EC330 HW 5

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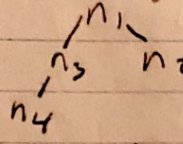
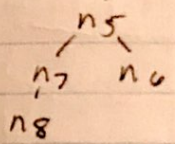
1) To construct a max heap from eight #s $\{n_1, n_2 \ldots n_8\}$ by only using 8 comparisons,

- we begin with a set of 4 pairs where: $n_1 > n_2$ $n_3 > n_4$, $n_5 > n_6$, $n_7 > n_8$
- Then, we compare the largest elements of two pairs, where if $n_1 > n_3$, our tree is

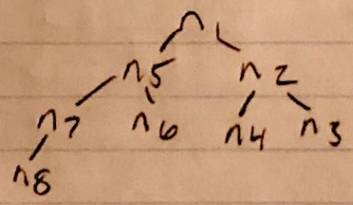


and if $n_5 > n_7$:



- We then need to know which of the two max-heaps has the larger root. if $n_1 > n_5$, we use our eighth + final comparison to reorder the elements that are children of n_1. This is essential b/c otherwise the final merged heap would not necessarily follow max-heap properties.

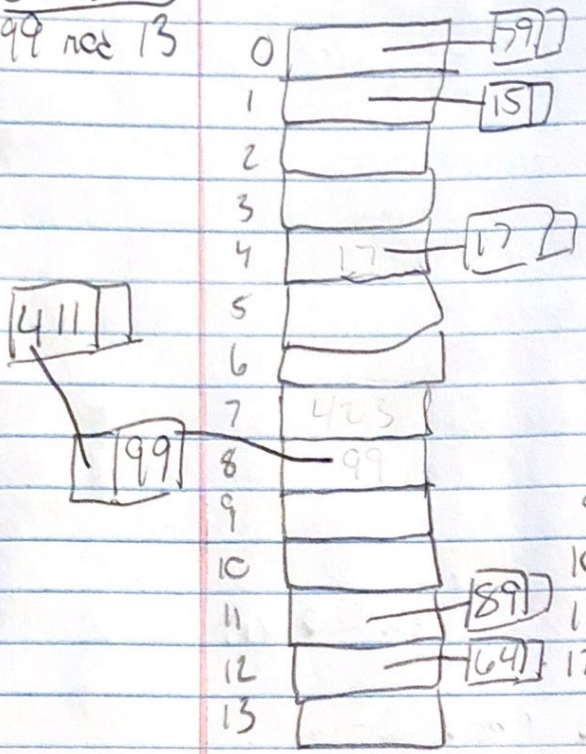
- By checking the two children of the larger root (n_1), if $n_2 > n_3$ our final max-heap ordered w/ 8 comparisons is



2) For the seq 17, 423, 64, 79, 411, 89, 99, 15

a) chaining

collision
99 mod 13



b) linear probing

collision
(99+1) mod 13

0	
1	79
2	15
3	
4	17
5	
6	
7	423
8	411
9	99
10	
11	89
12	64

c) quadratic probing

collision
$(99 + 1^2 + 1) \bmod 13$

0	
1	79
2	15
3	
4	17
5	
6	
7	423
8	411
9	
10	99
11	89
12	64

d) using a second hash

collision
99 mod 13
7 - 99 mod 7 = 6

0	99
1	79
2	
3	
4	17
5	
6	
7	423
8	411
9	
10	
11	89
12	64