Practical-6(a)

Q. Program for binary search using recursion.

Code:-

```
//Harsh Bamotra AC-1216
//Program for binary search using recursion

#include <iostream>
using namespace std;

//defining function for binary search
int binary(int s , int high , int low , int arr[])
  {
      if(high>=1)                                  //checking for empty array
          {

              int mid=low+(high-1)/2;
              if(arr[mid]==s)                        //searching in the mid index
                  {                                 //and if found then returning the index
                      return mid;
                  }
              else if(arr[mid]>s)                   //checking in the lower part
                  {                                 //of the array

                      return binary(s , mid-1 , low , arr );
                  }

              else                                   //checking in the upper part
                  {                                 //of the array

                      return binary(s , high , mid+1 , arr);
                  }
          }
```

```
        return -1;                                  //returning -1 to check for exception
    }

int main()

        {
                int n , s;                                          //defining variables
                cout << "Enter the number of elements::";
                cin >> n;                                           //taking number of elements
                int arr[n];
                cout << "Enter the elements in ascending order::" << endl;
                for(int i=0 ; i<n ; i++)
                        {
                                cin >> arr[i];                      //initializing the elements in the array
                        }
                cout << "The array you entered::";
                for(int i=0 ; i<n ; i++)
                        {
                                cout << arr[i] << " ";              //printing the array
                        }
                cout << endl << "Enter the element you want to search::";
                cin >> s;                                           //taking the search element
                int r=binary(s , n-1 , 0 , arr);
                if(r==-1)
                        {
                                cout << "Element not found !!";
                        }
                else                                                //printing the final result
                        {
                                cout << "Element found at index::" << r;
                        }
                return 0;
    }
```

Output:-

Normal case

```
C:\Users\harsh\Desktop>recur_binary.exe
Enter the number of elements::6
Enter the elements in ascending order::
1
3
5
7
9
12
The array you entered::1 3 5 7 9 12
Enter the element you want to search::12
Element found at index::5
C:\Users\harsh\Desktop>
```

Exception case

```
C:\Users\harsh\Desktop>recur_binary.exe
Enter the number of elements::5
Enter the elements in ascending order::
1
3
4
7
54
The array you entered::1 3 4 7 54
Enter the element you want to search::2
Element not found !!
C:\Users\harsh\Desktop>
```