CS325 Winter 2013: Implementation 1

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February 4, 2013

Asymptotic Analysis

1. In algorithm 1 the problem is not branched into any subproblems. With the nested for loops there is a comparison made between every element in the input, leading to an intuitive asymptotic complexity of $O(n^2)$

2. In algorithm 2 the problem is branched into 2 subproblems for size $n/2$ at each level.

3. In algorithm 3 the problem is branched into 2 subproblems of size $n/2$ at each level. The depth of the problem is $log_2 ofn$ and the width is $n^l og_2 2$. From the master theorem we know that A/B^D determines the run time complexity. Since this case is $2/2^1 = 1$, we know that the Asymptotic complexity is $O(nlogn)$.

Testing

verify.txt	test_input.txt
9670	249310
10567	252709
9282	253719
9269	249315
9675	247789
10378	254833
9911	239844
9790	257527
9580	241669
9965	255628

Extrapolation and Interpretation

Brute-force: