HeapSort.java

```
1   package com.example.SortingAlgos;
2
3   public class HeapSort {
4       public int[] heapSort(int arr[]) {
5           int N = arr.length;
6
7           // Build heap (rearrange array)
8   4       for (int i = N / 2 - 1; i >= 0; i--)
9   1           heapify(arr, N, i);
10
11          // One by one extract an element from heap
12  3       for (int i = N - 1; i > 0; i--) {
13              // Move current root to end
14              int temp = arr[0];
15              arr[0] = arr[i];
16              arr[i] = temp;
17
18              // call max heapify on the reduced heap
19  1           heapify(arr, i, 0);
20          }
21  1       return arr;
22      }
23
24      // To heapify a subtree rooted with node i which is
25      // an index in arr[]. n is size of heap
26      void heapify(int arr[], int N, int i) {
27          int largest = i; // Initialize largest as root
28  2       int l = 2 * i + 1; // left = 2*i + 1
29  2       int r = 2 * i + 2; // right = 2*i + 2
30
31          // If left child is larger than root
32  4       if (l < N && arr[l] > arr[largest])
33              largest = l;
34
35          // If right child is larger than largest so far
36  4       if (r < N && arr[r] > arr[largest])
37              largest = r;
38
39          // If largest is not root
40  1       if (largest != i) {
41              int swap = arr[i];
42              arr[i] = arr[largest];
43              arr[largest] = swap;
44
45              // Recursively heapify the affected sub-tree
46  1           heapify(arr, N, largest);
47          }
48      }
```

```
49  }
```

Mutations

8	1. negated conditional → KILLED 2. changed conditional boundary → KILLED 3. Replaced integer division with multiplication → SURVIVED 4. Replaced integer subtraction with addition → SURVIVED
9	1. removed call to com/example/SortingAlgos/HeapSort::heapify → KILLED
12	1. Replaced integer subtraction with addition → KILLED 2. negated conditional → KILLED 3. changed conditional boundary → SURVIVED
19	1. removed call to com/example/SortingAlgos/HeapSort::heapify → KILLED
21	1. replaced return value with null for com/example/SortingAlgos/HeapSort::heapSort → KILLED
28	1. Replaced integer multiplication with division → KILLED 2. Replaced integer addition with subtraction → KILLED
29	1. Replaced integer multiplication with division → KILLED 2. Replaced integer addition with subtraction → KILLED
32	1. changed conditional boundary → SURVIVED 2. changed conditional boundary → KILLED 3. negated conditional → KILLED 4. negated conditional → KILLED
36	1. negated conditional → KILLED 2. changed conditional boundary → KILLED 3. negated conditional → KILLED 4. changed conditional boundary → SURVIVED
40	1. negated conditional → KILLED
46	1. removed call to com/example/SortingAlgos/HeapSort::heapify → KILLED

Active mutators

- CONDITIONALS_BOUNDARY
- EMPTY_RETURNS
- FALSE_RETURNS
- INCREMENTS
- INVERT_NEGS
- MATH
- NEGATE_CONDITIONALS
- NULL_RETURNS
- PRIMITIVE_RETURNS
- TRUE_RETURNS
- VOID_METHOD_CALLS

Tests examined

- com.example.SortingAlgos.HeapSortTest.testSort(com.example.SortingAlgos.HeapSortTest) (0 ms)

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