

Week 5

Question 1:

```
#include <iostream>
#include<limits.h>
using namespace std;
void count_sort(char arr[],int n)
{
    int temp[26]={0};
    for (int i=0;i<n;i++)
        temp[arr[i]-97]++;
    int maxi=0;
    char res='$';
    for (int i=0;i<26;i++)
    {
        if (temp[i]>maxi)
        {
            maxi=temp[i];
            res=i+97;
        }
    }
    if (maxi==1)
        cout<<"No Duplicate Found"<<endl;
    else
        cout<<res<<" - "<<maxi<<endl;
}
int main()
{
    int t;
```

```
cout<<"enter the number of test cases"<<endl;
cin>>t;
while (t-->0)
{
    int n;
    cout<<"enter the number of array elements"<<endl;
    cin>>n;
    char arr[n];
    cout<<"enter the array elements"<<endl;
    for (int i=0;i<n;i++)
        cin>>arr[i];
    count_sort(arr,n);
}
return 0;
}
```

Output:

enter the number of test cases

3

enter the number of array elements

10

enter the array elements

a e d w a d q a f p

a - 3

enter the number of array elements

15

enter the array elements

r k p g v y u m q a d j c z e

No Duplicate Found

enter the number of array elements

20

enter the array elements

g t l l t c w a w g l c w d s a a v c l

l - 4

Process returned 0 (0x0) execution time : 73.110 s

Press any key to continue.

Question 2:

```
#include <iostream>

using namespace std;

void merge(int arr[],int l,int mid,int h)
{
    int count=0;
    int i=l,j=mid+1;
    int temp[h-l+1];
    int k=0;
    while (i<=mid && j<=h)
    {
        if (arr[i]<arr[j])
            temp[k++]=arr[i++];
        else
        {
            temp[k++]=arr[j++];
            count+=mid-i+1;
        }
    }
    for (;i<=mid;)
        temp[k++]=arr[i++];
    for (;j<=h;)
        temp[k++]=arr[j++];
    for (int f=0;f<k;f++)
        arr[f+l]=temp[f];
}

void merge_sort(int arr[],int l,int h)
{
    if (l<h)
    {
```

```

        int mid=l+(h-l)/2;
        merge_sort(arr,l,mid);
        merge_sort(arr,mid+1,h);
        merge(arr,l,mid,h);
    }
}

void find_duplicates(int arr[],int n,int k)
{
    int flag=0;
    int i=0,j=n-1;
    while (i<j)
    {
        if (arr[i]+arr[j]==k)
        {
            flag=1;
            cout<<arr[i]<<" "<<arr[j]<<endl;;
            i++;j--;
        }
        else if (arr[i]+arr[j]<k)
            i++;
        else
            j--;
    }
    if (flag==0)
        cout<<"No such pair exist"<<endl;
}

int main()
{
    int t;

    cout<<"enter the number of test cases"<<endl;
    cin>>t;

```

```
while (t--)  
{  
    int n;  
    cout<<"enter the number of array elements"<<endl;  
    cin>>n;  
    int arr[n];  
    cout<<"enter the array elements"<<endl;  
    for (int i=0;i<n;i++)  
        cin>>arr[i];  
    int key;  
    cout<<"enter the key element"<<endl;  
    cin>>key;  
    merge_sort(arr,0,n-1);  
    find_duplicates(arr,n,key);  
}  
return 0;  
}
```

Output:

enter the number of test cases

2

enter the number of array elements

10

enter the array elements

64 28 97 40 12 72 84 24 38 10

enter the key element

50

10,40

12,38

enter the number of array elements

15

enter the array elements

56 10 72 91 29 3 41 45 61 20 11 39 9 12 94

enter the key element

302

No such pair exist

Process returned 0 (0x0) execution time : 58.382 s

Press any key to continue.

Question 3:

```
#include<iostream>

#include<limits.h>

using namespace std;

void intersection(int arr1[],int n1,int arr2[],int n2)
{
    int maxi1=INT_MIN;
    for (int i=0;i<n1;i++)
    {
        if (arr1[i]>maxi1)
            maxi1=arr1[i];
    }
    int temp1[maxi1+1]={0};
    for (int i=0;i<n1;i++)
        temp1[arr1[i]]++;
    int maxi2=INT_MIN;
    for (int i=0;i<n2;i++)
    {
        if (arr2[i]>maxi2)
            maxi2=arr2[i];
    }
    int temp2[maxi2+1]={0};
    for (int i=0;i<n2;i++)
        temp2[arr2[i]]++;
    cout<<"common elements are:"<<endl;
    for (int i=0;i<n1;i++)
    {
        if (temp1[arr1[i]]!=0 && temp2[arr1[i]]!=0)
            cout<<arr1[i]<<" ";
    }
}
```



```
}  
  
int main()  
{  
    int n1;  
    cout<<"enter the size of first array"<<endl;  
    cin>>n1;  
    int arr1[n1];  
    cout<<"enter the array elements"<<endl;  
    for (int i=0;i<n1;i++)  
        cin>>arr1[i];  
    int n2;  
        cout<<"enter the size of second array"<<endl;  
    cin>>n2;  
    int arr2[n2];  
        cout<<"enter the array elements"<<endl;  
    for (int i=0;i<n2;i++)  
        cin>>arr2[i];  
    intersection(arr1,n1,arr2,n2);  
    return 0;  
}
```

Output:

enter the size of first array

7

enter the array elements

10 10 34 39 55 76 85

enter the size of second array

12

enter the array elements

10 10 11 30 30 34 34 51 55 69 72 89

common elements are:

10 10 34 55

Process returned 0 (0x0) execution time : 68.708 s

Press any key to continue.