PRIYANSHI

E – 26

2016927

WEEK – 3

1.

```
#include <iostream>
using namespace std;

void Insert_Sort(int[], int);
int main() {
    int T;
    cin >> T;
    for (int i = 0; i < T; i++)
    {
        int n;
        cin >> n;
        int A[1000];
        for (int j = 0; j < n; j++)
            cin >> A[j];

  Insert_Sort(A, n);
    }
}

void Insert_Sort(int A[], int n) {
    int temp, comp = 0, shift = 0;
    for (int i = 1; i < n; i++) {
        temp = A[i];
        int j = i - 1;
```

```
while (j >= 0 && A[j] > temp){
    comp++;
    A[j + 1] = A[j];
```

```
            shift++;  j--;
        }
        A[j + 1] = temp;
        shift++;
    }

    for (int i = 0; i < n; i++)
        cout << A[i] << " ";
    cout << "\ncomparisons = " << comp
            << endl << "shifts = " << shift << endl;
}
```

OUTPUT:

```
3
8
-23 65 -31 76 46 89 45 32
-31 -23 32 45 46 65 76 89
comparisons = 13
shifts = 20
10
54 65 34 76 78 98 46 32 51 21
21 32 34 46 51 54 65 76 78 98
comparisons = 28
shifts = 37
15
63 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
comparisons = 54
shifts = 68


...Program finished with exit code 0
Press ENTER to exit console.
```

2.

```
#include <iostream>
using namespace std;

void Sel_Sort(int[], int);

int main()
{
    int T;
    cin >> T;
    for (int i = 0; i < T; i++)
    {
        int n;
        cin >> n;
        int A[1000];
        for (int j = 0; j < n; j++)
        {
            cin >> A[j];
        }

        Sel_Sort(A, n);
    }
}
void Sel_Sort(int A[], int n)
{
    int comp = 0, swaps = 0;
    int min, temp = 0;

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

```
        min = i;
        for (int j = i + 1; j < n; j++)
        {
            comp++;
            if (A[min] > A[j])
            {
                min = j;
            }
        }
        swaps++;
        swap(A[min], A[i]);
    }

    for (int i = 0; i < n; i++)
    {
        cout << A[i] << " ";
    }

    cout << "\ncomparisons = " << comp << endl
         << "swaps = " << swaps << endl;
}
```

OUTPUT:

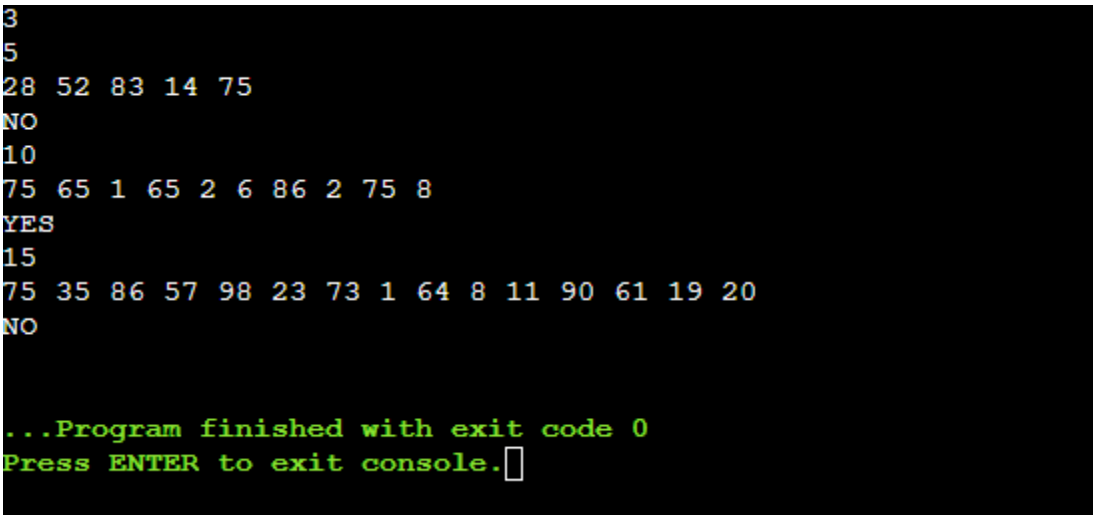
```
3
8
-13 65 -21 76 46 89 45 12
-21 -13 12 45 46 65 76 89
comparisons = 28
swaps = 7
10
54 65 34 76 78 97 46 32 51 21
21 32 34 46 51 54 65 76 78 97
comparisons = 45
swaps = 9
15
63 42 223 645 652 31 324 22 553 12 54 65 86 46 325
12 22 31 42 46 54 63 65 86 223 324 325 553 645 652
comparisons = 105
swaps = 14


...Program finished with exit code 0
Press ENTER to exit console.
```

3.

```
#include <iostream>
using namespace std;
void Quick_Sort(int[], int, int);
int main()
{
   int T;
   cin >> T;
   for (int i = 0; i < T; i++)
   {
      int n;
      cin >> n;
      int A[1000];
      for (int j = 0; j < n; j++)
         cin >> A[j];

      Quick_Sort(A, 0, n - 1);

      int flag = 0;
      for (int j = 0; j < n; j++)
      {
         if (A[j] == A[j + 1])
         {
            flag = 1;
            cout << "YES" << endl;
            break;
         }
      }

      if (flag == 0)
```

```
            cout << "NO" << endl;
        }
    }

    void Quick_Sort(int a[], int lb, int ub)
    {
        int i = lb, j = ub, key = a[lb];

        if (i > j)
            return;

        while (i < j)
        {
            while (key >= a[i] && i < j)
                i++;
            while (key < a[j])
                j--;
            if (i < j)
            {
                int t = a[i];
                a[i] = a[j];
                a[j] = t;
            }
        }
        a[lb] = a[j];
        a[j] = key;

        Quick_Sort(a, lb, j - 1);
        Quick_Sort(a, j + 1, ub);
    }
```

OUTPUT:


3
5
28 52 83 14 75
NO
10
75 65 1 65 2 6 86 2 75 8
YES
15
75 35 86 57 98 23 73 1 64 8 11 90 61 19 20
NO
...Program finished with exit code 0
Press ENTER to exit console.