算法导论习题 6.1

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Exercises 6.1-1 What are the minimum and maximum numbers of elements in a heap of height h?
最多就是一颗很完美的二叉树，是 $2^{h+1}-1$; 最少的话最后一层只有一个，是 2^h

Exercises 6.1-2 Show that an n-element heap has height $\lfloor \lg n \rfloor$
直接利用第一题的结论：$2^{h+1}-1 \geq x \geq 2^h \Rightarrow \lg x \geq h \geq \lg(x+1)-1$
所以 h = $\lfloor \lg n \rfloor$

Exercises 6.1-3 Show that in any subtree of a max-heap, the root of the subtree contains the largest value occurring anywhere in that subtree.
这就是最大堆的性质！

Exercises 6.1-4 Where in a max-heap might the smallest element reside, assuming that all elements are distinct?
肯定是在叶子节点

Exercises 6.1-5 Is an array that is in sorted order a min-heap?
没有说明是递增数组还是递减数组，所以不一定

Exercises 6.1-6 Is the sequence [23, 17, 14, 6, 13, 10, 1, 5, 7, 12] a max-heap?
不是，7 > 6

Exercises 6.1-7 Show that, with the array representation for storing an n-element heap, the leaves are the nodes indexed by $\lfloor n/2 \rfloor + 1, \lfloor n/2 \rfloor + 2, \ldots, n$.
也是很简单的性质