2-4 Teasure Hunting — Mergesort

(Wednesday, April 11, 2018 $\sim$ Sunday, April 15, 2018)

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April 11, 2018


TREASURE
HUNT
on foot


Hints
&
Tips


Help
Wanted

Analysis of Mergesort in CLRS (# of Comparisions; $a_i : \infty$ not Counted)

(a) Analyze the worst case $W(n)$ and the best case $B(n)$ time complexity of mergesort *as accurately as possible*.
Explore the relation between them and the binary representations of numbers.
Plot $W(n)$ and $B(n)$ and explain what you observe.

(b) Analyze the average case $A(n)$ time complexity of mergesort.
Plot $A(n)$ and explain what you observe.

(c) Prove that: The minimum number of comparisons needed to merge two sorted arrays of equal size m is $2m - 1$.

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(WED., April 11, 2018)

$W(n)$: Consider $W(n+1)$

(THU, April 12, 2018)

$$W(n) = \begin{cases} 0, & n = 1 \\ W(\lfloor \frac{n}{2} \rfloor) + W(\lceil \frac{n}{2} \rceil) + (n-1), & \textit{o.w.} \end{cases}$$

$$W(n+1) - W(n)$$

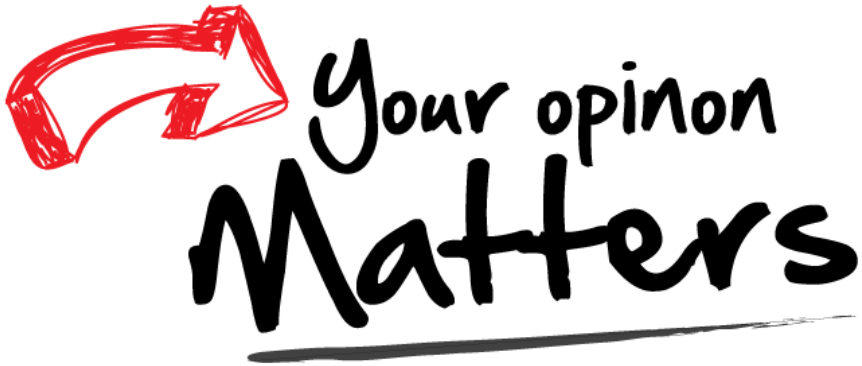
The total number of bits in the binary representations of *all the numbers less than* n.

(FRI, April 13, 2018)

(SAT, April 14, 2018)

(SUN, April 15, 2018)


Thank
You!



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