CSE 373: Section 8

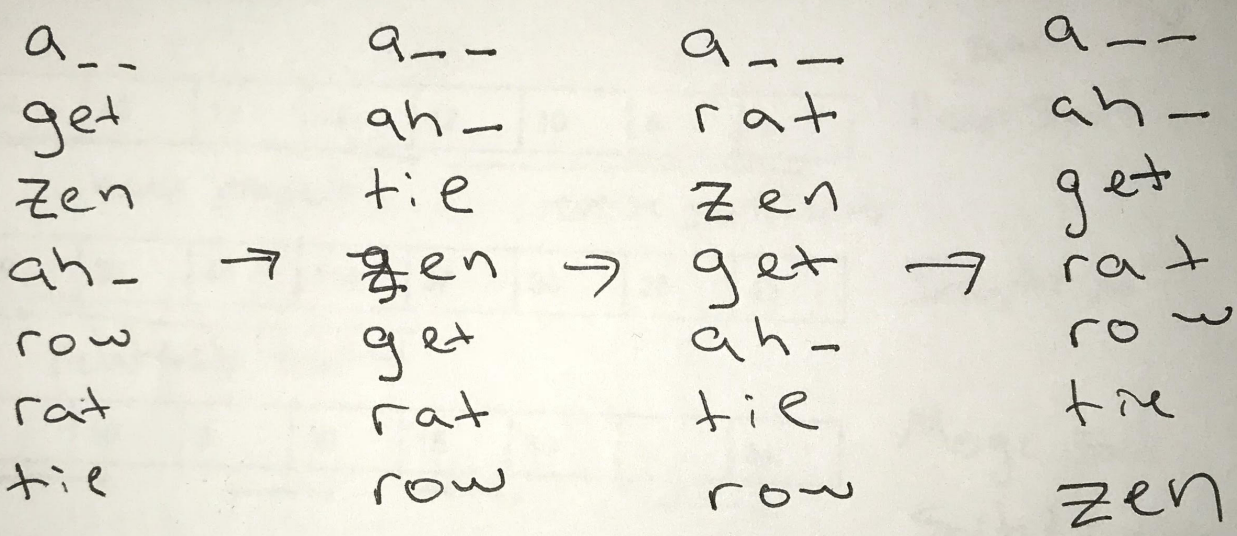
Sorting

November 15th

Radix Sort

Use radix sort to sort the following elements, show each pass.

['a','get','zen','ah','row','rat','tie']



Interrupting sorts

The following arrays have been interrupted in the middle of a sorting algorithm. Use your knowledge of comparison based sorting to determine which algorithm was being used on each array. Each of the following will be present exactly once: Heap Sort, Insertion Sort, Selection Sort, Merge Sort

Array:	Sort Used:
-5 | 2 | 19 | 53 | 44 | 91 | 87 | 35	Selection starts w/ global sort
14 | 42 | 17 | 72 | 12 | 10 | 5 | 1 (heap property; reverse sorted order)	Heap Sort
29 | 35 | 44 | 114 | 37 | 30 | 28 | 46 (relatively sorted)	Insertion
6 | 10 | 3 | 50 | 15 | 60 | 1 | 34	Merge sort sorted subportions

Short answer

1. Suppose we are trying to perform a radix sort on a set of positive java `int`. Recall that the runtime of Radix sort is $O(P(B+n))$ where B is the Radix and P is the number of passes. To what extend are P and B selectable and how might differing values of n impact that selection process.

   If 'n' is very large, we can let B be loooorlooo
   This increases the radix, but decreases the numbr of pass-es

2. Provide an example for each of the following or indicate why no sort exists:

   - A stable comparison sort with worst-case $O(n^2)$ runtime

     Insertion

   - A stable comparison sort with worst-case $O(n)$ runtime

     not possible, comparison sorts are $\Omega(n \lg n)$

   - A $O(nlogn)$ stable comparison sort

     merge sort (O(n) memory usage though)

   - A stable, in-place, comparison sort that runs in $O(nlogn)$ time

     Not possible
     quick + heap are not stable
     merge is not in-place
     comparison nlgn are only the above 3

Graph Introduction

Use this graph and help from the TA to introduce our next topic: graphs.

- Identify Vertices and Edges. *G(V,E)*
- Discuss directed vs. indirected graphs
- Discuss weights
- What sort of information could this graph represent?

$V = \{A, B, C, D, E, F\}$

$E = \{(A,B), (A,D), (A,C), (B,F), (C,D), (C,E), (C,G), (D,F), (E,F), (G$

↳ Maps, networks, traffic, genealogy, social connections

↳ Symmetry: if undirected $(A,B) \rightarrow (B,A)$

affiliated weight w/ each edge

(A,B) may have different weight than (B,A)