Question 1

// bubble sort

#include<iostream>

using namespace std;

int main()

{

int t;

cout<<"enter the number of test case : ";

cin>>t;

while(t--)

{

int n;

cout<<"\nenter the number element in the array: ";

cin>>n;

int arr[n];

for(int i=0;i<n;i++)

{

arr[i]=rand()/1000000;

}

for(int i=0;i<n;i++)

{

for(int j=0;j<n-1-i;j++)

{

if(arr[j]>arr[j+1]) swap(arr[j],arr[j+1]);

}

}

cout<<"the sorted array is : ";

for(int i=0;i<n;i++)

{

cout<<arr[i]<<" ";

}

cout<<"\n";

}

}

Question 2

#include<iostream>

using namespace std;

//insertion sort

int main()

{

int t;

cout<<"enter the number of test case : ";

cin>>t;

while(t--)

{

int n;

cout<<"\nenter the number element in the array: ";

cin>>n;

int arr[n];

for(int i=0;i<n;i++)

{

arr[i]=rand()/1000000;

}

int j;

for(int i=1;i<n;i++)

{

int temp =arr[i];

for(j=i-1;j>=0;j--)

{

if(arr[j]>temp)

{

arr[j+1]=arr[j];

}

else

{

break;

}

}

arr[j+1]=temp;

}

cout<<"the sorted array is : ";

for(int i=0;i<n;i++)

{

cout<<arr[i]<<" ";

}

cout<<"\n";

}

}

Question 3

#include<iostream>

using namespace std;

int main()

{

int t;

cout<<"enter the number of test case : ";

cin>>t;

while(t--)

{

int n;

cout<<"\nenter the number element in the array1: ";

cin>>n;

int arr1[(n+1)];

cout<<"enter the element in the array1 : ";

for(int i=0;i<n;i++)

{

cin>>arr1[i];

}

int m;

cout<<"\nenter the number element in the array2 : ";

cin>>m;

int arr2[m+1];

cout<<"enter the element in the array2 : ";

for(int i=0;i<m;i++)

{

cin>>arr2[i];

}

int kk;

cout<<"enter the value of k ";

cin>>kk;

int arr[m+n];

int large=max(arr1[n-1],arr2[m-1])+1;

arr1[n]=large;

arr2[m]=large;

int i=0,j=0;

for(int k=0;k<n+m;k++)

{

if(arr1[i]<arr2[j])arr[k]=arr1[i++];

else arr[k]=arr2[j++];

}

cout<<"the kth shorted element in M+N sorted array is "<<arr[kk-1]<<"\n";

}

}

Question 4

#include<iostream>

using namespace std;

int main()

{

int t;

cout<<"enter the number of test case : ";

cin>>t;

while(t--)

{

int n;

cout<<"\nenter the number element in the array: ";

cin>>n;

int arr[(n)];

cout<<"enter the element in the array (0,1) only : ";

for(int i=0;i<n;i++)

{

cin>>arr[i];

}

int s=0;

int e=n-1;

int mid;

while(s<=e)

{

mid=s+(e-s)/2;

if(arr[mid]==0)

{

s=mid+1;

}

else

e=mid-1;

}

cout<<s<<"\n";

}

}

Question 5 a

//merge sort

#include<iostream>

using namespace std;

void mergesort(int arr[],int s,int q,int e)

{

int n1=q-s+1;

int n2=e-q;

int l[n1+1],r[n2+1];

int j=0;

for(int i=s;i<=q;i++)

{

l[j++]=arr[i];

}

j=0;

for(int i=q+1;i<=e;i++)

{

r[j++]=arr[i];

}

int large=max(l[n1-1],r[n2-1])+1;

l[n1]=large;

r[n2]=large;

int i=0;

j=0;

for(int k=s;k<=e;k++)

{

if(l[i]<r[j])arr[k]=l[i++];

else arr[k]=r[j++];

}

}

void merge(int arr[],int s,int e)

{

if(s==e) return;

int q=s+(e-s)/2;

merge(arr,s,q);

merge(arr,q+1,e);

mergesort(arr,s,q,e);

}

int main()

{

int t;

cout<<"enter the number of test case : ";

cin>>t;

while(t--)

{

int n;

cout<<"\nenter the number element in the array: ";

cin>>n;

int arr[n];

for(int i=0;i<n;i++)

{

arr[i]=rand()/1000000;

}

// sorting

/\*int j;

for(int i=1;i<n;i++)

{

int temp =arr[i];

for(j=i-1;j>=0;j--)

{

if(arr[j]>temp)

{

arr[j+1]=arr[j];

}

else

{

break;

}

}

arr[j+1]=temp;

}\*/

merge(arr,0,n-1);

cout<<"the sorted array is : ";

for(int i=0;i<n;i++)

{

cout<<arr[i]<<" ";

}

cout<<"\n";

}

}

Question 5b

//quick sort

#include<iostream>

using namespace std;

int partition(int arr[],int s,int e)

{

int pivort=arr[e];

int i=s-1;

for(int k=s;k<=e-1;k++)

{

if(arr[k]<pivort)

{

swap(arr[i+1],arr[k]);

i++;

}

}

swap(arr[i+1],arr[e]);

return i+1;

}

void quick(int arr[],int s,int e)

{

if(s>=e) return;

int q=partition(arr,s,e);

quick(arr,s,q-1);

quick(arr,q+1,e);

}

int main()

{

int t;

cout<<"enter the number of test case : ";

cin>>t;

while(t--)

{

int n;

cout<<"\nenter the number element in the array: ";

cin>>n;

int arr[n];

for(int i=0;i<n;i++)

{

arr[i]=rand()/1000000;

}

quick(arr,0,n-1);

cout<<"the sorted array is : ";

for(int i=0;i<n;i++)

{

cout<<arr[i]<<" ";

}

cout<<"\n";

}

}