APPLICATIONS OF AARRAY			
File Name	**polynomial.c**	**Compiler**	**gcc**
Experiment No	**4**	**Operating System**	**Ubuntu**
Date	**13.08.2024**		
Aim	**Write a C program to implement a) sparse matrix b) polynomial sum**		

Program

```
#include<stdio.h>

struct Polynomial{
	int coef;
	int exp;
};

int main(){
	int deg1,deg2;
	int i=0,j=0,k=0;
	struct Polynomial poly1[10], poly2[10], result[10];
	printf("Enter the degree of first polynomial");
	scanf("%d",&deg1);
	printf("Enter the degree of second polynomial");
	scanf("%d",&deg2);

	printf("For the first polynomial ..");
	for(int i=0;i<deg1;i++){
		printf("Enter the coefficient of the %d term",i);
		scanf("%d",&poly1[i].coef);
		printf("Enter the exponent of the %d term",i);
		scanf("%d",&poly1[i].exp);
	}


	printf("For the second polynomial ..");
	for(int i=0;i<deg2;i++){
		printf("Enter the coefficient of %d th term",i);
		scanf("%d",&poly2[i].coef);
		printf("Enter the exponent of the  %d term",i);
		scanf("%d",&poly2[i].exp);
	}

	printf("The first polynomial is \n");
	for(int i=0; i<deg1; i++){
		printf("%dx^%d ",poly1[i].coef,poly1[i].exp);
		if(i < deg1 - 1) {
			printf("+");
		}
	}
```

```
	printf("\n The Second polynomial is \n");
	for(int i=0; i<deg2; i++){
		printf("%dx^%d",poly2[i].coef,poly2[i].exp);
		if(i < deg2 - 1) {
			printf("+");
		}
	}

	while(i < deg1 && j < deg2 ){
		if(poly1[i].exp == poly2[j].exp){
			result[k].exp = poly1[i].exp;
			result[k].coef = poly1[i].coef + poly2[j].coef;
			k++;
			i++;
			j++;
		}else if(poly1[i].exp < poly2[j].exp){
			result[k].exp = poly2[j].exp;
			result[k].coef = poly2[j].coef;
			j++;
			k++;
		}else if(poly1[i].exp > poly2[j].exp){
			result[k].exp = poly1[i].exp;
			result[k].coef = poly2[i].coef;
			i++;
			k++;
		}
	}
	while( i < deg1){
		result[k].exp = poly1[i].exp;
		result[k].coef = poly1[i].coef;
		i++;
		k++;
	}

	while( j < deg2){
		result[k].exp = poly2[j].exp;
		result[k].coef = poly2[j].coef;
		j++;
		k++;
	}


	printf("\n The resultant polynomial is ...\n");
	for(int i=0; i<k; i++){
		printf(" %dx^%d" ,result[i].coef,result[i].exp);
		if(i < k -1) {
```

```
                        printf(" + ");
                }
        }
}
```

Output