

Heap Sort

Explanation

Heap sort is a sorting algorithm that works by first building a heap from the input array. A heap is a special type of binary tree where the value of each node is greater than or equal to the values of its children. The root node of the heap is the largest (max-heap) or smallest (min-heap) element in the heap.

Once the heap has been built, heap sort repeatedly extracts the largest or the smallest element from the heap and places it at the end of the sorted array. The heap is then rebuilt without the extracted element. This process continues until the heap is empty, at which point the sorted array will be complete.

Algorithm

```
def heap_sort(array):
```

```
    build_heap(array)
```

```
    for i in range(len(array) - 1, 0, -1):
```

```
        swap(array[0], array[i])
```

```
        heapify(array, 0, i - 1)
```

```
def build_heap(array):
```

```
    for i in range(len(array) // 2, -1, -1):
```

```
        heapify(array, i, len(array) - 1)
```

```
def heapify(array, index, end):
```

```
    largest = index
```

```
    left = 2 * index + 1
```