```
#include <stdio.h>
#include <stdlib.h>
struct node
{
int coeff;
int pow;
struct node *Next;
};
 struct node *Poly1,*Poly2,*Result;
void Create(struct node *List);
void Display(struct node *List);
void Addition(struct node *Poly1,struct node *Poly2,struct node *Result);
int main()
{
Poly1=(struct node*)malloc(sizeof(struct node));
Poly2=(struct node*)malloc(sizeof(struct node));
Result=(struct node*)malloc(sizeof(struct node));

Poly1->Next = NULL;
Poly2->Next = NULL;
printf("Enter the values for first polynomial :\n");
Create(Poly1);
printf("The polynomial equation is : ");
Display(Poly1);
printf("\nEnter the values for second polynomial :\n");
Create(Poly2);
printf("The polynomial equation is : ");
```

```
Display(Poly2);
Addition(Poly1, Poly2, Result);
printf("\nThe polynomial equation addition result is : ");
Display(Result);
return 0;
}
void Create(struct node *List)
{
int choice;
struct node *Position, *NewNode;
Position = List;
do
{
NewNode = malloc(sizeof(struct node));
printf("Enter the coefficient : ");
scanf("%d", &NewNode->coeff);
printf("Enter the power : ");
scanf("%d", &NewNode->pow);
NewNode->Next = NULL;
Position->Next = NewNode;
Position = NewNode;
printf("Enter 1 to continue : ");
scanf("%d", &choice);
} while(choice == 1);
}
void Display(struct node *List)
{
```

```
struct node *Position;
Position = List->Next;
while(Position != NULL)
{
printf("%dx^%d", Position->coeff, Position->pow);
Position = Position->Next;
if(Position != NULL && Position->coeff > 0)
{
printf("+");
}
}
}
void Addition(struct node *Poly1, struct node *Poly2, struct node *Result)
{
struct node *Position;
struct node *NewNode;
Poly1 = Poly1->Next;
Poly2 = Poly2->Next;
Result->Next = NULL;
Position = Result;
while(Poly1 != NULL && Poly2 != NULL)
{
NewNode = malloc(sizeof(struct node));
if(Poly1->pow == Poly2->pow)
{
NewNode->coeff = Poly1->coeff + Poly2->coeff;
NewNode->pow = Poly1->pow;
```

```
Poly1 = Poly1->Next;
Poly2 = Poly2->Next;
}
else if(Poly1->pow > Poly2->pow)
{
NewNode->coeff = Poly1->coeff;
NewNode->pow = Poly1->pow;
Poly1 = Poly1->Next;
}
else if(Poly1->pow < Poly2->pow)
{
NewNode->coeff = Poly2->coeff;
NewNode->pow = Poly2->pow;
Poly2 = Poly2->Next;
}
NewNode->Next = NULL;
Position->Next = NewNode;
Position = NewNode;
}
while(Poly1 != NULL || Poly2 != NULL)
{
NewNode = malloc(sizeof(struct node));
if(Poly1 != NULL)
{
NewNode->coeff = Poly1->coeff;
NewNode->pow = Poly1->pow;
Poly1 = Poly1->Next;
```

```
}

if(Poly2 != NULL)

{

NewNode->coeff = Poly2->coeff;

NewNode->pow = Poly2->pow;

Poly2 = Poly2->Next;

}

NewNode->Next = NULL;

Position->Next = NewNode;

Position = NewNode;

}

}
```

Program 2:

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
   int coeff;
   int expo;
   struct node *next;
};

struct node* insert(struct node *head,int co,int exp)
{
   struct node *temp;
   struct node *newnode=malloc(sizeof(struct node));
   newnode->coeff=co;
   newnode->expo=exp;
   newnode->next=NULL;

   if(head==NULL || exp>head->expo)
   {
      newnode->next=head;
      head=newnode;
   }
   else
   {
      temp=head;
      while(temp->next!=NULL &&temp->next->expo>=exp)
         temp=temp->next;
```

```
        newnode->next=temp->next;
        temp->next=newnode;
    }
    return head;
}
struct node* create(struct node *head)
{
    int n,i;
    int coeff;
    int expo;
    printf("Enter the no of terms:");
    scanf("%d",&n);
    for(i=0;i<n;i++)
    {
        printf("Enter the coeefficient for term %d:",i+1);
        scanf("%d",&coeff);

        printf("Enter the exponent for term %d:",i+1);
        scanf("%d",&expo);

        head=insert(head,coeff,expo);
    }
    return head;
}
    void print(struct node* head)
    {
        if(head==NULL)
            printf("No Polynomial");
        else
        {
            struct node *temp=head;
            while(temp!=NULL)
            {
                printf("%dx^%d",temp->coeff,temp->expo);
                temp=temp->next;
                if(temp!=NULL)
                    printf("+");
                else
                    printf("\n");
            }
        }
    }

    void polyAdd(struct node *head1, struct node *head2)
    {
        struct node *ptr1=head1;
        struct node *ptr2=head2;
        struct node *head3=NULL;
        while(ptr1!=NULL && ptr2!=NULL)
        {
```

```
        if(ptr1->expo == ptr2->expo)
        {
        head3=insert(head3,ptr1->coeff+ptr2->coeff,ptr1->expo);
            ptr1=ptr1->next;
            ptr2=ptr2->next;
        }
        else if(ptr1->expo > ptr2->expo)
        {
            head3=insert(head3,ptr1->coeff,ptr1->expo);
            ptr1=ptr1->next;
        }
        else if(ptr1->expo < ptr2->expo)
        {
            head3=insert(head3,ptr2->coeff,ptr2->expo);
            ptr2=ptr2->next;
        }
    }
    while(ptr1!=NULL)
    {
        head3=insert(head3,ptr1->coeff,ptr1->expo);
        ptr1=ptr1->next;
    }
    while(ptr2!=NULL)
    {
        head3=insert(head3,ptr2->coeff,ptr2->expo);
        ptr2=ptr2->next;
    }
   printf("Added Polynomial is: ") ;
   print(head3);
}
int main()
{
    struct node *head1=NULL;
    struct node *head2=NULL;
    printf("Enter first polynomial\n");
    head1=create(head1);
    printf("Enter second polynomial\n");
    head2=create(head2);
    polyAdd(head1,head2);
    return 0;

}
```