POLYNOMIAL ADDITION

AIM:

To write a ‘c’ program to implement the polynomial addition of a given two polynomial equations

ALGORITHM:

Step 1: Start

Step 2: Display the menu to perform the operation

Step 3: Get the choice from the user

Step 4: Get two polynomial equations as the input from the user side

Step 5: Perform the addition of the given two equations

Step 5.1: Assign HEAD=NULL

Step 5.2: While (POLY!=NULL)

Step 5.3: HEAD=INSERTNODE(HEAD,COPYNODE(POLY1,1))

Step 5.4:POLY1=POLY->NEXT

Step 5.5:[End of Step 2 while Structure ]

Step5.6:While(POLY!=NULL)

Step5.7: HEAD=INSERTNODE(HEAD,COPYNODE(POLY2,1))

Step5.8:POLY2=POLY2->NEXT

Step 5.9:[End of Step 6 while Structure ]

Step 5.10:Return HEAD

Step 6:Stop

PROGRAM CODING:

#include<stdio.h>

#include<conio.h>

#include<stdlib.h>

#define positive 1

typedef struct node

{

float coef;

int exp;

struct node \*next;

}poly;

void viewmenu();

void readnode(poly \*);

void viewpoly(poly \*);

poly \*getnode();

poly \*createpoly();

poly \*copynode(poly \* ,int);

poly \*insertnode(poly \*,poly \*);

poly \*polyadd(poly \*p1,poly \*p2);

void main()

{

int choice;

poly \*poly1=NULL,\*poly2=NULL,\*res=NULL;

poly \*quotient,\*remainder=NULL;

viewmenu();

clrscr();

while(1)

{

printf("\n?");

fflush(stdin);

scanf("%d",&choice);

switch(choice)

{

case 0:

viewmenu();

break;

case 1:

printf("\nenter the first polynomial...\n");

poly1=createpoly();

printf("\nfirst polynomial is:\n");

viewpoly(poly1);

break;

case 2:

printf("enter the second polynomial...\n");

poly2=createpoly();

printf("\nsecond polynomial is..\n");

viewpoly(poly2);

break;

case 3:

printf("\nthe first polynomial is...\n");

viewpoly(poly1);

printf("\nthe second polynomial is...\n");

viewpoly(poly2);

break;

case 4:

printf("\nthe resultant polynomial after addition is...\n");

res=polyadd(poly1,poly2);

viewpoly(res);

break;

default:

printf("\nend of run of your program...");

exit(0);

}

}

getch();

}

void viewmenu()

{

printf("\npolynomial manipulation usig singly linked list...");

printf("\n\t0.view the main menu");

printf("\n\t1.create the first polynomial");

printf("\n\t2.create the second polynomial");

printf("\n\t3.view the first and second polynomial");

printf("\n\t4.polynomial addition");

printf("\n\t5.exit");

}

poly \*createpoly()

{

poly \*p,\*head=NULL;

do

{

p=getnode();

readnode(p);

head=insertnode(head,p);

}while(p->exp!=0);

return head;

}

poly \*getnode()

{

return(poly\*)malloc(sizeof(poly));

}

void readnode(poly \*newnode)

{

int exp;

float coef;

printf("\nenter the coefficient:");

scanf("%f",&coef);

printf("enter the exponent :");

scanf("%d",&exp);

newnode->coef=coef;

newnode->exp=exp;

newnode->next=NULL;

}

poly \*insertnode(poly \*head,poly \*p)

{

if(p->coef==0.0f)

return head;

if(head==NULL)

return p;

else if(p->exp>head->exp)

{

p->next=head;

return p;

}

else if(p->exp<head->exp)

head->next=insertnode(head->next,p);

else if((head->coef=head->coef + p->coef)==0.0f)

return head->next;

return head;

}

void viewpoly(poly \*ply)

{

if(ply==NULL)

printf("NULL\n");

while(ply!=NULL)

{

printf("%.2fx^%d",ply->coef,ply->exp);

printf("%s",(ply->next==NULL)?" = 0 \n": " + ");

ply=ply->next;

}

}

poly \*polyadd(poly \*poly1,poly \*poly2)

{

poly \*head=NULL;

while(poly1!=NULL)

{

head=insertnode(head,copynode(poly1,positive));

poly1=poly1->next;

}

while(poly2!=NULL)

{

head=insertnode(head,copynode(poly2,positive));

poly2=poly2->next;

}

return head;

}

poly \*copynode(poly \*p,int sign)

{

poly \*newnode;

newnode=getnode();

newnode->coef=sign\*p->coef;

newnode->exp=p->exp;

newnode->next=NULL;

return newnode;

}

OUTPUT:

polynomial manipulation usig singly linked list...

0.view the main menu

1.create the first polynomial

2.create the second polynomial

3.view the first and second polynomial

4.polynomial addition

5.exit

?1

enter the first polynomial...

enter the coefficient:5

enter the exponent :3

enter the coefficient:8

enter the exponent :2

enter the coefficient:6

enter the exponent :1

enter the coefficient:9

enter the exponent :0

first polynomial is:

5.00x^3 + 8.00x^2 + 6.00x^1 + 9.00x^0 = 0

?2

enter the second polynomial...

enter the coefficient:7

enter the exponent :3

enter the coefficient:6

enter the exponent :2

enter the coefficient:4

enter the exponent :1

enter the coefficient:5

enter the exponent :0

second polynomial is..

7.00x^3 + 6.00x^2 + 4.00x^1 + 5.00x^0 = 0

?4

the resultant polynomial after addition is...

12.00x^3 + 14.00x^2 + 10.00x^1 + 14.00x^0 = 0