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#include <stdio.h>
#include <stdlib.h>
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void insertionSort(int arr[], int n);
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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;
                    }
                }
            }
        }
    } while (choice != 3);
}
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    }
    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("\n Please enter a valid choice 1, 2, 3.");
}
}
} while (choice != 3);

```

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}

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```

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;
    }
}

```

```
itl4@22DL407:~$ gcc expdsa9.c
itl4@22DL407:~$ ./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 :
1
2
3
4
5

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

The sorted array is :
1      2      3      4      5

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

Enter the number to be searched : 4

4 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 Youitl4@22DL407:~$
```