**PROGRAM 5)**

**Write a C program to implement addition of long positive integers using circular single linked list with header node.**

**Program :**

#include<stdio.h>

#include<stdlib.h>

#include<string.h>

struct node

{

int data;

struct node\* next;

};

typedef struct node \*NODE;

struct node \*getnode()

{

struct node \*p;

p = (NODE) malloc(sizeof(struct node));

if(p== NULL)

{

printf("Insufficient Memory");

}

p->next = p;

return p;

}

void insert\_after\_head(NODE head, int x)

{

struct node\* p ;

p= getnode();

p->data =x;

p->next=head->next;

head->next=p;

}

NODE addLists(NODE l1, NODE l2,NODE l3)

{

NODE p,q;

NODE prev = NULL;

int carry , sum,digit;

p=l1->next;

q=l2->next;

carry=0;

while (p!= l1 && q != l2)

{

sum = carry + p->data + q->data;

carry = sum/10;

digit = sum%10;

insert\_after\_head(l3,digit);

p=p->next;

q=q->next;

}

while(p!=l1)

{

sum = carry + p->data ;

carry = sum/10;

digit = sum%10;

insert\_after\_head(l3,digit);

p=p->next;

}

while(q!=l2)

{

sum = carry + q->data ;

carry = sum/10;

digit = sum % 10;

insert\_after\_head(l3,digit);

q=q->next;

}

if (carry != 0)

insert\_after\_head(l3,carry);

}

void printList(NODE head)

{

NODE p;

p= head->next;

while(p != head)

{

printf("%d\n", p->data);

p = p->next;

}

}

void Read\_Number(NODE head)

{

char number[100];

int i,digit;

scanf("%s",number);

i =0;

while(number[i]!='\0')

{

digit=number[i] - 48;

insert\_after\_head(head,digit);

i++;

}

}

int main(void)

{

NODE l1 ,l2,l3;

l1=getnode();

l2=getnode();

l3=getnode();

printf("Enter the first number :");

Read\_Number(l1);

printf("Enter the second number :");

Read\_Number(l2);

addLists(l1, l2,l3);

printf("Sum is ");

printList(l3);

return 0;

}

**OUTPUTS :**

OUTPUT 1:

Enter the first number :123123123

Enter the second number :321321321

Sum is 444444444

OUTPUT 2:

Enter the first number :123456789123456789

Enter the second number :987654321987654321

Sum is 1111111111111111110

OUTPUT 3:

Enter the first number :111111111111

Enter the second number :55555555555555555

Sum is 55555666666666666