0-1 Knapsack Problem

Time Limit : 1 sec, Memory Limit : 131072 KB

English / Japanese

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> You have N items that you want to put them into a knapsack. Item i has value v_i and weight w_i.
>
> You want to find a subset of items to put such that:
>
> - The total value of the items is as large as possible.
> - The items have combined weight at most W, that is capacity of the knapsack.
>
> Find the maximum total value of items in the knapsack.

Input

N W
v_1 w_1
v_2 w_2
:
v_N w_N

> The first line consists of the integers N and W. In the following lines, the value and weight of the i-th item are given.

Output

> Print the maximum total values of the items in a line.

Constraints

> - $1 \leq N \leq 100$
> - $1 \leq v_i \leq 1000$
> - $1 \leq w_i \leq 1000$
> - $1 \leq W \leq 10000$

Sample Input 1

```
4 5
4 2
5 2
2 1
8 3
```

Sample Output 1

Sample Input 2

```
2 20
5 9
4 10
```

Sample Output 2

```
9
```

Source: https://onlinejudge.u-aizu.ac.jp/problems/DPL_1_B