ADA Lab

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

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

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--) {
```

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```
        swap(&arr[0], &arr[i]);
        heap(arr, i, 0);
    }
}
int main(){
    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("\n Time taken by heap sort for %d elements:
                %lf \n", n, t);
    }
}
```


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Modification

```
void minheap(int arr[], int n, int i) {
    int smallest = i;
    int l = 2*i+1;
    int r = 2*i+2;
    if (l<n && arr[l] < arr[smallest])
        smallest = l;
    if (r<n && arr[r]< arr[smallest])
        smallest = r;
    if (smallest != i) {
        swap(arr[i], arr[smallest]);
        minheap(arr, n, smallest);
    }
}
int main() {
    int arr[] = {3,7,4,6,1}
    in n = sizeof(arr)/sizeof(arr[0]);
    heapSort(arr, n);
}
```


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