LAB PROGRAM 11

Write a program to perform addition of two polynomial functions.

```c
#include<stdio.h>

#include<process.h>

#include<math.h>

struct NODE

{

    float cf;

    float px;

    float py;

    int flag;

    struct NODE *link;

};
typedef struct NODE *node;


node getnode()

{

    node x;

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

    if(x == NULL)

    {

     printf("Memory is full.\n");

     exit(0);

    }

    return x;

}


node insert_rear(float cf,float x,float y,node head)
```

```c
{
    node temp,cur;
    int flag;
    temp=getnode();
    temp->cf=cf;
    temp->px=x;
    temp->py=y;
    temp->flag=0;
    cur=head->link;
    while(cur->link!=head)
       cur=cur->link;
    cur->link=temp;
    temp->link=head;
    return head;
}

node read_polynomial(node head)
{
    int i;
    float cf,px,py;
    printf("Enter the coefficient as -999 to end the polynomial.\n");
    for(i=0;;i++)
    {
        printf("Enter term %d:\n",i+1);
        printf("   Coefficient: ");
        scanf("%f",&cf);
        if(cf == -999)
            break;
```

```c
        printf("   Pow of x: ");
        scanf("%f",&px);
        printf("   Pow of y: ");
        scanf("%f",&py);
        head=insert_rear(cf,px,py,head);
    }
    return head;
}


node add_polynomial(node h1,node h2,node h3)
{
    node p1,p2;
    int x1,x2,y1,y2,cf1,cf2,cf;
    p1=h1->link;
    while(p1!=h1)
    {
        x1=p1->px;
        y1=p1->py;
        cf1=p1->cf;
        p2=h2->link;
        while(p2!=h2)
        {
            x2=p2->px;
            y2=p2->py;
            cf2=p2->cf;
            if(x1==x2 && y1==y2)
                break;
            p2=p2->link;
```

```
            }
        if(p2!=h2)
        {
            cf=cf1+cf2;
            p2->flag=1;
            if(cf!=0)
                h3=insert_rear(cf,x1,y1,h3);
        }
        else
            h3=insert_rear(cf1,x1,y1,h3);
        p1=p1->link;
    }
    p2=h2->link;
    while(p2!=h2)
    {
        if(p2->flag==0)
        {
            h3=insert_rear(p2->cf,p2->px,p2->py,h3);
        }
        p2=p2->link;
    }
    return h3;
}

void display(node head)
{
    node temp;
    if(head->link==head)
```

```c
    {
      printf("Polynomial does not exist.\n");

      return;

    }

    temp=head->link;

    while(temp!=head)

    {

      if(temp->cf >= 0)

      {

          if (temp->link != NULL)

              printf(" +");

      }

      printf("%5.1fx^%3.1fy^%3.1f",temp->cf,temp->px,temp->py);

      temp=temp->link;

    }

    printf("\n");

}


int main()

{

    node h1,h2,h3;

    h1=getnode();

    h2=getnode();

    h3=getnode();

    h1->link=h1;

    h2->link=h2;

    h3->link=h3;

    printf("Enter the first polynomial:\n");
```

```c
    h1=read_polynomial(h1);
    printf("\nEnter the second polynomial:\n");
    h2=read_polynomial(h2);
    h3=add_polynomial(h1,h2,h3);
    printf("\nThe first polynomial:\n");
    display(h1);
    printf("\nThe second polynomial:\n");
    display(h2);
    printf("\nThe sum of the 2 polynomials:\n");
    display(h3);
}
```

```
Enter the first polynomial:
Enter the coefficient as -999 to end the polynomial.
Enter term 1:
   Coefficient: -7
   Pow of x: 3
   Pow of y: 1
Enter term 2:
   Coefficient: 4
   Pow of x: 2
   Pow of y: 2
Enter term 3:
   Coefficient: -2
   Pow of x: 0
   Pow of y: 0
Enter term 4:
   Coefficient: -999

Enter the second polynomial:
Enter the coefficient as -999 to end the polynomial.
Enter term 1:
   Coefficient: 4
   Pow of x: 3
   Pow of y: 1
Enter term 2:
   Coefficient: 1
   Pow of x: 0
   Pow of y: 0
Enter term 3:
   Coefficient: -8
   Pow of x: 2
   Pow of y: 2
Enter term 4:
   Coefficient: -999

The first polynomial:
 -7.0x^3.0y^1.0 +  4.0x^2.0y^2.0 -2.0x^0.0y^0.0

The second polynomial:
 +  4.0x^3.0y^1.0 +  1.0x^0.0y^0.0 -8.0x^2.0y^2.0

The sum of the 2 polynomials:
 -3.0x^3.0y^1.0 -4.0x^2.0y^2.0 -1.0x^0.0y^0.0

Process returned 0 (0x0)   execution time : 39.975 s
Press any key to continue.
```