Lecture 3
Problem Solving Techniques

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Abstract. This lecture is a part of competitive programming training lectures prepared for Eastern University, Dhaka. The lecture covers commonly used problem solving techniques : Brute-force Technique, Greedy Technique, Binary Search, Complete Search, Prefix Sums, Two Pointers.

1 Commonly used Problem Solving Techniques

1.1 Brute-force Technique

Try out all possible options and find the solution.

1.2 Greedy Technique

Make locally optimal decision and expect globally optimal outcome.

1.3 Binary Search

- Can be performed only on monotonic functions.
- Think of the search space as a sequence of zeroes and ones.
- Look for $O(NlogN)$ solutions by finding the correct predicate function.

1.4 Complete Search

Try out all subsets in $O(2^N)$.

1.5 Prefix Sums

Allows $O(N)$ Pre-Computation and $O(1)$ querying of Range Sums.

1.6 Two Pointers

Maintain two separate pointers and traverse over a given array to solve some problem in $O(N)$.

1.7 Discussion on Problem Solving Strategies