```c
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
double cpu_time1, cpu_time2;
clock_t start1, start2, end1, end2;

int linear_search(int arr[], int high, int low, int flag)
{
    if (low<high)
        return -1;
    if (arr[high] == flag)
        return high;
    if (arr[low] == flag)
        return low;
    return linear_search(arr,high+1,low-1,flag);
}

int binary_search(int arr[],int high, int low, int flag)
{
    if (low>=high)
    {
        int mid = (high+low)/2;


        if (arr[mid]==flag)
            return mid;


        if (arr[mid]>flag)
            return binary_search(arr,high,mid-1,flag);


        return binary_search(arr, mid + 1, low, flag);
    }


    return -1;
}
```

```
37      return -1;
38  }
39
40  int main()
41  {
42
43      int k,pos;
44      int c,d;
45      int i,n,a;
46      int choice,flag,j;
47      srand(time(0));
48      while (1)
49      {
50          printf("1:Linear_Search\n2:Binary_Search\n3:Exit\n");
51          printf("Enter your choice\n");
52          scanf("%d", &choice);
53
54          if (choice == 1)
55          {
56              printf("Enter the No: of elements:\n");
57              scanf("%d", &n);
58              int arr[n];
59
60              for (k = 1; k <= n; k++)
61              {
62                 arr[k]=rand()%100;
63                 printf("%d\t",arr[k]);
64              }
65              printf("\nEnter the Element to be Searched : \n");
66              scanf("%d", &flag);
67              start1 = clock();
68              pos = linear_search(arr, 0, n-1, flag);
69              for (c = 1; c <= 5000; c++) for (d = 1; d <= 5000; d++) { }
70              end1 = clock();
71              cpu_time1 = (double)(end1 - start1) / CLOCKS_PER_SEC;
72              if(pos == -1)
73              {
74               printf("Element is not present in the Array\n");
```

```
71          cpu_time1 = (double)(end1 - start1) / CLOCKS_PER_SEC;
72          if(pos == -1)
73          {
74           printf("Element is not present in the Array\n");
75          }
76          else
77          {
78           printf("Element is present at the Position %d\n", pos);
79          }
80          printf("Time taken: %f\n",cpu_time1);
81      }
82
83      else if (choice == 2)
84      {
85          printf("Enter the No: of elements:");
86          scanf("%d", &n);
87          int arr[n];
88          for (int k =1; k<=n; k++)
89          {
90             arr[k]=rand()%100;
91          }
92         for (i=1; i <=n;i++)
93      {
94          for (j = i + 1; j <= n; ++j)
95          {
96              if (arr[i] >arr[j])
97              {
98                  a =arr[i];
99                  arr[i] = arr[j];
100                 arr[j] = a;
101             }
102
103         }
104
105     }
106      for (int k =1; k <=n; k++)
107         {
108            printf("%d\t",arr[k]);
```

```
96                  if (arr[i] >arr[j])
97                  {
98                      a =arr[i];
99                      arr[i] = arr[j];
100                     arr[j] = a;
101                 }
102
103             }
104
105         }
106          for (int k =1; k <=n; k++)
107             {
108                printf("%d\t",arr[k]);
109             }
110             printf("\nEnter the element to be Searched :\n");
111             scanf("%d", &flag);
112             start2 = clock();
113             pos = binary_search(arr, 0, n - 1, flag);
114             for (c = 1; c <= 5000; c++) for (d = 1; d <=5000; d++) { }
115             end2 = clock();
116             cpu_time2 = (double)(end2 - start2) / CLOCKS_PER_SEC;
117             if(pos == -1)
118             {
119              printf("Element is not present in array\n");
120             }
121             else
122             {
123              printf("Element is present at the Position %d\n", pos);
124             }
125             printf("Time taken: %f\n", cpu_time2);
126         }
127         else
128             break;
129     }
130     return 0;
131 }
132
```

C:\WINDOWS\SYSTEM32\cmd.exe

```
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
1
Enter the No: of elements:
100
48      95      66      41      26      88      7       91      76      35      2       98      34      45      0       13      85      86      11      76
        44      64      56      92      30      99      12      49      65      69      23      9       29      10      20      84      79      2       75
        80      19      38      71      75      60      25      40      35      67      72      51      66      95      60      79      86      80      86
        53      67      29      15      7       66      67      89      98      8       10      18      59      23      86      63      46      16      26
        0       38      18      59      2       52      89      81      89      71      75      77      47      91      35      14      80      21      99
        78      16      75      68
Enter the Element to be Searched :
16
Element is present at the Position 98
Time taken: 0.051000
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
1
Enter the No: of elements:
100
7       30      33      31      63      27      6       38      28      77      62      16      52      52      16      57      92      94      88      45
        45      6       16      14      4       73      34      92      2       55      84      65      3       67      3       5       76      92      17
        40      39      30      18      41      70      42      36      85      2       21      58      81      33      0       2       0       25      32
        55      84      12      18      77      34      9       22      14      4       5       39      29      56      9       66      13      94      65
        80      56      34      94      45      8       50      56      51      78      0       19      31      21      40      39      70      26      57
        46      21      14      77
Enter the Element to be Searched :
33
Element is present at the Position 3
Time taken: 0.048000
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
2
Enter the No: of elements:50
1       3       7       11      15      15      15      18      18      19      20      21      22      24      24      27      29      29      32      35
        35      38      40      43      44      50      51      51      53      56      57      58      61      62      64      66      68      71      71
```

C:\WINDOWS\SYSTEM32\cmd.exe

```
Time taken: 0.048000
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
2
Enter the No: of elements:50
1       3       7       11      15      15      15      18      18      19      20      21      22      24      24      27      29      29      32      35
        35      38      40      43      44      50      51      51      53      56      57      58      61      62      64      66      68      71      71
        72      75      77      80      80      83      83      89      92      97      97
Enter the element to be Searched :
83
Element is present at the Position 46
Time taken: 0.048000
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
1
Enter the No: of elements:
50
80      68      76      93      52      90      13      96      67      74      25      16      48      32      54      6       32      55      24      41
        53      11      12      15      55      96      24      56      48      31      69      58      61      20      43      29      15      97      32
        8       67      30      68      58      94      66      23      94      36      65
Enter the Element to be Searched :
93
Element is present at the Position 4
Time taken: 0.043000
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
3


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(program exited with code: 0)

Press any key to continue . . .
```