2018-04-24 NLogN Sorts

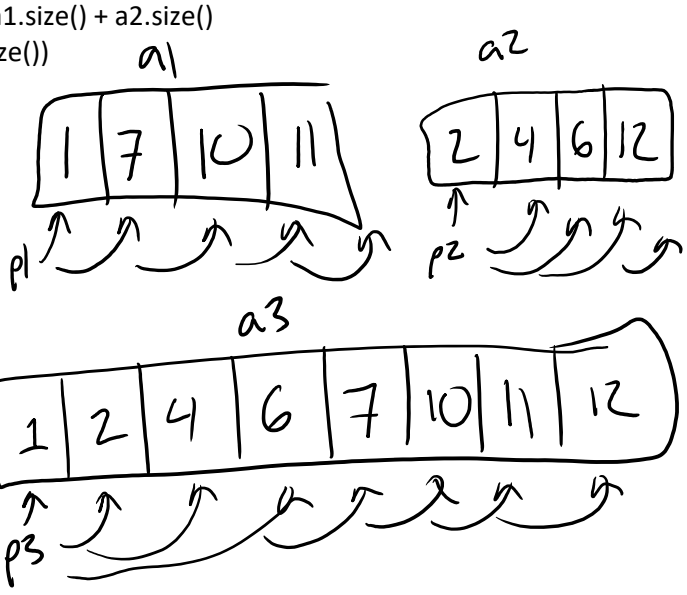
Tuesday, April 24, 2018 9:45 AM

MergeSort

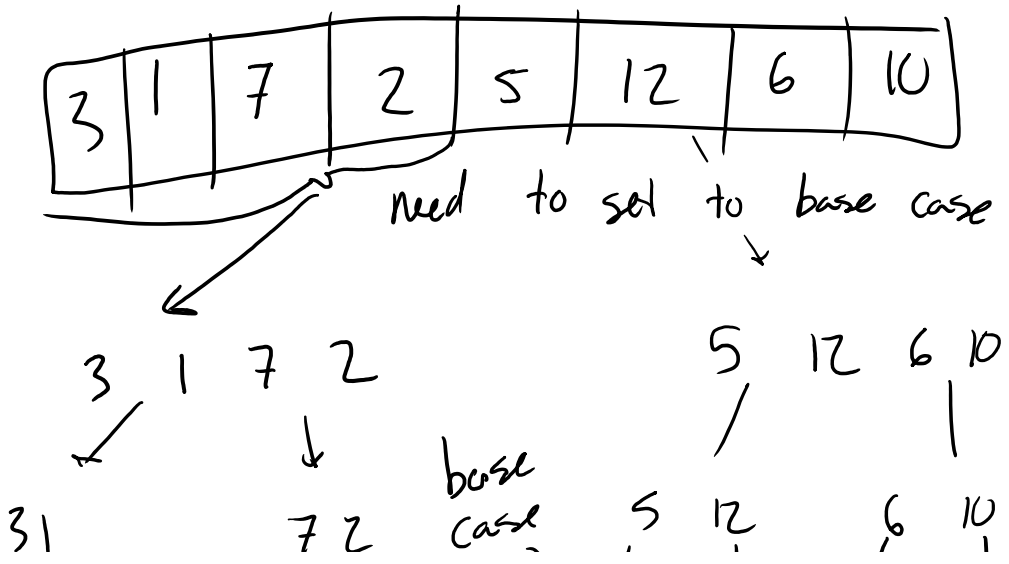
- Based on two observations:
  - An array of size 1 is sorted
  - Sorted arrays can be merged in linear time
- Objective of merge sort: break down an array into sub arrays of size, progressively merge back to full array

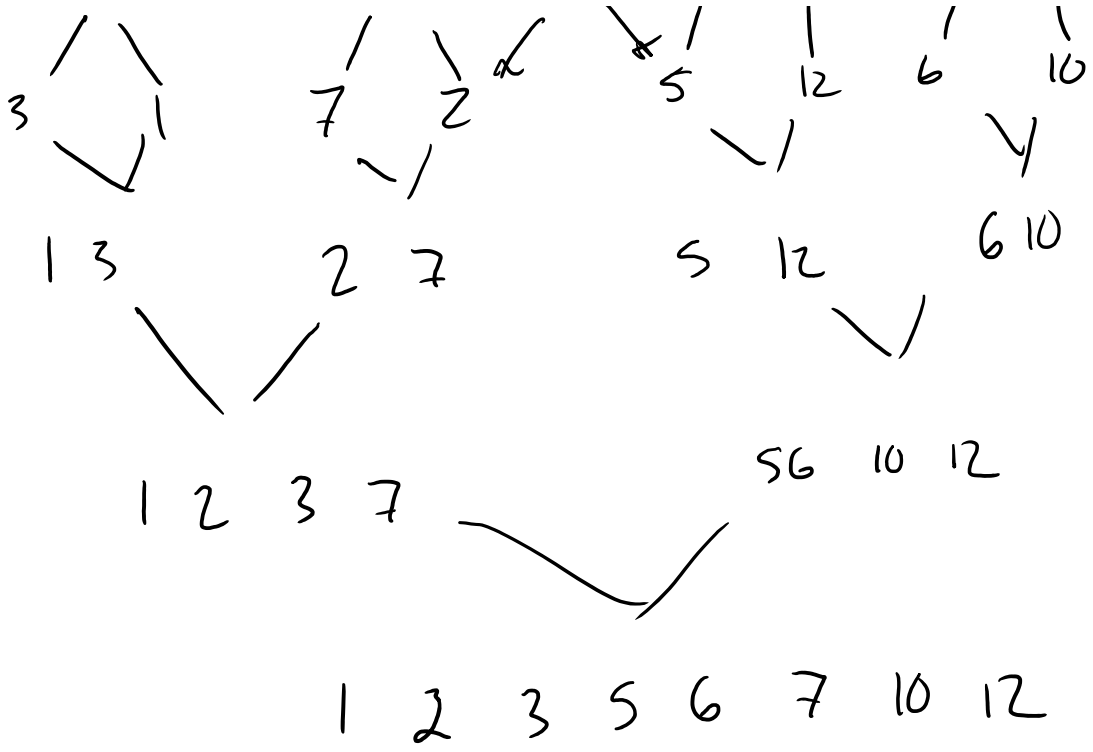
Merging Sorted Arrays in Linear Time

- Given sorted arrays a1 and a2
- Let p1 = 0, p2 = 0, p3 = 0 (p1 = pointer to a1, p2 = pointer to a2, p3 = pointer to a3)
- Let a3 = new array having size of a1.size() + a2.size()
- While(p1 < a1.size() && p2 < a2.size())
  - IF a1[p1] < a2[p2]
    - A3[p3] = a1[p1]
    - P1++
  - ELSE
    - A3[p3] = a2[p2]
    - P2++
  - P3++
- While p1 < a1.size()
  - A3[p3] = a1[p1]
  - P3++
  - P1++
- While p2 < a2.size()
  - A3[p3] = a2[p2]
  - P3++
  - P2++



Conceptual Merge Sort




3 1
7 2
5 12 6 10
1 3
2 7
5 12
6 10
1 2 3 7
5 6 10 12
1 2 3 5 6 7 10 12