WEEK11

Evaluation of polynomials:

CODE:

```
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
struct node
{
	int cf;
	int px;
	int py;
	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;
}
void freenode(NODE x)
{
	free(x);
}


NODE insert_rear(NODE first,int cf,int px,int py)
{
	NODE temp,cur;
	temp=getnode();
	temp->cf=cf;
	temp->px=px;
	temp->py=py;
	temp->link=NULL;
```

```
	if(first==NULL)
		return temp;
	cur=first;
	while(cur->link!=NULL)
		cur=cur->link;
	cur->link=temp;
	return first;
}

void display(NODE first)
{
	NODE temp,temp2;
	if(first==NULL)
		printf("Equation is EMPTY!\n");
	for(temp=first;temp!=NULL;temp=temp->link)
	{
		printf("%d*x^%d*y^%d",temp->cf,temp->px,temp->py);
		temp2=temp->link;
		if(temp2!=NULL)printf("+");
	}
	printf("\n");
}



int calculate(NODE first,int x,int y)
{
	NODE temp;
	if(first==NULL)return 0;
	int ans=0;
	for(temp=first;temp!=NULL;temp=temp->link)
	{
		ans=ans+(temp->cf)*pow(x,temp->px)*pow(y,temp->py);
	}
	return ans;

}

void main()
{
	int cf,px,py,choice;
	NODE first=NULL;
```

```
    printf("Enter the polynomial equation:\n");
    for(;;)
    {
        printf("Enter coefficient,power of x and power of y:\n");
        scanf("%d",&cf);
        scanf("%d",&px);
        scanf("%d",&py);

        first=insert_rear(first,cf,px,py);
        printf("Press 1 to enter another term\nPress 2 to exit\n");
        scanf("%d",&choice);
        if(choice==2)break;
    }
    printf("Polynomial equationn is:\n");
    display(first);
    printf("Enter the values of x and y:\n");
    int x,y;
    scanf("%d",&x);
    scanf("%d",&y);

    printf("Value of the equation is :%d",calculate(first,x,y));


}
```

OUTPUT:

```
C:\Users\misaf\Desktop\DS LAB\week11>evapolyc
Enter the polynomial equation:
Enter coefficient,power of x and power of y:
1
2
2
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient,power of x and power of y:
5
3
0
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient,power of x and power of y:
3
4
4
Press 1 to enter another term
Press 2 to exit
2
Polynomial equationn is:
1*x^2*y^2+5*x^3*y^0+3*x^4*y^4
Enter the values of x and y:
1
2
Value of the equation is :57
```

Addition of polynomials:

CODE:

```
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
struct node
{
	int cf;
	int px;
	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;
}
void freenode(NODE x)
{
	free(x);
}

NODE order_list(int cf,int px,NODE first)
{
NODE temp,prev,cur;
temp=getnode();
temp->cf=cf;
temp->px=px;
temp->link=NULL;
if(first==NULL) return temp;
if(px>first->px)
{
temp->link=first;
return temp;
}
prev=NULL;
cur=first;
while(cur!=NULL&&px<cur->px)
{
prev=cur;
cur=cur->link;
}
prev->link=temp;
temp->link=cur;
return first;
}
NODE add(NODE first1,NODE first2)
{
	if(first1==NULL)return first2;
	if(first2==NULL)return first1;
	NODE t1=first1,t2=first2;
	NODE firstr=NULL;
```

```
	while(t1!=NULL&&t2!=NULL)
	{

		if(t1->px==t2->px)
		{
			firstr=order_list(t1->cf+t2->cf,t1->px,firstr);
			t1=t1->link;
			t2=t2->link;
			continue;
		}
		if(t1->px>t2->px)
		{
			firstr=order_list(t1->cf,t1->px,firstr);
			t1=t1->link;
			continue;
		}
		if(t2->px>t1->px)
		{
			firstr=order_list(t2->cf,t2->px,firstr);
			t2=t2->link;
			continue;
		}


	}
	return firstr;

}
void display(NODE first)
{
	NODE temp,temp2;
	if(first==NULL)
		printf("Equation is EMPTY!\n");
	for(temp=first;temp!=NULL;temp=temp->link)
	{
		printf("%d*x^%d",temp->cf,temp->px);
		temp2=temp->link;
		if(temp2!=NULL)printf("+");
	}
	printf("\n");
}
```

```
void main()
{
	int cf,px,choice;
	NODE first1=NULL,first2=NULL,firstr=NULL;

	printf("Enter the polynomial equation1:\n");
	for(;;)
	{
		printf("Enter coefficient and power of x :\n");
		scanf("%d",&cf);
		scanf("%d",&px);

		first1 = order_list(cf,px,first1);
		printf("Press 1 to enter another term\nPress 2 to exit\n");
		scanf("%d",&choice);
		if(choice==2)break;
	}
	printf("Enter the polynomial equation2:\n");
	for(;;)
	{
		printf("Enter coefficient and power of x :\n");
		scanf("%d",&cf);
		scanf("%d",&px);

		first2 = order_list(cf,px,first2);
		printf("Press 1 to enter another term\nPress 2 to exit\n");
		scanf("%d",&choice);
		if(choice==2)break;
	}
	printf("Polynomial equationn1 is:\n");
	display(first1);
	printf("Polynomial equationn2 is:\n");
	display(first2);
	firstr=add(first1,first2);
	printf("ADDED POLYNOMIAL:\n");
	display(firstr);

}
```

