1BM19CS176

INSERTION SORT

```
#include<time.h>
#include <math.h>
#include <stdio.h>

void sort(int arr[], int n)
{
   int i, key, j;
   for (i = 1; i < n; i++)
   {
      key = arr[i];
      j = i - 1;

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


      printf("%d ", arr[i]);
   }
}


int main()
{
        int n,i;
        printf("Enter the number of elements: ");
        scanf("%d",&n);
        int a[n];
        printf("Enter the elements to sort:\n");
        for(i=0;i<n;i++)
        {
                scanf("%d",&a[i]);
        }
        clock_t t;
        t=clock();
        sort(a,n);
```

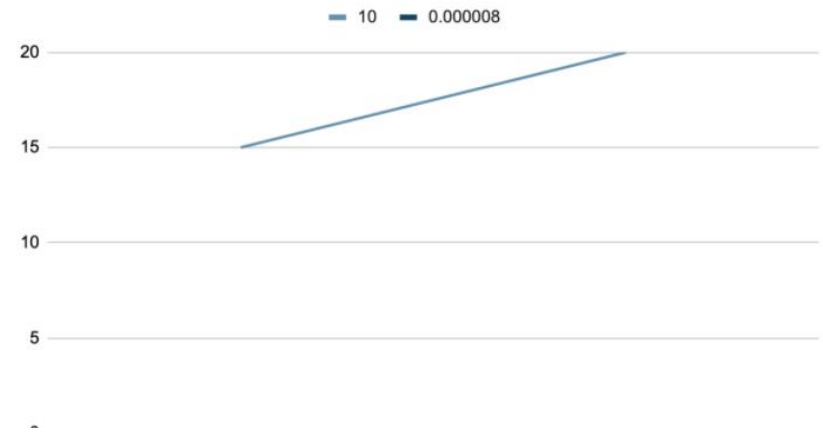
```
    t = clock() - t;
        double time_taken = ((double)t)/CLOCKS_PER_SEC;
    printf("\n The sort function took %f seconds to execute.\n", time_taken);
    return 0;

}
```

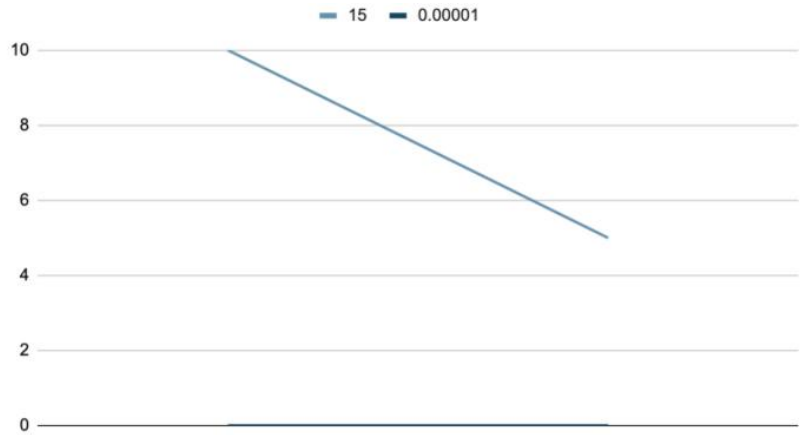
```
Enter the number of elements: 4
Enter the elements to sort:
23
17
90
1
1 17 23 90
 The sort function took 0.000005 seconds to execute.
```

GRAPHS-

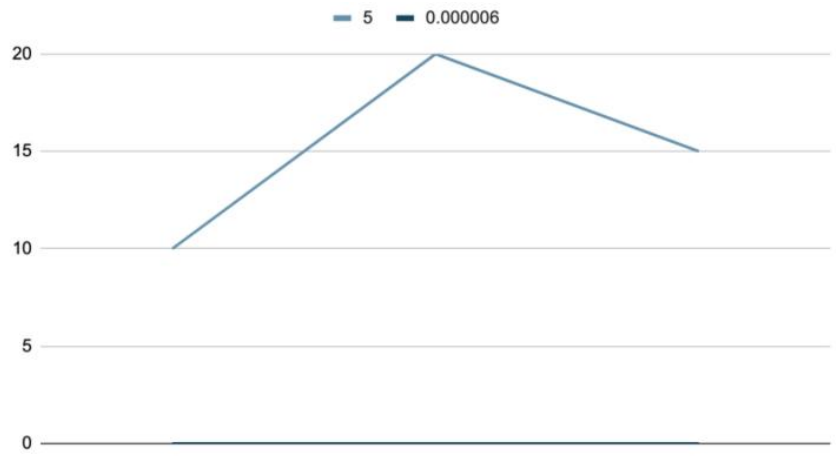
Insertion sort(ascending order):



Insertion sort(descending order):



Insertion sort(random order):


5
0.000006
20
15
10
5
0