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 `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 `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

[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!