# Picky Thief (Hard)

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|---|---|
| Input file: | `standard input` |
| Output file: | `standard output` |
| Time limit: | 2 seconds |
| Memory limit: | 256 megabytes |

**The only difference between the easy and hard version of the problem is the size of the constraints. Please read both the problems carefully**

A thief breaks into the house and encounters $n$ items of value $v_i$ and weight $w_i$. Fortunately, he can't lift more than $W$ kgs so we can't steal items of total weight more than $W$. Can you calculate the maximum total value of the items the thief can steal?

Note: Breaking an item makes its value zero. Thus the thief will never break any item.

## Input

The first line contains the number of items $1 \leq n \leq 100$ and $1 \leq W \leq 10^8$

This is followed by $n$ lines, each containing two integer $v_i$ and $w_i$ ($0 \leq v_i \leq 10^4$, $0 \leq w_i \leq 10^6$) — the value and weight of the $i^{th}$ item.

## Output

Print a single non-negative integer $d$ where $d$ is the maximum total value of items the thief could have stolen.

Note: Value of maximum total value of items the thief could have stolen doesn't exceed $10^4$, i.e. $d \leq 10^4$

## Examples

| standard input | standard output |
|---|---|
| 3 8<br>30 3<br>50 4<br>60 5 | 90 |
| 6 15<br>6 5<br>5 6<br>4 6<br>6 6<br>5 3<br>2 7 | 17 |