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EX NO: 03
PROGRAM NAME: POLYNOMIAL MANIPULATION

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CODE:

```
#include <stdio.h>
#include<stdlib.h>
struct node{
   int coeff;
   int pwr;
   struct node*link;
}*first=NULL,*first2=NULL,*temp,*first3=NULL,*ptr;
int co=0;
int bothnotnull(){
   if(first!=NULL && first2!=NULL)
      return(1);
   else
      return(0);
}
void genpol(int co,int pr,int list){
   struct node*new;
   new=(struct node*)malloc(sizeof(struct node));
   new->coeff=co;
   new->pwr=pr;
new->link=NULL;
if(list==1){
if(first==NULL){
   first=new;
}
else{temp=first;
   while(temp->link!=NULL){
      temp=temp->link;
   }
   temp->link=new;
}
}
else if(list==2){
   if(first2==NULL){
   first2=new;
}
else{temp=first2;
   while(temp->link!=NULL){
      temp=temp->link;
   }
   temp->link=new;
}
}
}
```

```
void disp(int list){
   if(list==1)
   temp=first;
   else if(list==2)
    temp=first2;
   else
      temp=first3;
   while(temp!=NULL){
      printf("%d %d\n",temp->coeff,temp->pwr);
      temp=temp->link;
   }
}
void addpol(){
   while(first!=NULL && first2!=NULL){
   struct node*res;
   res=(struct node*)malloc(sizeof(struct node));
   res->link=NULL;
   if(first->pwr==first2->pwr){
      res->pwr=first->pwr;
      res->coeff=first->coeff+first2->coeff;
      first=first->link;
      first2=first2->link;
   }
   else if(first->pwr<first2->pwr){
    res->pwr=first2->pwr;
    res->coeff=first2->coeff;
    first2=first2->link;
}
else if(first->pwr>first2->pwr){
   res->pwr=first->pwr;
   res->coeff=first->coeff;
   first=first->link;
}
if(first3==NULL)
    first3=res;
else{temp=first3;

    while(temp->link!=NULL){
        temp=temp->link;
    }
    temp->link=res;
}
}
if(first!=NULL || first2!=NULL){
  if(first==NULL){temp->link->link=first2;}
  if(first2==NULL){
    temp->link->link=first;
  }
```

```
        }
     }
  void subpol(){
     while(first!=NULL && first2!=NULL){
        struct node*res;
        res=(struct node*)malloc(sizeof(struct node));
        res->link=NULL;
        if(first->pwr==first2->pwr){
           res->pwr=first->pwr;
           res->coeff=first->coeff-first2->coeff;
           first=first->link;
           first2=first2->link;
        }
        else if(first->pwr<first2->pwr ){
           res->pwr=first2->pwr;
           res->coeff=0-first2->coeff;
           first2=first2->link;
        }
        else if(first->pwr>first2->pwr){
          res->pwr=first->pwr;
          res->coeff=first->coeff;
          first=first->link;
        }
```

```
    if(first3==NULL)
      first3=res;
    else{temp=first3;
      while(temp->link!=NULL){
        temp=temp->link;
      }
      temp->link=res;
    }
  }
  if(first!=NULL || first2!=NULL){
     if(first==NULL){temp->link->link=first2;
     while(first2!=NULL){
      first2->coeff=0-first2->coeff;
      first2=first2->link;
     }
     }
     if(first2==NULL){
      temp->link->link=first;
     }
    }

}
void simplify(){
  int f=0;
```

```
    struct node*prev;
    temp=first3;
    ptr=first3;
    while(temp!=NULL){
        while(ptr!=NULL){
            if(temp->pwr==ptr->pwr && temp!=ptr){
                temp->coeff=temp->coeff+ptr->coeff;
                prev->link=ptr->link;
            }
            prev=ptr;
            ptr=ptr->link;
        }temp=temp->link;ptr=first3;
    }
}
void mulpol()
{
        ptr=first2;
        while(first!=NULL){
        while(first2!=NULL){
            struct node*res;
            res=(struct node*)malloc(sizeof(struct node));
            res->link=NULL;
            res->coeff=first->coeff*first2->coeff;
            res->pwr=first->pwr+first2->pwr;
```

```
         first2=first2->link;
      if(first3==NULL)
         first3=res;
      else{temp=first3;
         while(temp->link!=NULL){
            temp=temp->link;
         }
         temp->link=res;
      }
      }
       first=first->link;
       first2=ptr;
      }
      simplify();
}
int main(){
   int d,co,pr,opt;
   scanf("%d",&d);
   for(int i=0;i<d;i++){
      scanf("%d %d",&co,&pr);
      genpol(co,pr,1);
   }
   scanf("%d",&d);
   for(int i=0;i<d;i++){
      scanf("%d %d",&co,&pr);
      genpol(co,pr,2);
   }
   while(1){
      printf("Enter option:1.add 2.sub 3.Multiply\n")
      scanf("%d",&opt);
      if(opt==1)
         addpol();
      else if(opt==2)
         subpol();
      else
       mulpol()
   }
```

OUTPUT 1://FOR ADDITION:

```
2
1 2
2 1
4
1 4
2 3
3 2
1 0
Enter option:1.add 2.sub 3.Multiply
1
```

```
1 4
2 3
4 2
2 1
1 0
Enter option:1.add 2.sub 3.Multiply
```

OUTPUT 2 //SUBTRACTION:

```
2
1 2
2 1
4
1 4
2 3
3 2
1 1
Enter option:1.add 2.sub 3.Multiply
2
-1 4
-2 3
-2 2
1 1
Enter option:1.add 2.sub 3.Multiply
```

OUTPUT 3//MULTIPLICATION:

```
2
1 2
2 1
4
1 4
2 3
3 2
4 1
Enter option:1.add 2.sub 3.Multiply
3
1 6
4 5
7 4
10 3
8 2
Enter option:1.add 2.sub 3.Multiply
```