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("\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 ");
  printf("\n 2. Search A particular value ");
  printf("\n 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;
```

```c
   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 in the array",x);
   }
   break;

   case 3:
   printf("\n program Finished !! Thank You");
   break;

   default:
   printf(" Please enter a valid choice 1,2,3.");
   break;
  }
 }while(choice!=3);
}
```

Output:

```c
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;
 }
}
```

```
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gedit Exp_8.c
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gedit Exp_9.c
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gcc Exp_8.c
student@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ ./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 :
5 9 6 2 3


 !! -- Operations available -- !!
 1. Display sorted List
 2. Search A particular value
 3. Exit
 Please Enter Your Choice : 1


 The sorted array is :
 2       3       5       6       9

 !! -- 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 Youstudent@dl405-HP-ProDesk-400-G7-Microtower-PC:~$ gedit Exp_8.c
```