

Rajalakshmi Engineering College

Name: Harshavarthini
Email: 240701181@rajalakshmi.edu.in
Roll no: 240701181
Phone: 9150394958
Branch: REC
Department: I CSE AH
Batch: 2028
Degree: B.E - CSE

Scan to verify results



NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_week 1_CY

Attempt : 1
Total Mark : 30
Marks Obtained : 30

Section 1 : Coding

1. Problem Statement

Hasini is studying polynomials in her class. Her teacher has introduced a new concept of two polynomials using linked lists.

The teacher provides Hasini with a program that takes two polynomials as input, represented as linked lists, and then displays them together. The polynomials are simplified and should be displayed in the format ax^b , where a is the coefficient and b is the exponent.

Input Format

The first line of input consists of an integer n , representing the number of terms in the first polynomial.

The following n lines of input consist of two integers each: the coefficient and the exponent of the term in the first polynomial.

The next line of input consists of an integer m , representing the number of terms in the second polynomial.

The following m lines of input consist of two integers each: the coefficient and the exponent of the term in the second polynomial.

Output Format

The first line of output prints the first polynomial.

The second line of output prints the second polynomial.

The polynomials should be displayed in the format ax^b , where a is the coefficient and b is the exponent.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 3

1 2

2 1

3 0

3

2 2

1 1

4 0

Output: $1x^2 + 2x + 3$

$2x^2 + 1x + 4$

Answer

```
// You are using GCC
```

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
struct Node{  
    int coeff,exp;  
    struct Node* next;  
};
```

```

struct Node* insertTerm(struct Node* head,int coeff,int exp){
    struct Node* newnode=(struct Node*)malloc(sizeof(struct Node));
    newnode->coeff=coeff;
    newnode->exp=exp;
    newnode->next=NULL;
    if(!head) return newnode;
    struct Node* temp=head;
    while(temp->next) temp=temp->next;
    temp->next=newnode;
    return head;
}

```

```

void printpolynomial(struct Node* head){
    int first=1, allzero=1; //Track if all coefficients are zero
    while(head){
        if(head->coeff!=0){
            allzero=0;
            if(!first) printf(head->coeff > 0 ? " + " : " - ");
            else if(head->coeff < 0) printf("-");

            int abscoeff=head->coeff < 0 ? -head->coeff : head->coeff;
            if (head->exp ==0) printf("%d",abscoeff);
            else if (head->exp==1) printf("%dx",abscoeff);
            else printf("%dx^%d",abscoeff,head->exp);
            first=0;
        }
        head=head->next;
    }
    if(allzero) printf("0");
    printf("\n");
}

```

```

int main(){
    struct Node *poly1=NULL, *poly2=NULL;
    int n,m,coeff,exp;
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        scanf("%d %d",&coeff,&exp);
        poly1=insertTerm(poly1,coeff,exp);
    }
    scanf("%d",&m);
    for(int i=0;i<m;i++){

```

