Basic Algorithms, Assignment 4
Due, Thursday, Oct 4

MIDTERM October 9 In Class!
Wednesday, October 3: NO OFFICE HOURS
SPECIAL PREMIDTERM OFFICE HOURS Monday, October 9,
7-8:30p.m.

1. When $H$ is a heap with length fifty million and $\text{HEAPIFY-UP}(A, 300)$ is
called what is the maximum number of exchanges that can take place.
What is the minimiml number of exchanges that can take place.

2. When $H$ is a heap with length fifty million and $\text{HEAPIFY-DOWN}(A, 300)$
is called what is the maximum number of exchanges that can take place. What is the minimiml number of exchanges that can take place.

3. Consider a heap $H$ with length 1023. $^1$ Assume the elements of the
array are distinct. Let $x$ be the third smallest element in the array.
What are the possible positions for $x$. Let $y = H[700]$. Can $y$ be the
largest element in the array? Can $y$ be the smallest element in the
array? What is the smallest $i$ so that it is possible that $y$ is the $i$-th
smallest element of the array.

4. Page 69, Problem 8. (Do part (b) only for $k = 3$.)

A person who never made a mistake never tried anything new.
– Albert Einstein

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$^1$Did you recognize 1023 as a special number? Its one less than $1024 = 2^{10}$. The binary
tree with that many nodes just fills out a row!