

**Q1.**

```
#include<iostream>

#include<cstdlib>

using namespace std;

int c=0;

int s=0;

void ins_sort(int a[],int n)

{

    c=0,s=0;

    int i,j,temp;

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

    {

        s++;

        temp=a[i];

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

        {

            if(temp<a[j])

            {

                a[j+1]=a[j];

                s++;

                c++;

            }

            else

                break;

        }

        a[j+1]=temp;
```

```

        }
    }
    int main()
    {
        int a[100];
        int t,i,n;
        cout<<"enter number of test cases";
        cin>>t;
        for(int p=0;p<t;p++)
        {

            cout<<"enter the number of elements:";
            cin>>n;
            cout<<"enter the elements";
            for(i=0;i<n;i++)
            cin>>a[i];
            ins_sort(a,n);
            for(i=0;i<n;i++)
            cout<<a[i]<<" ";
            cout<<endl;
            cout<<"comparisons"<<c<<endl<<"shift"<<s<<endl;
        }
        return 0;
    }

```

**OUTPUT-**

enter number of test cases3

enter the number of elements:8

enter the elements-23 65 -31 76 46 89 45 32

-31 -23 32 45 46 65 76 89

comparisons13

shift20

enter the number of elements:10

enter the elements54 65 34 76 78 97 46 32 51 21

21 32 34 46 51 54 65 76 78 97

comparisons28

shift37

enter the number of elements:15

enter the elements63 42 223 645 652 31 324 22 553

-12 54 65 86 46 325

-12 22 31 42 46 54 63 65 86 223 324 325 553 645 652

comparisons54

shift68

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**Q2.**

```
#include<iostream>

#include<cstdlib>

using namespace std;

int c=0;

int s=0;

void sel_sort(int a[],int n)
{
    c=0,s=0;

    int i,j,min,pos;

    for(i=0;i<n-1;i++)
    {
        min=a[i];

        pos=i;

        for(j=i+1;j<n;j++)
        {c++;

            if(min>a[j])

            {

                min=a[j];

                pos=j;

            }

        }

        if(pos!=i)

        {s++;

            a[pos]=a[i];
```

```

        a[i]=min;}

    else

        s++;}}

int main()
{
    int a[100];

    int t,i,n;

    cout<<"enter number of test cases";

    cin>>t;

    for(int p=0;p<t;p++)
    {

        cout<<"enter the number of elements:";

        cin>>n;

        cout<<"enter the elements";

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

            cin>>a[i];

        sel_sort(a,n);

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

            cout<<a[i]<<" ";

        cout<<endl;

        cout<<"comparisons"<<c<<endl<<"swaps"<<s<<endl;

    }

    return 0;

}

```

**OUTPUT-**

enter number of test cases3

enter the number of elements:8

enter the elements-13 65 -21 76 46 89 45 12

-21 -13 12 45 46 65 76 89

comparisons28

swaps7

enter the number of elements:10

enter the elements54 65 34 76 78 97 46 32 51 21

21 32 34 46 51 54 65 76 78 97

comparisons45

swaps9

enter the number of elements:15

enter the elements63 42 223 645 652 31 324 22 553 12 54 65 86 46 325

12 22 31 42 46 54 63 65 86 223 324 325 553 645 652

comparisons105

swaps14

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**Q3.**

```
#include<iostream>

using namespace std;

int quick_sort(int a[],int lb,int ub)
{

    int temp,key=lb,i=lb,j=ub;

    if(i>j)

    return 0;

    i++;

    while(i<j)

    {

        while(a[i]<a[key] && i<j)

        {i++;

            if(a[i]==a[key])

            return 1;

        }

        while(a[j]>a[key])

        {j--;

            if(a[j]==a[key])

            return 1;

        }

        temp=a[i];

        a[i]=a[j];

        a[j]=temp;
```

```

}

a[lb]=a[i];

a[i]=a[key];


return quick_sort(a,lb,key-1);

return quick_sort(a,key+1,ub);

}

main()

{

int a[100];

int n,t,p,i,j,c;

cout<<"enter t";

cin>>t;

for(p=0;p<t;p++)

{

cout<<"enter n";

cin>>n;

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

cin>>a[i];

c=quick_sort(a,0,n-1);

if(c==0)

cout<<"no";

else

cout<<"yes";

}}

```



**OUTPUT-**

enter t3

enter n5

28 52 83 14 75

noenter n10

75 65 1 65 2 6 86 2 75 8

yesenter n15

75 35 86 57 98 23 73 1 64 8 11 90 61 19 20

no

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