

0-1 Knapsack Problem

The famous knapsack problem

A thief breaks into a museum. Fabulous paintings, sculptures, and jewels are everywhere. The thief has a good eye for the value of these objects, and knows that each will fetch hundreds or thousands of dollars on the clandestine art collector's market.

But, the thief has only brought a single knapsack to the scene of the robbery, and can take away only what he can carry.

What items should the thief take to maximize the haul?

The 0-1 knapsack problem

You can take it or not; you cannot take a fraction of items.

Solve the 0-1 knapsack problem by dynamic programming.

In this assignment, you get a list of items with weight from given file (`input.txt`). Your program should generate output file (`result.txt`) with given items. Moreover, you should make a document composed of the source codes with comments, and explanations about your algorithm.

In the input file, first 5 lines show you the number of items I ($1 \leq I \leq 100$), the weight limit of items W ($1 \leq W \leq 1000$). From the 6th line, there are 4 columns; first column shows the item numbers, second column shows the value of items, third column shows the weight of items.

You should choose the most valuable items set with given knapsack size.

Sample input file (input.txt):

Item list of 2-dimensional 0-1 knapsack problem

Number of items: 100

Weight limit of knapsack: 100

ID	Value	Weight
1	125	20
2	80	35
3	97	86
⋮	⋮	⋮

Sample output (result.txt)

Total weight of the selected items: 000

Total value of the selected items: 00000

List of the selected items:

ID	Value	Weight
00	000	000
0	000	00
⋮	⋮	⋮

What you have to turn in:

- 1) Your source program (hw3.c)
- 2) Documentation file (hw3.doc or hw3.hwp)

Due date – 2010 5.25 23:59:59