Ex 3: Polynomial Addition

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PROGRAM:

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
   int coeff;
   int expo;
   struct node *next;
};

struct node* insert(struct node *head,int co,int exp)
{
   struct node *temp;
   struct node *newnode=malloc(sizeof(struct node));
   newnode->coeff=co;
   newnode->expo=exp;
   newnode->next=NULL;

   if(head==NULL || exp>head->expo)
   {
      newnode->next=head;
      head=newnode;
   }
```

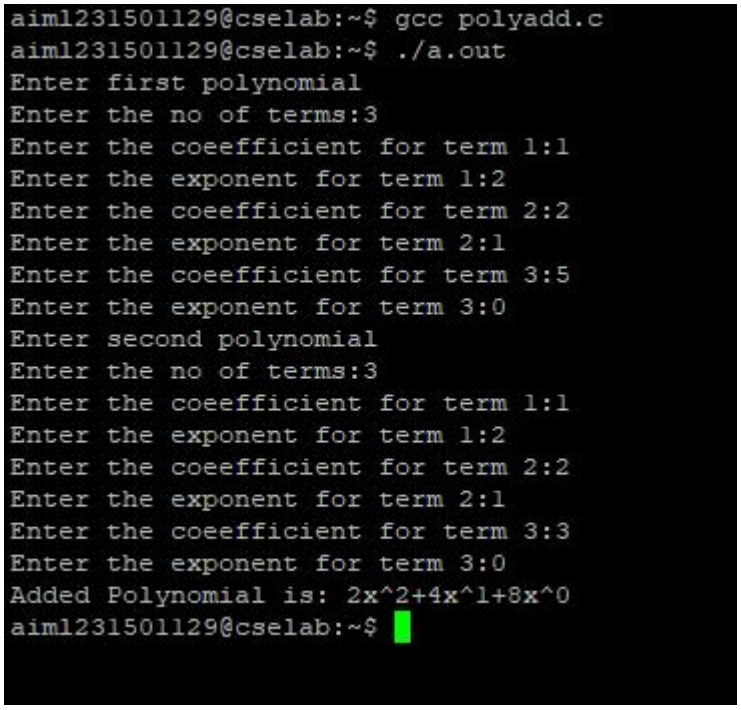
```
    else
    {
        temp=head;
        while(temp->next!=NULL &&temp->next->expo>=exp)
            temp=temp->next;
        newnode->next=temp->next;
        temp->next=newnode;
    }
    return head;
}
struct node* create(struct node *head)
{
    int n,i;
    int coeff;
    int expo;
    printf("Enter the no of terms:");
    scanf("%d",&n);
    for(i=0;i<n;i++)
    {
        printf("Enter the coeefficient for term %d:",i+1);
        scanf("%d",&coeff);

        printf("Enter the exponent for term %d:",i+1);
        scanf("%d",&expo);

        head=insert(head,coeff,expo);
    }
```

```
    return head;
}
    void print(struct node* head)
    {
        if(head==NULL)
            printf("No Polynomial");
        else
        {
            struct node *temp=head;
            while(temp!=NULL)
            {
                printf("%dx^%d",temp->coeff,temp->expo);
                temp=temp->next;
                if(temp!=NULL)
                    printf("+");
                else
                    printf("\n");
            }
        }
    }

    void polyAdd(struct node *head1, struct node *head2)
    {
        struct node *ptr1=head1;
        struct node *ptr2=head2;
        struct node *head3=NULL;
        while(ptr1!=NULL && ptr2!=NULL)
```

```
{
   if(ptr1->expo == ptr2->expo)
   {
   head3=insert(head3,ptr1->coeff+ptr2->coeff,ptr1->expo);
      ptr1=ptr1->next;
      ptr2=ptr2->next;
   }
   else if(ptr1->expo > ptr2->expo)
   {
      head3=insert(head3,ptr1->coeff,ptr1->expo);
      ptr1=ptr1->next;
   }
   else if(ptr1->expo < ptr2->expo)
   {
      head3=insert(head3,ptr2->coeff,ptr2->expo);
      ptr2=ptr2->next;
   }
}
while(ptr1!=NULL)
{
   head3=insert(head3,ptr1->coeff,ptr1->expo);
   ptr1=ptr1->next;
}
while(ptr2!=NULL)
{
   head3=insert(head3,ptr2->coeff,ptr2->expo);
   ptr2=ptr2->next;
```

```
    }
    printf("Added Polynomial is: ") ;
    print(head3);
}
int main()
{
    struct node *head1=NULL;
    struct node *head2=NULL;
    printf("Enter first polynomial\n");
    head1=create(head1);
    printf("Enter second polynomial\n");
    head2=create(head2);
    polyAdd(head1,head2);
    return 0;

}
```

OUTPUT:


aiml231501129@cselab:~$ gcc polyadd.c
aiml231501129@cselab:~$ ./a.out
Enter first polynomial
Enter the no of terms:3
Enter the coeefficient for term 1:1
Enter the exponent for term 1:2
Enter the coeefficient for term 2:2
Enter the exponent for term 2:1
Enter the coeefficient for term 3:5
Enter the exponent for term 3:0
Enter second polynomial
Enter the no of terms:3
Enter the coeefficient for term 1:1
Enter the exponent for term 1:2
Enter the coeefficient for term 2:2
Enter the exponent for term 2:1
Enter the coeefficient for term 3:3
Enter the exponent for term 3:0
Added Polynomial is: 2x^2+4x^1+8x^0
aiml231501129@cselab:~$