Sorting

Sorting

- sorting = process of arranging group of items into ascending/descending order based on some criteria
- examples:
  - alphabetize list of names
  - sort list of numbers from highest to lowest
  - sort people by height
  - sort people by age

Sorting

- We've been using built-in sorting methods/functions `.sort()` or `sorted()`
- How do we actually describe an algorithm used to sort?
- Is there more than one?

Activity

- Need 5 volunteers

Bubble Sort

- Make passes through list
- On each pass, swap out of order elements

Bubble Sort - Complexity

- How many passes through list are made?
- How much work does each pass take?
- Can we stop early if not all passes needed?

Selection Sort

- Goes through list positions one by one
- Selects value that should go there
- More formally:
  - go through list to find smallest value
  - swap that value with value in first spot
  - scan rest of list to find next smallest value
  - swap that value with value in second spot
  - continue with remaining spots for each position in the list

Selection Sort - Complexity

- Think about the work it does:
  - How many times does it go through the list?
  - For each pass, how many elements does it look at?

Merge Sort

- divide and conquer algorithm
- recursive
- process:
  - divide array into 2 halves
  - **recursively** sort each half (by calling mergesort on each half)
  - merge sorted halves (take 2 sorted lists and combine into one sorted list)

Merge Sort - Complexity

- Tree like, recursive halving/combining
- How much work at each step of tree?
- How many levels to the tree?