2025 Canadian Computing Olympiad
Day 1, Problem 1
2025 Canadian Informatics Workshop
Day 1, Problem 3

Asteroid Mining

Time Limit: 3 seconds

Problem Description

It is the year 2217 and Ryan is an asteroid miner. He makes a living by mining asteroids and selling them at the CCO (Celestial Cargo Outpost).

On his latest mining expedition, he has mined N mineral chunks where the i-th chunk has a value v_i and a mass m_i. Ryan plans to transport a set of chunks to the CCO with his rocket, but he only has enough fuel to last one more trip. He calculated that the maximum total mass he can safely carry on his rocket is M. Due to Ryan's mining technique, the chunks exhibit a special property: for any two mineral chunks, one's mass is divisible by the other chunk's mass.

Help Ryan find the maximum total value he can ship to CCO while adhering to his rocket's constraints.

Input Specification

The first line will contain two space-separated integers N ($1 \leq N \leq 500\,000$) and M ($1 \leq M \leq 10^{12}$).

The next N lines will each contain two space-separated integers v_i ($1 \leq v_i \leq 10^{12}$) and m_i ($1 \leq m_i \leq 10^{12}$), representing the value and mass of the i-th mineral chunk respectively. **Additionally, for any two mineral chunks i, j ($1 \leq i, j \leq N$), either $m_i \mid m_j$ or $m_j \mid m_i$, where $a \mid b$ means that a is a divisor of b (i.e., b/a is an integer).**

The following table shows how the available 25 marks are distributed:

Marks Awarded	Bounds on N	Bounds on M	Additional Constraints
2 marks	$N = 2$	$1 \leq M \leq 10^4$	None
2 marks	$1 \leq N \leq 20$	$1 \leq M \leq 10^4$	None
4 marks	$1 \leq N \leq 1\,000$	$1 \leq M \leq 10^4$	None
6 marks	$1 \leq N \leq 1\,000$	$1 \leq M \leq 10^8$	None
2 marks	$1 \leq N \leq 500\,000$	$1 \leq M \leq 10^8$	All m_i are equal.
3 marks	$1 \leq N \leq 500\,000$	$1 \leq M \leq 10^8$	At most 2 distinct m_i.
6 marks	$1 \leq N \leq 500\,000$	$1 \leq M \leq 10^{12}$	None

Output Specification
On one line, output one integer, the maximum total value Ryan can ship to CCO.

Sample Input
```
6 10
1 1
5 2
200 6
9 2
6 2
100 1
```

Output for Sample Input
```
310
```

Explanation of Output for Sample Input
Ryan can take all the chucks except the second and fifth chucks to achieve a total value of $1 + 200 + 9 + 100 = 310$. Note that the total mass of the chunks is $1 + 6 + 2 + 1 = 10$. We can show that this is optimal.