

School of Engineering

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| Subject Name: | DATA STRUCTURES AND ALGORITHMS |
| Subject Code: | |
| Department: | B.TECH IN COMPUTER SCIENCE AND ENGINEERING |

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| Semester: | 2nd |
| Academic Year: | 1st (2022 - 2023) |

ASSIGNMENT 10

Q1. Implement Linear search.

CODE:

```
//PROGRAM FOR SEARCHING AN ELEMENT USING LINEAR SEARCH METHOD
#include<stdio.h>
#include<stdlib.h>

void Linear_search(int arr[], int size, int item);
int main()
{
    int i, size;
    int arr[100];
    int item;
    system("cls");
    printf("Enter total number of elements: ");
    scanf("%d",&size);
    printf("Enter the elements: ");
    for(i=0; i<size; i++)
    {
        scanf("%d",&arr[i]);
    }
    printf("Enter the element to be searched: ");
    scanf("%d",&item);

    Linear_search(arr, size, item);
    return 0;
}

//FUNCTION FOR LINEAR SEARCH
void Linear_search(int arr[], int size, int item)
{
    int i, flag = 0;

    //loop to search element
    while(i<=size)
    {
        if(arr[i] == item)
        {
            printf("%d is present at position %d.",item,i+1);
            flag = 1;
            break;
        }
        i++;
    }
    if(flag == 0)
    {
        printf("%d is not in this Array.",item);
    }
}
```

OUTPUT:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Enter total number of elements: 5
Enter the elements: 1 2 3 4 5
Enter the element to be searched: 4
4 is present at position 4.
PS C:\Users\CHANDREYEE SHOME\Desktop\C C++> |
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Enter total number of elements: 6
Enter the elements: 1 2 3 4 5 6
Enter the element to be searched: 7
7 is not in this Array.
PS C:\Users\CHANDREYEE SHOME\Desktop\C C++> |
```

Q2. Implement Binary search.

CODE:

```
//BINARY SEARCH WITH ALREADY SORTED ELEMENTS

#include<stdio.h>
#include<stdlib.h>

void Binary_search(int arr[], int n, int item);
int main()
{
    int i,size,key;
    int a[100];

    system("cls");

    printf("\nTotal number of elements: ");
    scanf("%d",&size);
    printf("\nEnter the elements in ascending (smaller ---> larger) order: ");
    for(i=0;i<size;i++)
    {
        scanf("%d",&a[i]);
    }
    printf("\nEnter the element to be searched: ");
    scanf("%d",&key);

    Binary_search(a, size, key);
}
```

```

}

//FUNCTION FOR BINARY SEARCH
void Binary_search(int arr[], int n, int item)
{
    int UB, LB;
    int i, mid;
    int flag = 0;

    UB=n-1;
    LB=0;

    while(LB<=UB)
    {
        mid=(LB+UB)/2;
        if(arr[mid]==item)
        {
            flag=1;
            break;
        }
        else
        {
            if(arr[mid]<item)
            {
                LB=mid+1;
            }
            else
            {
                UB=mid-1;
            }
        }
    }

    if(flag==1)
        printf("\nElement found at position %d.\n", mid+1);
    else
        printf("\nElement Not Found.\n");
}

```

OUTPUT:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Total number of elements: 5

Enter the elements in ascending (smaller ---> larger) order: 1 2 3 4 5

Enter the element to be searched: 4

Element found at position 4.
PS C:\Users\CHANDREYEE SHOME\Desktop\C C++> █
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Total number of elements: 6

Enter the elements in ascending (smaller ---> larger) order: 1 2 3 4 5 6

Enter the element to be searched: 7

Element Not Found.
PS C:\Users\CHANDREYEE SHOME\Desktop\C C++> █
```