

## LAB-10

**Q) Sort a given set of N integer elements using Quick Sort technique and**

compute its time taken.

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

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

```
void heapify(int arr[], int n, int i) {
```

```
    int largest = i;
```

```
    int left = 2 * i + 1;
```

```
    int right = 2 * i + 2;
```

```
    if (left < n && arr[left] > arr[largest])
```

```
        largest = left;
```

```
    if (right < n && arr[right] > arr[largest])
```

```
        largest = right;
```

```
    if (largest != i) {
```

```
        int temp = arr[i];
```

```
        arr[i] = arr[largest];
```

```
        arr[largest] = temp;
```

```
        heapify(arr, n, largest);
```

```
    }
```

```
}
```

```
void heapSort(int arr[], int n) {
```

```
    for (int i = n / 2 - 1; i >= 0; i--)
```

```
        heapify(arr, n, i);
```

```
    for (int i = n - 1; i > 0; i--) {
```

```
        int temp = arr[0];
```

```
        arr[0] = arr[i];
```

```
        arr[i] = temp;
```

```
        heapify(arr, i, 0);
```

```
    }
```

```
}
```

```
int main() {
```

```
    int n;
```

```
    printf("Enter the number of elements: ");
```

```
    scanf("%d", &n);
```

```
    int arr[n];
```

```
    printf("Enter %d elements:\n", n);
```

```
    for (int i = 0; i < n; i++)
```

```
        scanf("%d", &arr[i]);
```

```
    clock_t start_time = clock();
```

```
    heapSort(arr, n);
```

```
    clock_t end_time = clock();
```

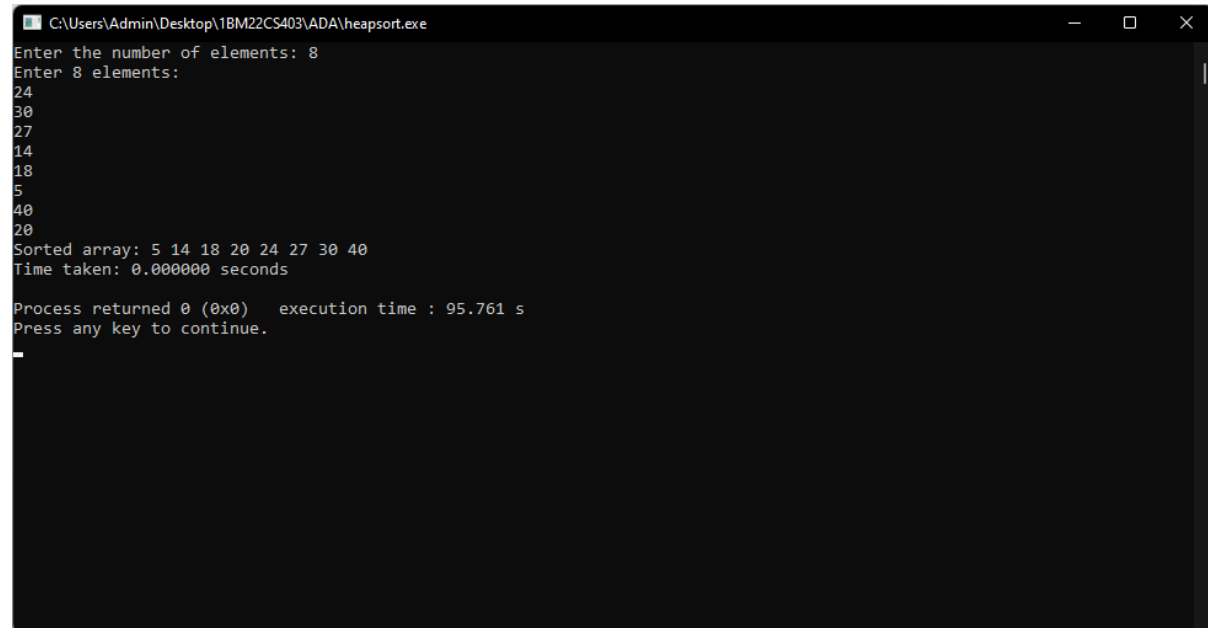
```
    printf("Sorted array: ");
```

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

double time_taken = (double)(end_time - start_time) / CLOCKS_PER_SEC;
printf("Time taken: %f seconds\n", time_taken);

return 0;
}
```

## OUTPUT :



The screenshot shows a Windows command prompt window titled "C:\Users\Admin\Desktop\1BM22CS403\ADA\heapsort.exe". The window contains the following text:

```
Enter the number of elements: 8
Enter 8 elements:
24
30
27
14
18
5
40
20
Sorted array: 5 14 18 20 24 27 30 40
Time taken: 0.000000 seconds

Process returned 0 (0x0)   execution time : 95.761 s
Press any key to continue.
```