



```
1 #include<stdio.h>
2 #include<time.h>
3 void main(){
4     clock_t start,end;
5     int n;
6     printf("Enter number of array elements:");
7     scanf("%d",&n);
8     int a[n];
9     for(int i=0;i<n;i++){
10         printf("Element %d:",i+1);
11         scanf("%d",&a[i]);
12     }
13     printf("Array Elements are,\n");
14     for(int i=0;i<n;i++){
15         printf("%d ",a[i]);
16     }
17     start=clock();
18     BubbleSort(n,a);
19     end=clock();
20     printf("\nTime Taken for BubbleSort:%lf",(double)(end-start)/CLOCKS_PER_SEC);
21     start=clock();
22     IBubbleSort(n,a);
23     end=clock();
24     printf("\nTime Taken for Improvised BubbleSort:%lf",(double)(end-start)/CLOCKS_PER_SEC);
25 }
26 BubbleSort(int n,int a[])
27 {
28     int temp;
29     for(int i=1;i<=n-1;i++){
30         for(int j=0;j<=n-i-1;j++){
31             if (a[j]>a[j+1]){
32                 temp=a[j];
33                 a[j]=a[j+1];
34                 a[j+1]=temp;
35             }
36         }
37     }
38     printf("\n\nSorted Array in BubbleSort: ");
39     for(int i=0;i<n;i++){
40         printf("%d ",a[i]);
41     }
42 }
43 IBubbleSort(int n,int a[])
44 {
45     int temp;
46     for(int i=1;i<=n-1;i++){
47         int flag=0;
48         for(int j=0;j<=n-i-1;j++){
49             if (a[j]>a[j+1]){
50                 flag=1;
51                 temp=a[j];
52                 a[j]=a[j+1];
53                 a[j+1]=temp;
54             }
55         }
56         printf("\n\nSorted Array in Improvised BubbleSort: ");
57         for(int i=0;i<n;i++){
58             printf("%d ",a[i]);
59         }
60         if(flag==0)
61             return;
62     }
63 }
```

× Terminal

Enter number of array elements:5

Element 1:10

Element 2:20

Element 3:30

Element 4:40

Element 5:50

Array Elements are,

10 20 30 40 50

Sorted Array in BubbleSort: 10 20 30 40 50

Time Taken for BubbleSort:0.000018

Sorted Array in Improvised BubbleSort: 10 20 30 40 50

Time Taken for Improvised BubbleSort:0.000015

Process finished.

## × Terminal

Enter number of array elements:4

Element 1:45

Element 2:35

Element 3:25

Element 4:15

Array Elements are,  
45 35 25 15

Sorted Array in BubbleSort: 15 25 35 45

Time Taken for BubbleSort:0.000016

Sorted Array in Improvised BubbleSort: 15 25 35 45

Time Taken for Improvised BubbleSort:0.000014

Process finished.