
int k=n;
int n1=n+n-1;
int j,mi=n-1;
for(i=n;i!=0;i--)
{
for(j=n;j>0;j--)
{
acum[j]=acum[j-1];

}
acum[0]=q[n-1];
for(j=n-1;j>0;j--)
{
q[j]=q[j-1];
}

add(acum,bc,n+1);
if(acum[n]==1)
{
q[0]=0;
add(acum,b,n+1);
}
else
{
q[0]=1;
}
}
printf("\nQuoient   : ");

for(  l=n-1;l>=0;l--)
{
printf("%d",q[l]);

}
printf("\nRemainder : ");
for( l=n;l>=0;l--)
{
printf("%d",acum[l]);
```

```
}
return 0;
}
void add(int acum[],int bo[],int n)
{
int i=0,temp=0,sum=0;
for(i=0;i<n;i++)
{
sum=0;
sum=acum[i]+bo[i]+temp;
if(sum==0)
{
acum[i]=0;
temp=0;
}
else if (sum==2)
{
acum[i]=0;
temp=1;
}
else if(sum==1)
{
acum[i]=1;
temp=0;
}
else if(sum==3)
{
acum[i]=1;
temp=1;
}
}
}
```

Output –

```
Input:
15 7

Output:
Enter the Number :

Quoient: 0010
Remainder: 00001
```

Conclusion –

In this experiment, we learned about the division algorithm in computer architecture which is the Restoring Algorithm. In wrapping up the study of restoring division algorithms, it's clear that we've traversed a landscape of precision and efficiency in numerical computation. Restoring division algorithms offer a powerful method for dividing numbers,