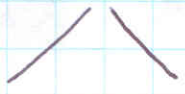
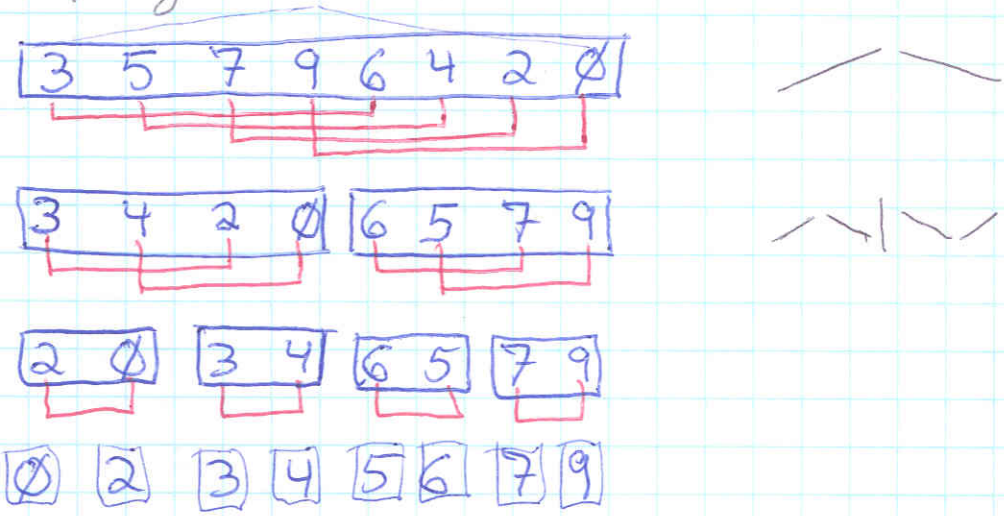
6.897
L13.4
Mar. 17, 2005

Bitonic sorting

- sequence of numbers is bitonic if it is a cyclic shift of nondecreasing seq. + nonincreasing seq.

i.e.,  or etc.

- bitonic sorting algorithm:
  - put $A[i]$ & $A[n/2+i]$ in right order for $i = 0, 1, \ldots, n/2$
  - split A in half $(n/2 : n/2)$
  - recurse on halves in parallel
  - (conceptually concatenate)



- invariant after round:
  - both halves are bitonic
  - all elements in left half < all elements in right half

[see CLRS]

- $O(\lg n)$ rounds