# 최적화근사해법
# 제 5주 과제

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A supplementary lecture note for the book *Approximation algorithms* by V. Vazirani

2007년 봄학기

8.1 Consider the greedy algorithm for the knapsack problem. Sort the objects by decreasing ratio of profit to size, and then greedily pick objects in this order. Show that this algorithm can be made to perform arbitrarily badly.

8.2 Consider the following modification to the algorithm given in Exercise 8.1. Let the sorted order of objects be $a_1, \ldots, a_n$ Find the lowest $k$ such that the size of the first $k$ objects exceeds $B$. Now, pick the more profitable of $\{a_1, \ldots, a_{k-1}\}$ and $\{a_k\}$. Show that this algorithm achieves an approximation factor of 2.

8.3 Obtain an FPTAS for the following problem.
**Subset-sum ratio problem** Given n positive integers, $a_1 < \ldots < a_n$, find two disjoint nonempty subsets $S_1, S_2 \subseteq \{1, \ldots, n\}$ with $\Sigma_{i \in S_1} a_i \geq \Sigma_{i \in S_2} a_i$, such that the ratio $(\Sigma_{i \in S_1} a_i)/(\Sigma_{i \in S_2} a_i)$ is minimized.