



EXPERIMENT – 1.2

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Aim of Practical:

Write a program to demonstrate the use of linear and binary search to find a given element in an array.

Program Code:

```
#include <iostream>
#include <algorithm>
#include <vector>
using namespace std;
using ll = long long;

int binarySearch(vector<int>& v, int target){
    int low = 0, high = v.size()-1;

    while(low<=high){
        int mid = (low + high)/2;
        if(v[mid]==target)
            return mid;
        if(v[mid]>target)
            high = mid -1;
        else
            low = mid +1;
    }
    return -1;
}
```



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```
int linearSearch(vector<int>& v, int target){
    for(int i=0;i<v.size();++i)
        if(v[i]==target)
            return i;
    return -1;
}

int main(){
    cout<<"Enter the size of array followed by its elements: ";
    int n;cin>>n;
    vector<int> v(n);
    for(auto &i: v)
        cin>>i;

    cout<<"Enter the number you want to search: ";
    int num;cin>>num;

    cout<<"Linear Search: \n";
    int linear = linearSearch(v,num);
    if(linear==-1)
        cout<<num<<" is not present in the array!";
    else
        cout<<num<<" is present at index "<<linear;

    cout<<"\n\n";
    sort(v.begin(), v.end());
    cout<<"Sorted array: ";
    for(auto i: v)
        cout<<i<<" ";
    cout<<"\n\n";

    cout<<"Binary Search: \n";
    int binary = binarySearch(v,num);
    if(binary==-1)
        cout<<num<<" is not present in the array!";
    else
        cout<<num<<" is present at index "<<binary;
}
```



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Output:

```
Enter the size of array followed by its elements: 5 2 3 67 2 32
Enter the number you want to search: 67
Linear Search:
67 is present at index 2

Sorted array: 2 2 3 32 67

Binary Search:
67 is present at index 4
```

Learning outcomes (What I have learnt):

- Learned about types of Searching_Algorithms
- Learned about binary search
- Learned about sorting of array.