## Ex.No:3 Addition of two Polynomials using List ADT

**Program**

```
#include<stdio.h>
#include<malloc.h>
#include<conio.h>

typedef struct link
{
   int coeff;
   int pow;
   struct link *next;
}LIST;

void main()
{
 LIST *poly1,*poly2,*poly;
 char ch;
 void create(LIST *);
 void polyadd(LIST *,LIST *,LIST *);
 void show(LIST *node);
 clrscr();
      do
      {
      poly1=(LIST *)malloc(sizeof(LIST));
      poly2=(LIST *)malloc(sizeof(LIST));
      poly=(LIST *)malloc(sizeof(LIST));
      printf("\nEnter 1st number:");
      create(poly1);
      printf("\n\nEenter 2nd number:");
      create(poly2);
      printf("\n\n1st Number:");
      show(poly1);
      printf("\n2nd Number:");
      show(poly2);
      polyadd(poly1,poly2,poly);
      printf("\n\nAdded polynomial:");
      show(poly);
      printf("\nDo you wants to continue(Press Y for Yes):");
      ch=getch();
      }
      while(ch=='y' || ch=='Y');

}

void create(LIST *node)
{
 char ch;
 do
 {
  printf("\nEnter coeff:");
```

```
  scanf("%d",&node->coeff);
  printf("\nEnter power:");
  scanf("%d",&node->pow);
  node->next=(LIST *)malloc(sizeof(LIST));
  node=node->next;
  node->next=NULL;
  printf("\nContinue to next term(y/n):");
  ch=getch();
 }while(ch=='y' || ch=='Y');
}

void show(LIST *node)
{
 while(node->next!=NULL)
 {
  printf("%dx^%d",node->coeff,node->pow);
  node=node->next;
  if(node->next!=NULL)
   printf("+");
 }
}

void polyadd(LIST *poly1,LIST *poly2,LIST *poly)
{
     while(poly1->next!=NULL &&  poly2->next!=NULL)
     {
      if(poly1->pow>poly2->pow)
      {
       poly->pow=poly1->pow;
       poly->coeff=poly1->coeff;
       poly1=poly1->next;
       }
      else if(poly1->pow<poly2->pow)
      {
       poly->pow=poly2->pow;
       poly->coeff=poly2->coeff;
       poly2=poly2->next;
       }
      else
      {
       poly->pow=poly1->pow;
       poly->coeff=poly1->coeff+poly2->coeff;
       poly1=poly1->next;
       poly2=poly2->next;
       }
      poly->next=(LIST *)malloc(sizeof(LIST));
      poly=poly->next;
      poly->next=NULL;
     }
     while(poly1->next!=NULL || poly2->next!=NULL)
     {
```

```
    if(poly1->next!=NULL)
    {
     poly->pow=poly1->pow;
     poly->coeff=poly1->coeff;
     poly1=poly1->next;
     }
    if(poly2->next!=NULL)
    {
     poly->pow=poly2->pow;
     poly->coeff=poly2->coeff;
     poly2=poly2->next;
     }
     poly->next=(LIST *)malloc(sizeof(LIST));
     poly=poly->next;
     poly->next=NULL;
     }
}
```

**Output:(**A: 5x^3+6x^2+1x^1+7x^0, B: 3x^2+2x^1+4x^0, C:A+B=?)

```
Enter 1st number:
Enter coeff:5
Enter power:3

Continue to next term(y/n):
Enter coeff:6
Enter power:2

Continue to next term(y/n):
Enter coeff:1
Enter power:1

Continue to next term(y/n):
Enter coeff:7
Enter power:0

Continue to next term(y/n):

Eenter 2nd number:
Enter coeff:3
Enter power:2

Continue to next term(y/n):
Enter coeff:2
Enter power:1

Continue to next term(y/n):
Enter coeff:4
Enter power:0

Continue to next term(y/n):

1st Number:5x^3+6x^2+1x^1+7x^0
2nd Number:3x^2+2x^1+4x^0

Added polynomial:5x^3+9x^2+3x^1+11x^0
Do you wants to continue(Press Y for Yes):n
```