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Heap Sort

- Heap Sort was implemented by John Williams and uses the approach just opposite to selection sort. The selection sort finds the smallest element among "n" elements, and smallest elements among (n-1) elements and so on.
- Heap is almost complete Binary Tree.

Algorithm

```
HEAP-SORT(a)
   BUILD-MAX-HEAP(a)
   for i=length[a] down to 2
      do exchange a[1] with a[i]
      heap-size[a] = heap-size[a]-1
      MAX-HEAPIFY(a,1)
BUILD-MAX-HEAP(a)
   heap-size(a) = length[a]
   for i = floor (length[a]/2) down to 1 do
      MAX-HEAPIFY(a, i)
MAX-HEAPIFY(a, i)
   L = left[i)
   R = right[i]
   if L <= heap-size and a[L] > a[i]
      largest = L;
   else
      largest = i
   if(R<= heap-size and a[R] > a[largest])
      largest = r;
   if (largest != i)
      exchange a[i] with a[largest]
      MAX-HEAPIFY(a, largest)
```

Note:- Heap sort works only on Max Heap or Min Heap