Ben Pung

Prof Orduz

Advanced Algorithms

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Description automatically generated

1. When we look at the sub-set-sum problem we know tht for each subset the algorithm does O(N) work looking each n-k elements. If there are O(n^k) subsets of size k , then for n things chosen k at a time we get a polynomial of degree k. Each subset is generated in O(k) time.

So for S sequence of numbers we can solve it in polynomial time.

1. Given a subset sum decision problem, (S,K), create a knapsack instance of (S,K). The resultant knapsack problem has a solution if n only if the subset sum (S,K) has as solution. Knapsack is NP-Complete because we know that subset-sum is a reduction from knapsack. We know subset-sum is np-complete. Subset-sum is complete because it can be solved by a polynomial time algorithm and is the reduction for many problems in NP (NP-hard).