8/1/26

Experiment No :- 02

Implementation of linear search and binary search.

@ binary search :-

```
#include <stdio.h>
int linearsearch(int arr[], int n, int key, int i){
    if (i == n){
        return -1;
    }
    if(arr[i] == key){
        return i;
    }
    linearsearch(arr, n, key, i+1);
}
int main(){
    printf("Enter the total number of elements to
        be entered :-");
    int n;
    scanf("%d", &n);
    int arr[n];
    printf("Enter %d elements :- ", n);
    for(int i=0; i<n; i++){
        scanf("%d", &arr[i]);
    }
    int key;
    printf("Enter the number to be searched :-");
    scanf("%d", &key);
    int res = linearsearch(arr, n, key, 0);
    (res==-1)? printf("Element not found"):
        printf("%d is found at index %d and
        position %d", key, res, res+1);
}
```

output :-

Enter the total number of elements to be entered :- 5

Enter 5 elements :- 10 20 30 40 50

Enter the number to be searched :- 20

20 is found at index 1 and position 2.

(b) Binary search :-

```
#include<stdio.h>
int binarySearch(int arr[], int s, int e, int key){
    if(s>e){
        return -1;
    }
    int mid = (s+e)/2;
    if(arr[mid] == key){
        return mid;
    }
    if(arr[mid] > key){
        binarySearch(arr, s, mid-1, key);
    }else{
        binarySearch(arr, mid+1, e, key);
    }
}
void arrayPrint(int arr[], int n){
    for(int i=0; i<n; i++){
        printf("%d", arr[i]);
        if(i != n-1){
            printf(", ");
        }
    }
    printf("\n");
}
```

```
int main(){
    printf("Enter the total number of elements
        to be entered :- ");
    int n;
    scanf("%d", &n);
    int arr[n];
    printf("Enter %d elements :- ", n);
    for(int i = 0 ; i<n ; i++){
        scanf("%d", &arr[i]);
    }
    Printf("The entered array is :- ");
    arrayPrint(arr, n);
    for(int i=1 ; i<n ; i++){
        int key = arr[i];
        int j=i-1;
        while (j>=0 && arr[j] > key){
            arr[j+1] = arr[j];
            j--;
        }
        arr[j+1] = key;
    }
    Printf("After sorting the array become:-");
    arrayPrint(arr,n);
    int key;
    printf("Enter the number to be searched:-");
    scanf("%d", &key);
    int res = binarySearch(arr, 0, n-1, key);
    (res == -1) ? Printf("Element not found"):
        printf("%d is found at index %d and
        position %d", key, res, res+1);
}
```

output:-

Enter the total number of elements to be entered :- 5

Enter 5 elements :- 20 30 40 10 50

The entered array is :- 10, 20, 30, 40, 50

After sorting the array become :- 10, 20, 30, 40, 50

Enter the number to be searched :- 30

30 is found at index 2 and position 3