```

scanf("%d %d",&coeff,&exp);
poly2=insertTerm(poly2,coeff,exp);
}
printpolynomial(poly1);
printpolynomial(poly2);
return 0;
}

```

Status : Correct

Marks : 10/10

2. Problem Statement

Hayley loves studying polynomials, and she wants to write a program to compare two polynomials represented as linked lists and display whether they are equal or not.

The polynomials are expressed as a series of terms, where each term consists of a coefficient and an exponent. The program should read the polynomials from the user, compare them, and then display whether they are equal or not.

Input Format

The first line of input consists of an integer n , representing the number of terms in the first polynomial.

The following n lines of input consist of two integers, each representing the coefficient and the exponent of the term in the first polynomial.

The next line of input consists of an integer m , representing the number of terms in the second polynomial.

The following m lines of input consist of two integers, each representing the coefficient and the exponent of the term in the second polynomial.

Output Format

The first line of output prints "Polynomial 1: " followed by the first polynomial.

The second line prints "Polynomial 2: " followed by the second polynomial.

The polynomials should be displayed in the format ax^b , where a is the

coefficient and b is the exponent.

If the two polynomials are equal, the third line prints "Polynomials are Equal."

If the two polynomials are not equal, the third line prints "Polynomials are Not Equal."

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 2

1 2

2 1

2

1 2

2 1

Output: Polynomial 1: $(1x^2) + (2x^1)$

Polynomial 2: $(1x^2) + (2x^1)$

Polynomials are Equal.

Answer

// You are using GCC

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
struct node{
```

```
    int coeff,exp;
```

```
    struct node* next;
```

```
};
```

```
struct node* insertterm(struct node* head,int coeff,int exp){
```

```
    struct node* newnode = (struct node*)malloc(sizeof(struct node));
```

```
    newnode->coeff=coeff;
```

```
    newnode->exp=exp;
```

```
    newnode->next=NULL;
```

```
    if(!head) return newnode;
```

```
    struct node* temp=head;
```

```
    while(temp->next) temp=temp->next;
```

```
    temp->next=newnode;
```

```
    return head;
```

```
}
```

```
void printpolynomial(struct node* head, int polynum){
```

```
    printf("Polynomial %d: ",polynum);
```

```
    int first=1;
```

```
    while(head){
```

```
        if(!first) printf(" + ");
```

```
        printf("(%dx^%d)",head->coeff,head->exp);
```

```
        first=0;
```

```
        head=head->next;
```

```
    }
```

```
    printf("\n");
```

```
}
```

```
int arepolynomialsequal(struct node* p1,struct node* p2){
```

```
    while(p1 && p2){
```

```
        if(p1->coeff != p2->coeff || p1->exp != p2->exp) return 0;
```

```
        p1=p1->next;
```

```
        p2=p2->next;
```

```
    }
```

```
    return (p1==NULL && p2==NULL);
```

```
}
```

```
int main(){
```

```
    struct node *poly1=NULL, *poly2=NULL;
```

```
    int n,m,coeff,exp;
```

```
    scanf("%d",&n);
```

```
    for(int i=0;i<n;i++){
```

```
        scanf("%d %d",&coeff,&exp);
```

```
        poly1=insertterm(poly1,coeff,exp);
```

```
    }
```

```
    scanf("%d",&m);
```

```
    for(int i=0;i<m;i++){
```

```
        scanf("%d %d",&coeff,&exp);
```

```
        poly2=insertterm(poly2,coeff,exp);
```

```
    }
```

```
    printpolynomial(poly1,1);
```

```
    printpolynomial(poly2,2);
```

```
    if(arepolynomialsequal(poly1,poly2))
```

```
        printf("Polynomials are Equal.\n");
```

```
else  
printf("Polynomials are Not Equal.\n");  
}
```

Status : Correct

Marks : 10/10

3. Problem Statement

Timothy wants to evaluate polynomial expressions for his mathematics homework. He needs a program that allows him to input the coefficients of a polynomial based on its degree and compute the polynomial's value for a given input of x . Implement a function that takes the degree, coefficients, and the value of x , and returns the evaluated result of the polynomial.

Example

Input:

degree of the polynomial = 2

coefficient of x^2 = 13

coefficient of x^1 = 12

coefficient of x^0 = 11

x = 1

Output:

36

Explanation:

Calculate the value of $13x^2$: $13 * 12 = 13$.

Calculate the value of $12x^1$: $12 * 11 = 12$.

Calculate the value of $11x^0$: $11 * 10 = 11$.

Add the values of x^2 , x^1 , and x^0 together: $13 + 12 + 11 = 36$.

Input Format

The first line of input consists of an integer representing the degree of the polynomial.

The second line consists of an integer representing the coefficient of x^2 .

The third line consists of an integer representing the coefficient of x^1 .

The fourth line consists of an integer representing the coefficient of x^0 .

The fifth line consists of an integer representing the value of x , at which the polynomial should be evaluated.

Output Format

The output is an integer value obtained by evaluating the polynomial at the given value of x .

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 2

13

12

11

1

Output: 36

Answer

```
// You are using GCC
#include <stdio.h>
#include <math.h>
int evaluatepolynomial(int degree,int coeffs[],int x){
    int result=0;
    for(int i=0;i<=degree;i++){
        result+=coeffs[i]*pow(x,degree-i);
    }
    return result;
}
int main(){
    int degree,x;
```



```
scanf("%d",&degree);
if(degree != 2){
    printf("Invalid degree. Degree must be 2.\n");
    return 0;
}
int coeffs[degree+1];
for(int i=0;i<=degree;i++){
    scanf("%d",&coeffs[i]);
}
scanf("%d",&x);
if(x<1 || x>5){
    printf("Invalid x value. x must be between 1 and 5.\n");
    return 0;
}
int result=evaluatepolynomial(degree,coeffs,x);
printf("%d\n",result);
return 0;
}
```

Status : Correct

Marks : 10/10