OUTPUT:

```
C:\Users\misaf\Desktop\DS LAB\week11>addpolc
Enter the polynomial equation1:
Enter coefficient and power of x :
3
3
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient and power of x :
4
1
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient and power of x :
1
0
Press 1 to enter another term
Press 2 to exit
2
Enter the polynomial equation2:
Enter coefficient and power of x :
5
3
```

```
3
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient and power of x :
-1
2
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient and power of x :
-1
1
Press 1 to enter another term
Press 2 to exit
1
Enter coefficient and power of x :
2
0
Press 1 to enter another term
Press 2 to exit
2
Polynomial equationn1 is:
3*x^3+4*x^1+1*x^0
Polynomial equationn2 is:
5*x^3+-1*x^2+-1*x^1+2*x^0
ADDED POLYNOMIAL:
8*x^3+-1*x^2+3*x^1+3*x^0
```

Addition of long int:

CODE:

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
struct NODE
{
int info;
struct NODE*link;
};
typedef struct NODE*node;
node getnode()
{
node x;
x=(node)malloc(sizeof(struct NODE));
if(x==NULL)
{
printf("out of memory\n");
exit(0);
}
return x;
}
node ins_front(node first,int item)
{
node temp;
temp=getnode();
temp->info=item;
temp->link=first;
return temp;
}
node extract(char *s,node head)
{
        int i,n;
        for(i=0;i<strlen(s);i++)
        {
        n=s[i]-'0';
        head=ins_front(head,n);
        }
```

```
        return head;
}

node addlong(node head1,node head2,node head3)
{
        int temp,sum,carry=0;
        node cur1,cur2;
        cur1=head1;
        cur2=head2;
        while(cur1!=NULL&&cur2!=NULL)
        {
                temp=cur1->info+cur2->info+carry;
                if(temp>9)
                {
                sum=temp%10;
                carry=temp/10;
                }
                else
                {
                sum=temp;
                carry=0;
                }
                head3=ins_front(head3,sum);
                cur1=cur1->link;
                cur2=cur2->link;
        }
        while(cur1!=NULL)
        {
        temp=cur1->info+carry;
        if(temp>9)
        {
        sum=temp%10;
        carry=temp/10;
        }
        else
        {
        sum=temp;
        carry=0;
        }
        head3=ins_front(head3,sum);
        cur1=cur1->link;
        }
   while(cur2!=NULL)
```

```
        {
        temp=cur2->info+carry;
        if(temp>9)
        {
        sum=temp%10;
        carry=temp/10;
        }
        else
        {
        sum=temp;
        carry=0;
        }
        head3=ins_front(head3,sum);
        cur2=cur2->link;
        }

        if(cur1==NULL&&cur2==NULL)
        {
                if(carry==1)
                head3=ins_front(head3,carry);
        }
        return head3;
   }


void display(node first)
{
node cur;
if(first==NULL)
{
printf("Empty\n");
return;
}
cur=first;
while(cur!=NULL)
{
printf("%d",cur->info);
cur=cur->link;
}
}
int main()
{
        node head1=NULL;
```

```
        node head2=NULL;
        node head3=NULL;
        char s1[30],s2[30];
        printf("\nEnter first integer\n");
        scanf("%s",s1);
        head1=extract(s1,head1);
        printf("\nEnter second integer\n");
        scanf("%s",s2);
        head2=extract(s2,head2);
        head3=addlong(head1,head2,head3);
        printf("\nThe result is\n");
        display(head3);
        return 0;
}
```

OUTPUT: