**6.4-4.**

Show that the worst-case running time of HEAPSORT is $\Omega(n \lg n)$.

**Proof.**

As HEAPSORT is a comparison sort and any comparison sort algorithm requires $\Omega(n \lg n)$ comparisons in the worst case (see Theorem 8.1), the the worst-case running time of HEAPSORT is therefore $\Omega(n \lg n)$.[1] □

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1. We call a sorting algorithm *comparison sort* if the sorted order it determines is based only on comparisons between the input elements. Thus, the running time of any comparison sort is dominated by the number of comparisons.