# Lab Tutorial – 01

Course Title : Algorithm Lab

Course Code : CSE222

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Topic : Linear Search & Binary Search

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# ❖Linear Search

```
#include<stdio.h>
int main()
{
    int i,n,key,a[100];
    printf("Enter Array length : ");
    scanf("%d",&n);
    for(i=0; i<n; i++)
    {
        scanf("%d",&a[i]);
    }
    printf("Enter Search key : ");
    scanf("%d",&key);
    for(i=0; i<n; i++)
    {
        if(a[i]==key)
        {
            printf("Found at : %d Location",i);
            break;
        }
    }
    if(i==n)
    {
        printf("Not Found!");
    }
}
```

# ❖Binary Search

```
#include<stdio.h>
int main()
{
   int n,i,a[100];
   printf("Enter Array Size : ");
   scanf("%d",&n);
   for(i=0;i<n;i++)
   {
      scanf("%d",&a[i]);
   }
   int left,right,mid;
   left=0;
   right=n-1;
   mid=(left+right)/2;
   int key;
   printf("Enter Search Key : ");
   scanf("%d",&key);
   while(left<=right)
     {
         if(key<a[mid])
         {
            right=mid-1;
         }
         else if(key>a[mid])
         {
            left=mid+1;
         }
         else if(key==a[mid])
         {
            printf("Found %d at Location",mid);
            break;
         }
         mid=(left+right)/2;
      }
      if(left>right)
      {
         printf("Not Found");
      }
  }
```

# ❖Practice Time:

**Problem: 01**

Write a program that find the last occurrence of a given number in a sorted array.

| Input | Output |
|---|---|
| Ar[] = {1,2,3,3,3,4,4,5}<br>Key = 3 | Last Occurrence = 4 |
| Ar[] = {1,2,3,3,3,4,5,5}<br>Key = 6 | Item not found |

**Problem: 02**

Suppose you go to the supermarket, you have to press the code number to find a product, you can find the product position by pressing the product code. Write a search program (You have the product Code).

| Input | Output |
|---|---|
| Ar[] = {202,104,304,223,453,123}<br>Search = 304 | Position = 2 Row |
| Ar[] = {202,104,304,223,453,123}<br>Search = 111 | Product not available |

**Problem:03**

Suppose you and your friend are talking about Searching Algorithm, now one algorithm takes more time to solve one problem and another takes less time. So which algorithm is better? Choose the right algorithm & Write the program [Time Complexity O (n), O (log n)].

| Input | Output |
|---|---|
| Ar[]= {1,2,3,4,5,6}<br>Key = 4 | Found at 3 Position |
| Ar[]= {1,2,4,5,9}<br>Key = 7 | Not Found |

# "Happy Coding"