Subject : Data Structures
Semester : 3rd
Topic : Polynomial Arithmetic

PROGRAM TO ENTER TWO POLYNOMIALS AND SHOW THEIR ADDITION.

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

struct TERM
{
   int COE;
   int EXP;
};

struct TERM EXP1[30],EXP2[30],ADD_EXP[30];
int fc,sc,ac;

void INPUT_FIRST_EXPRESSION()
{
int i;
char ch;
fc=0;
i=0;
do
{
printf("\n\nFOR THE FIRST POLYNOMIAL\n");
printf("ENTER COEFFICIENT ");
scanf("%d",&EXP1[i].COE);
printf("ENTER EXPONENT ");
scanf("%d",&EXP1[i].EXP);
i=i+1;
fc=fc+1;
printf("DO YOU HAVE MORE TERMS ? \n");
scanf(" %c",&ch);
}while(ch=='y' || ch=='Y');
}

void DISPLAY_FIRST_EXPRESSION()
{
int i;
printf("\n\nTHE FIRST POLYNOMIAL EXPRESSION IS \n");
for(i=0;i<fc;i++)
{
     printf("%d x^ %d + ",EXP1[i].COE,EXP1[i].EXP);
}
}
```

```
void INPUT_SECOND_EXPRESSION()
{
int i;
char ch;
sc=0;
i=0;
do
{
printf("\n\nFOR THE SECOND POLYNOMIAL\n");
printf("ENTER COEFFICIENT ");
scanf("%d",&EXP2[i].COE);
printf("ENTER EXPONENT ");
scanf("%d",&EXP2[i].EXP);
i=i+1;
sc=sc+1;
printf("DO YOU HAVE MORE TERMS ? \n");
scanf(" %c",&ch);
}while(ch=='y' || ch=='Y');
}
```

```
void DISPLAY_SECOND_EXPRESSION()
{
int i;
printf("\n\nTHE SECOND POLYNOMIAL EXPRESSION IS \n");
for(i=0;i<sc;i++)
{
     printf("%d x^ %d + ",EXP2[i].COE,EXP2[i].EXP);
}
}
```

```
void ADD_POLYNOMIALS()
{
int i,j,k;
ac=0;
i=0;
k=0;
j=0;
```

```
while(i<fc && j<sc)
{
if(EXP1[i].EXP==EXP2[j].EXP)
{
      ADD_EXP[k].EXP=EXP1[i].EXP;
      ADD_EXP[k].COE=EXP1[i].COE+EXP2[j].COE;
      ac=ac+1;
      k=k+1;
      i=i+1;
      j=j+1;
}
else if(EXP1[i].EXP>EXP2[j].EXP)
{
      ADD_EXP[k].EXP=EXP1[i].EXP;
      ADD_EXP[k].COE=EXP1[i].COE;
      ac=ac+1;
      k=k+1;
      i=i+1;
}
else if(EXP1[i].EXP<EXP2[j].EXP)
{
      ADD_EXP[k].EXP=EXP2[j].EXP;
      ADD_EXP[k].COE=EXP2[j].COE;
      ac=ac+1;
      k=k+1;
      j=j+1;
}
}
while(i<fc)
{
      ADD_EXP[k].EXP=EXP1[i].EXP;
      ADD_EXP[k].COE=EXP1[i].COE;
      ac=ac+1;
      k=k+1;
      i=i+1;
}
while(j<sc)
{
      ADD_EXP[k].EXP=EXP2[j].EXP;
      ADD_EXP[k].COE=EXP2[j].COE;
      ac=ac+1;
      k=k+1;
      j=j+1;
}
}
```

```
void DISPLAY_ADDED_EXPRESSION()
{
int i;
printf("\n\nTHE ADDED POLYNOMIAL EXPRESSION IS \n");
for(i=0;i<sc;i++)
{
     printf("%d x^ %d + ",ADD_EXP[i].COE,ADD_EXP[i].EXP);
}
}


void main()
{
clrscr();
INPUT_FIRST_EXPRESSION();
INPUT_SECOND_EXPRESSION();
DISPLAY_FIRST_EXPRESSION();
DISPLAY_SECOND_EXPRESSION();
ADD_POLYNOMIALS();
DISPLAY_ADDED_EXPRESSION();
getch();
}
```