**Code for Assignment 10:**

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#include <stdio.h>

#include <stdlib.h>

typedef struct node

{

int power;

float coeff;

struct node \*next;

}node;

float pow1(float n, int p);

node \* insert(node \*head,int power1,float coeff1);

node \* create();

node \* padd(node \*p1,node \*p2,node \*p3);

node \* pmul(node \*p1,node \*p2);

float eval(node \*p1,float x);

void print(node \*head);

node \*insert(node \*head,int power1,float coeff1)

{

node \*p,\*q;

p=(node\*) malloc(sizeof(node));

p->power=power1;

p->coeff=coeff1;

p->next=NULL;

if(head==NULL)

{

head=p;

head->next=head;

return(head);

}

if(power1<head->power) //arrage in descending order of power

{

p->next=head->next;

head->next=p;

head=p;

return(head);

}

if(power1==head->power) //add coefficients

{

head->coeff=head->coeff+coeff1;

return(head);

}

q=head;

while(q->next!=head && power1<=q->next->power) //locate the postion for insertion

q=q->next;

if(p->power==q->power)

q->coeff=q->coeff+coeff1;

else

{

p->next=q->next;

q->next=p;

}

return(head);

}

node \*create()

{

int n,i,power1;

float coeff1;

node \*head=NULL;

printf("\nEnter No. of Terms:");

scanf("%d",&n);

head=insert(head,-1,0);

for(i=1;i<=n;i++)

{

printf("\nenter a term as a tuple of (power,coefficient) : ");

scanf("%d%f",&power1,&coeff1);

head=insert(head,power1,coeff1);

}

return(head);

}

node \* padd(node \*p1,node \*p2,node \*p3)

{

int done=0;

node \*t1,\*t2,\*startA;

t1=p1;

startA=t1;

//p1=p1->next;

t1=p1->next;//p1 pointing to first node

//p2=p2->next;

t2=p2->next;

do

{

if(t1->power==t2->power)

{

if (startA==t1) done=1;

else

{

p3=insert(p3,t1->power,t1->coeff+t2->coeff);

t1=t1->next;

t2=t2->next;

}

}

else if(t1->power>t2->power)

{

p3=insert(p3,t1->power,t1->coeff);

t1=t1->next;

}

else if(t2->power>t1->power)

{

p3=insert(p3,t2->power,t2->coeff);

t2=t2->next;

}

}while(!done); //t1!=p1->next && t2!=p2->next);

return p3;

}

node \*pmul(node \*p1,node \*p2)

{

node \*head1,\*head2;

node \*head=NULL;

head2=p2->next;

if(head2->power == -1)

head2=p2->next;

do

{

head1=p1->next;

if(head1->power == -1)

head1=p1->next;

do //multiply with every term of the first polynomial

{

head=insert(head,head1->power+head2->power,head1->coeff \* head2->coeff);

head1=head1->next;

if(head1->power == -1)

head1=head1->next;

}while(head1!=p1->next);

head2=head2->next;

if(head2->power == -1)

head2=head2->next;

}while(head2!=p2->next);

return(head);

}

float pow1(float n, int p)

{

float r=1;

for(; p>=1; p--)

r = r\*n;

return r;

}

float eval(node \*head,float x)

{

float value=0.00,j;

node \*p;

p=head->next;

if(p->power == -1)

p=p->next;

do

{

j=pow1(x,p->power);

value=value+p->coeff \* j;

p=p->next;

}while(p!=head->next);

return(value);

}

void print( node \*head)

{

node \*p;

p=head->next;

printf("\n");

do

{

if(p->power!=-1)

{

printf("%fx^%d +",p->coeff,p->power);

p=p->next;

}

else

p=p->next;

}while(p!=head->next);

}

void main()

{

node \*p1,\*p2,\*p3;

int op;

float value,x;

p1=p2=p3=NULL;

do

{

printf("\n1)Create first polynomial");

printf("\n2)Create second polynomial");

printf("\n3)Print first polynomial");

printf("\n4)Print second polynomial");

printf("\n5)Add\n6)Multiply\n7)Evaluate First Polynomial\n8)Quit");

printf("\nEnter Your Choice: ");

scanf("%d",&op);

switch(op)

{

case 1: p1=create();break;

case 2: p2=create();break;

case 3: print(p1);break;

case 4: print(p2);break;

case 5: p3=padd(p1,p2,p3);

print(p3);break;

case 6: p3=pmul(p1,p2);

print(p3);break;

case 7: printf("\nEnter the value of X:");

scanf("%f",&x);

value=eval(p1,x);

printf("\nEvaluated value = %6.2f",value);

break;

}

}while(op!=8);

}

**Output:**





