WEEK – 2

Q 1.

```cpp
#include <iostream>
using namespace std;
 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];
}
 int flag = 0, comp = 0, key;
cin >> key;
for (int k = 0; k < n; k++) {
 comp++;
 if (A[k] == key) {
 flag++;
 cout << "Present "; break; }
}
```

```
 if (flag == 0) cout << "Not present "; cout << comp << endl;

}

}
```

OUTPUT:

Q 2.

```cpp
#include<iostream>

 using namespace std;

 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];

int flag = 0, comp = 0, key, mid, lower = 0, greater = n − 1;
```

```cpp
 cin >> key;

while (greater >= lower) {

 comp++;

 mid = lower + (greater - lower) / 2;

 if (A[mid] == key) { cout << "Present ";

flag++;

break;

}

else if (key > A[mid]) lower = mid + 1;

else greater = mid - 1;

}

 if (flag == 0)

 cout << "Not Present ";

cout << comp << endl;

}

}
```

OUTPUT:

```
main.cpp

1  /***********************************************************
2  Q2) Given an already sorted array of positive integers, design an algorithm and implement it using a
3  program to find whether given key element is present in the array or not. Also, find total number of
4  comparisons for each input case. (Time Complexity = O(nlogn), where n is the size of input).
5  ***********************************************************/
```

Run | Debug | Stop | Share | Save | {} Beautify   Language C++

```
input
2
3
23 45 67
23
Present 2
4
104 567  345 753




567
Present 1


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

Q 3.

```cpp
#include<iostream>

 #include<math.h>

 int main() {

int n,e,point=0,prev=0;

 printf("Enter the size of an array: ");

 scanf("%d",&n);

int arr[n];

int step=(int)(sqrt(n));

 printf("Enter the Elements in an array: ");

 for(int i=0;in -1) point=n -1;

for(int i=prev+1;i<=point;i++) {

 if(arr[i]==e) { printf("Element found at the index %d ",i);

exit(0);

}

 }

 printf("Element Not found\n");

return 0;

 }

 }
```

OUTPUT:

▶ Run   ⊙ Debug   ■ Stop   ⤷ Share   💾 Save   {} Beautify   ⬇

Language C

main.c

```c
1  /*****************************************************************
2   Q3 Given an already sorted array of positive integers, design an algorithm and implement it using a
3   program to find whether a given key element is present in the sorted array or not. For an array arr[n],
4   search at the indexes arr[0], arr[2], arr[4],.... ,arr[2k] and so on. Once the interval (arr[2k] < key < arr[ 2k+1]
5   ) is found, perform a linear search operation from the index 2k to find the element key. (Complexity < O(n),
6   where n is the number of elements need to be scanned for searching):
7   *****************************************************************/
8  #include<stdlib.h>
9  #include<math.h>
10 int
11 main ()
12 {
13     int n, e, point = 0, prev = 0;
14     printf ("Enter the size of an array: ");
15     scanf ("%d", &n);
16     int arr[n];
17     int step = (int) (sqrt (n));
18     printf ("Enter the Elements in an array: ");
19     for (int i = 0; i < n; i++)
```

input

```
Enter the size of an array:
5
Enter the Elements in an array:
10 20 30 40 50
enter the element to be searched :
54
Element Not found


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