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Program Code:-

```
/**********************************
 Implementation of BINARY SEARCH
**********************************/

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

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

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

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

void insertionSort(int arr[], int n)
{
```

```
        int i, j, temp;
        for (i = 1; i < n; i++)
        {
        temp = arr[i];
        j = i - 1;
        while ((temp < arr[j]) && (j >= 0))
        {
        arr[j + 1] = arr[j];
        j--;
        }
        arr[j + 1] = temp;
        }
}
```

Output:-

```
Program Finished !! Thank Youitadmin@itadmin-HP-ProDesk-400-G7-Microtower-PC:~/Desktop$ ./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 :
2
6
8
4
5


!! -- Operations available -- !!
1. Display Sorted List          2. Search a particular value    3. Exit
Please Enter your choice : 1


The sorted array is :
2       4       5       6       8

!! -- Operations available -- !!
1. Display Sorted List          2. Search a particular value    3. Exit
Please Enter your choice : 2

Enter the number to be searched : 6

6 is present in the sorted array at index : 3

!! -- Operations available -- !!
1. Display Sorted List          2. Search a particular value    3. Exit
Please Enter your choice : 3

Program Finished !! Thank Youitadmin@itadmin-HP-ProDesk-400-G7-Microtower-PC:~/Desktop$
```