

HEAP SORT:

PROGRAM:

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

void swap(int *a, int *b)
{
    int t = *a;
    *a = *b;
    *b = t;
}

void heap(int arr[], int n, int i)
{
    int largest = i;
    int l = 2 * i + 1;
    int r = 2 * i + 2;

    if (l < n && arr[l] > arr[largest])
        largest = l;

    if (r < n && arr[r] > arr[largest])
        largest = r;

    if (largest != i)
    {
        swap(&arr[i], &arr[largest]);
        heap(arr, n, largest);
    }
}

void heapSort(int arr[], int n)
{
    for (int i = n / 2 - 1; i >= 0; i--)
        heap(arr, n, i);

    for (int i = n - 1; i > 0; i--)
    {
        swap(&arr[0], &arr[i]);
        heap(arr, i, 0);
    }
}
```

```

int main()
{
    int i, n, a[20];

    printf("Enter the value of n\n");
    scanf("%d", &n);
    printf("Enter the elements to sort\n");
    for (i = 0; i < n; i++)
        scanf("%d", &a[i]);

    heapSort(a, n);
    printf("The sorted vector is\n");
    for (i = 0; i < n; i++)
        printf("%d ", a[i]);

    /* clock_t start, end;
    double t;
    for (int n = 100; n < 601; n = n + 100)
    {
        int array[n];
        for (int i = 0; i < n; i++)
        {
            array[i] = rand() % 1000;
        }

        start = clock();
        heapSort(array, n);
        end = clock();
        t = ((double)(end - start)) / CLOCKS_PER_SEC;
        printf("\nTime taken by Heap Sort for %d elements : %lf\n", n, t);}*/
}

```

OUTPUT:

```

User@PRATHIKSHA /c/ada lab
$ cd "/c/ada lab/" && gcc heap_sort.c -o heap_sort && "/c/ada lab/"heap_sort
Enter the value of n
6
Enter the elements to sort
0 10 -1 -5 4 90
The sorted vector is
-5 -1 0 4 10 90

```