EXPERIMENT NO. 9

INPUT:

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

void insertionSort(int arr[], int n);

void main()
{
    int arr[100], i, n, x, choice, flag = 0;
    printf("\n --- WELCOME TO IMPLEMENTATION OF BINARY SEARCH --- \n");
    printf("Enter the number of elements of the array [maximum size = 100] : ");
    scanf("%d", &n);
    printf("Enter %d elements of the array : \n", n);
    for (i = 0; i < n; i++)
    {
        scanf(" %d", &arr[i]);
    }
    insertionSort(arr, n);
    do
    {
        printf("!! -- Operations available -- !!\n");
        printf("1. Display Sorted List \n");
        printf("2. Search a particular value \n");
        printf("3. Exit \n");
        printf("Please Enter your choice : \n");
        scanf("%d", &choice);
        switch (choice)
        {
        case 1:
        {
            printf("The sorted array is : \n");
            for (i = 0; i < n; i++)
            {
                printf(" %d \t", arr[i]);
            }
            break;
        }
```

```c
        case 2:
        {
            printf("Enter the number to be searched : \n");
            scanf("%d", &x);
            int beg = 0, end = n - 1, mid;
            while (beg <= end)
            {
                mid = (beg + end) / 2;
                if (arr[mid] == x)
                {
                    printf("%d is present in the sorted array at index : %d \n", x, mid);
                    flag = 1;
                    break;
                }
                else if (arr[mid] > x)
                {
                    end = mid - 1;
                }
                else
                {
                    beg = mid + 1;
                }
            }
            if (beg > end || flag == 0)
            {
                printf("%d does not exist int the array \n", x);
            }
            break;
        }
        case 3:
        {
            printf("Program Finished !! Thank You \n");
            break;
        }
        default:
        {
            printf("Please enter a valid choice 1, 2, 3. \n");
        }
        }
    } while (choice != 3);
}
```

OUTPUT:

```
dl406@itadmin:~$ gedit Expt9.c
dl406@itadmin:~$ gcc Expt9.c
dl406@itadmin:~$ ./a.out

 --- WELCOME TO IMPLEMENTATION OF BINARY SEARCH ---
Enter the number of elements of the array [maximum size = 100] : 5
Enter 5 elements of the array :
10
20
30
40
50
!! -- Operations available -- !!
1. Display Sorted List
2. Search a particular value
3. Exit
Please Enter your choice :
1
The sorted array is :
 10      20      30      40      50     !! -- Operations available -- !!
1. Display Sorted List
2. Search a particular value
3. Exit
Please Enter your choice :
2
Enter the number to be searched :
30
30 is present in the sorted array at index : 2
!! -- Operations available -- !!
1. Display Sorted List
2. Search a particular value
3. Exit
Please Enter your choice :
3
Program Finished !! Thank You
```