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);}*/
}
```

Screenshot: