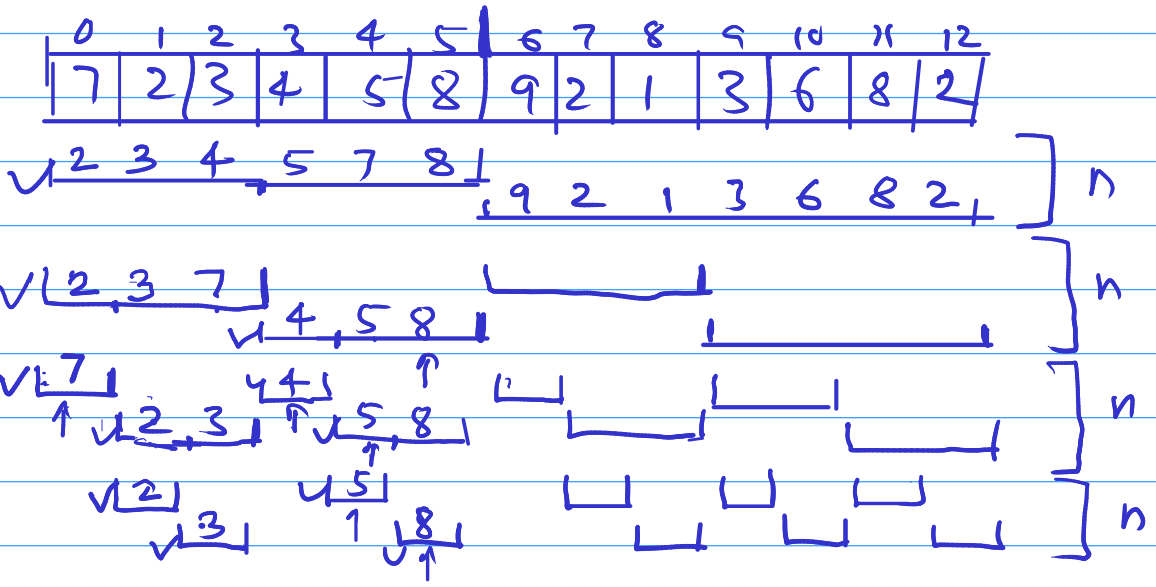
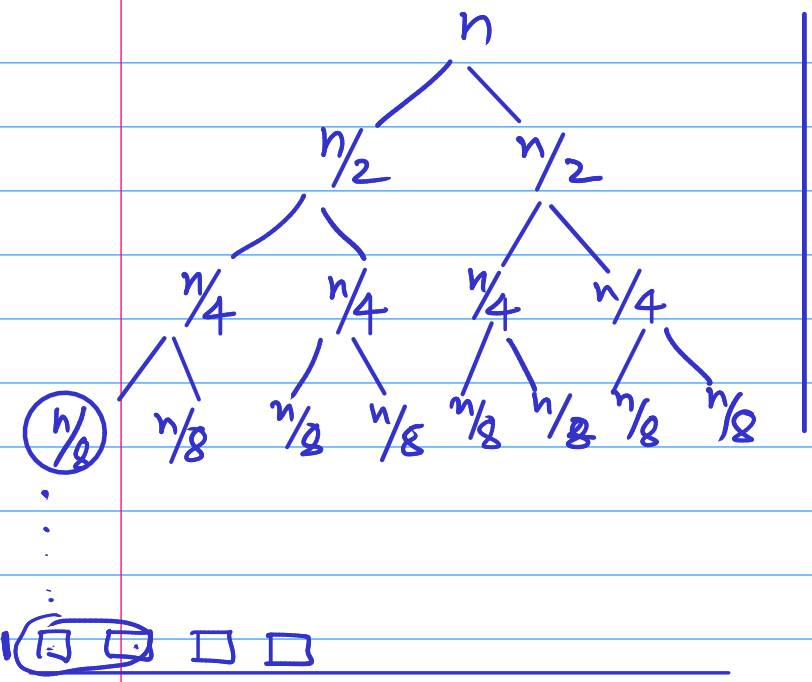
① Heap Sort

② Merge sort — Divide and conqure



Time Complexity



$1 \times n = n$

$2 \times n/2 = n$

$4 \times n/4 = n$

$8 \times n/8 = n$

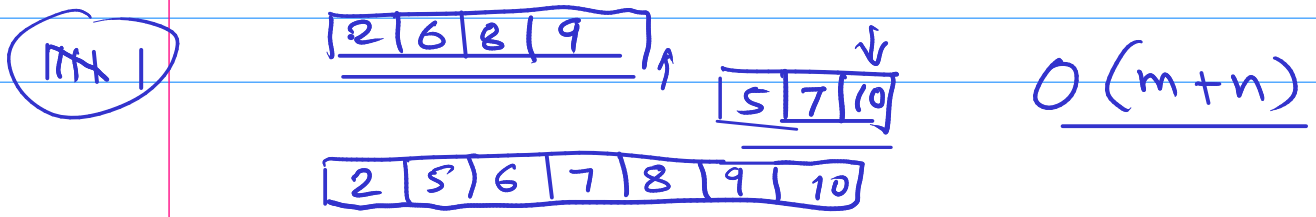
$n/2 \times 2$

$n \times 1 = n$

height ~ log(n)

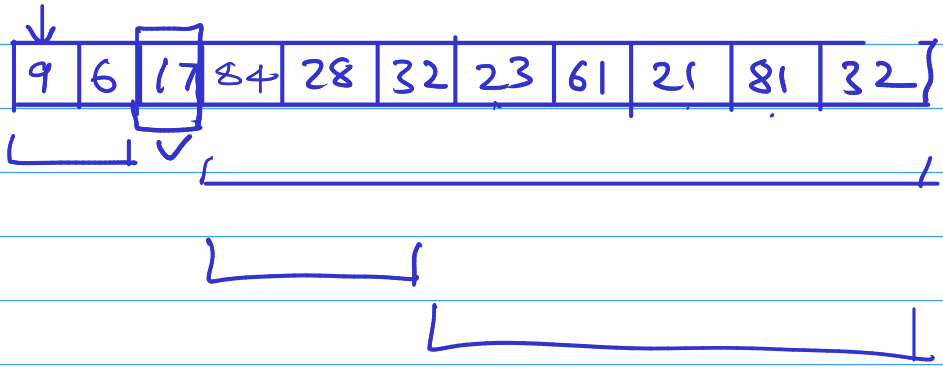
$O(n \log(n))$

Time complexity of merging two sorted arrays of m and n elements into one sorted array?

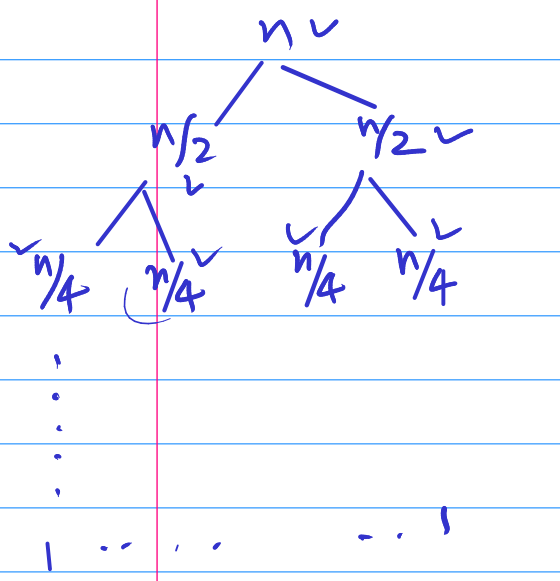


$O(m+n)$

③ Quick Sort — Divide and conqure



Best case



n

$n/2 + n/2 = n$

$4 \times n/4 = n$

$n \times 1 = n$

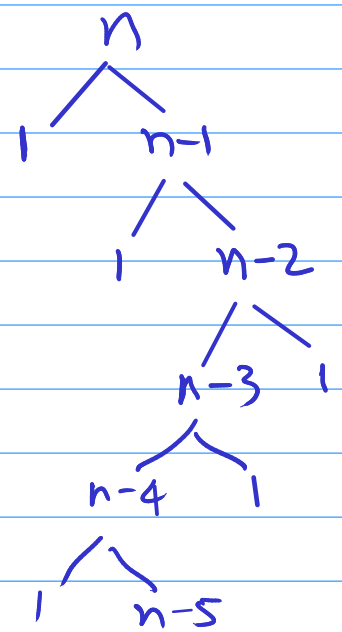
Time complexity

height $\sim \log_2(n)$

$n \times \log_2(n)$

$O(n \log(n))$

Worst case



h

h

h

height = n

$O(n)$

$n \times n$

$O(n^2)$