Mechi Multiple Campus

(Tribhuvan University)
Bhadrapur, Jhapa

Lab Report of

Data Structures and Algorithm (CACS-201)

Implementation of Searching Algorithm

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Introduction to Searching and Searching Algorithms

Searching is the process of finding out whether the required data is available in the given list or not. If the searched data is available in the list, it will return the location of the data, otherwise the search will be unsuccessful.

Searching Algorithms

Some of the common Searching Algorithms are;-

- Sequential Search
- Binary Search
- Tree Search
- Hashing

Algorithm, Program Code and Output

Linear Search

Algorithm

(1) [Initialize]
    Set i=0 and loc=1
(2) Repeat step 3 and 4 while loc=-1 and i<=N-1
(3) If Data = A[i], then Set loc=i
(4) i=i+1
(5) If loc=-1 then
        Print Search is Unsuccessful
    Else
        Print the required data is at location = loc
(6) EXIT

Program Code

```
#include<stdio.h>
void main(){
        int n,num[50],i,loc=-1,data;
        printf("How many Data You Want to Insert: ");
        scanf("%d",&n);
        for(i=0;i<n;i++){
                printf("Enter a Number: ");
                scanf("%d",&num[i]);
        }
        printf("Enter a Search Number: ");
        scanf("%d",&data);
        i=0;
        while(loc==-1 && i<=n-1){
                if(num[i]==data)
                        loc=i;
                i++;
        }
        if(loc==-1)
                printf("Search is Unsuccessful");
        else
                printf("Search is Successful at Location = %d",loc);
}
```

Output of the Program

```
How many Data You Want to Insert: 5
Enter a Number: 10
Enter a Number: 2
Enter a Number: 15
Enter a Number: 35
Enter a Number: 30
Enter a Search Number: 35
Search is Successful at Location = 3
```

Binary Search

Algorithm

The following algorithm search DATA in the array a[p---q] with N elements and return location (loc) of the search data of search = Successful.

① Set:- BEG = P, END = q and MID = int((BEG+END)/2)
② Repeat steps 3 and 4 while BEG <= END and a[MID] != DATA
③ If DATA < a[MID], then
    Set END = MID - 1
  else
    Set BEG = MID + 1
④ Set MID = int((BEG + END)/2)
⑤ If a[MID] = DATA, then
    Set loc = MID and print Search is Successful at location = MID
  else
    Set loc = 1 and print Search is Unsuccessful
⑥ EXIT

Program Code

```
#include<stdio.h>
void main(){
        int n,num[50],i,data,beg,mid,end;
        printf("How many Data You Want to Insert: ");
        scanf("%d",&n);
        for(i=0;i<n;i++){
                printf("Enter a Number: ");
                scanf("%d",&num[i]);
        }
        printf("Enter a Search Number: ");
        scanf("%d",&data);
        beg=0;
        end= n-1;
        mid=(beg+end)/2;
        while(beg<=end && num[mid]!=data){
                if(data<num[mid])
                        end=mid-1;
                else
                        beg=mid+1;
                mid=(beg+end)/2;
        }
        if(num[mid]!=data)
                printf("Search is Unsuccessful");
        else
                printf("Search is Successful at Location = %d",mid);
}
```

Output of the Program

```
How many Data You Want to Insert: 5
Enter a Number: 10
Enter a Number: 20
Enter a Number: 30
Enter a Number: 40
Enter a Number: 50
Enter a Search Number: 40
Search is Successful at Location = 3
```

Conclusion

Searching is the process of finding out whether the required data is available in the given list or not. In Searching, if the search data is avaible, the search will be successful otherwise it will be unsuccessful.