DMOPC '17 Contest 1 P4 - Quests

Time limit: 1.0s **Memory limit:** 64M

In a distant kingdom, there lived a certain knight. What did this knight do? Play video games of course!

In his most recent video game, there are N NPCs, each of whom offers a distinct repeatable quest. It takes the knight h_i hours to reach the i^{th} NPC and he gains g_i gold along the way. Once he reaches an NPC, he can perform its quest as many times as he likes. Doing the i^{th} quest takes him t_i hours and rewards him with q_i gold. This knight wishes to obtain as much gold as he can, however he cannot log more than H hours, lest his lord find out and fire him. Can you help this knight find out the maximum amount of gold he can obtain?

Constraints

For all subtasks:

$1 \leq g_i, q_i \leq 10^9$

$1 \leq h_i, t_i \leq H$

$1 \leq H \leq 5\,000$

Subtask 1 [30%]

$1 \leq N \leq 8$

Subtask 2 [30%]

$g_i = q_i$ and $h_i = t_i$ for all $1 \leq i \leq N$

$1 \leq N \leq 5\,000$

Subtask 3 [40%]

$1 \leq N \leq 5\,000$

Input Specification

The first line of input will have two space separated integers, N and H.

The next N lines of input will each have four space separated integers, g_i, h_i, q_i, and t_i in that order.

Output Specification

A single integer, the maximum amount of gold the knight can get after H hours.

Sample Input 1

```
3 6
6 1 3 1
7 1 1 1
3 1 9 2
```

Sample Output 1

```
28
```

Explanation for Sample 1

The knight should go to the second NPC but not do its quest. Then, he should go to the third NPC and do its quest twice. This gives him $7 + 3 + 9 + 9$ gold and takes him $1 + 1 + 2 + 2$ hours.

Sample Input 2

```
5 7
8 2 10 2
9 1 7 1
1 2 8 1
5 3 2 1
7 1 4 3
```

Sample Output 2

```
51
```

Explanation for Sample 2

The knight should go to the second NPC and do its quest six times.

Sample Input 3

```
5 557
819777 142 467177 150
647198 31 265541 155
903546 115 261596 138
757957 84 108764 101
935057 137 532908 164
```

Sample Output 3

```
4063535
```