

5. Sort a given set of N integer elements using Insertion Sort technique and compute its time taken.

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

int arr[1000000];
void insetionSort(int arr[], int n)
{
    for (int i = 1; i < n; i++)
    {
        int curr = arr[i];
        int j = i - 1;
        while (j >= 0 && curr < arr[j])
        {
            arr[j + 1] = arr[j];
            j--;
        }
        arr[j + 1] = curr;
    }
}

void printArray(int arr[], int n)
{
    int i;
    for (i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n");
}

int main()
{
    time_t start, end;
    int n;
    srand(time(0));
    printf("Enter the no of elements \n");
    scanf("%d", &n);

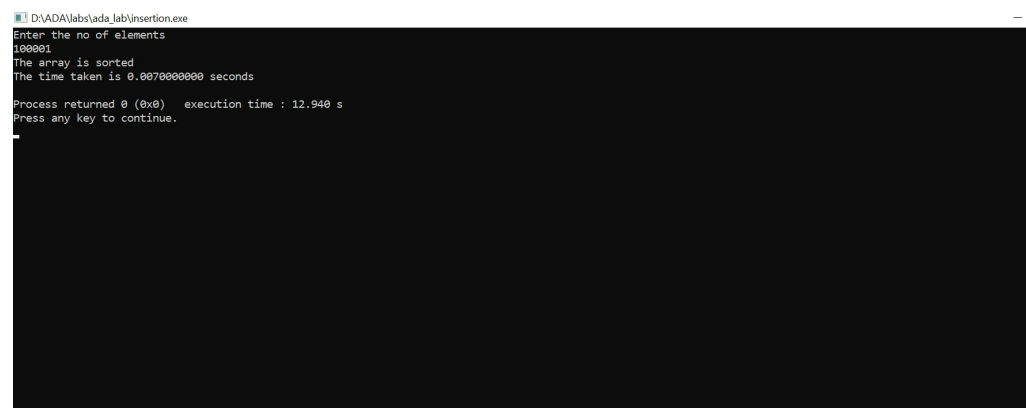
    for (int i = 0; i < n; i++)
    {
        arr[i] = rand();
    }
}
```

```
start = time(NULL);
insetionSort(arr, n);
end = time(NULL);

printf("The array is sorted\n");

printf("The time taken is %.10f seconds\n", difftime(end, start) /
CLOCKS_PER_SEC);
return 0;
}
```

Screenshot:



The screenshot shows a Windows command prompt window titled "D:\ADA\labs\ada_lab\insertion.exe". The user has entered "100001" for the number of elements. The program outputs "The array is sorted" and "The time taken is 0.0070000000 seconds". At the bottom, it shows "Process returned 0 (0x0) execution time : 12.940 s" and "Press any key to continue.".

```
D:\ADA\labs\ada_lab\insertion.exe
Enter the no of elements
100001
The array is sorted
The time taken is 0.0070000000 seconds

Process returned 0 (0x0)   execution time : 12.940 s
Press any key to continue.
```