

# IOITC 2020 Practice Test 3

## Dispatching

In a sect of ninja, ninjas are dispatched to a client, and they are rewarded according to their work.

In this sect, there are  $N$  ninjas numbered  $1, 2, \dots, N$ . The ninja numbered 1 is the master. Every ninja except the master has one and only one boss. The boss of a ninja numbered  $i$  ( $i > 1$ ) is  $B_i$ . In order to preserve the confidentiality and to encourage leadership, any instructions concerning their work are always sent by a boss to his/her subordinates. It is forbidden to send instructions by other methods.

You have to gather a number of ninjas and dispatch them to a client. You have to pay salaries to dispatched ninjas. The amount of salary for ninja numbered  $i$  is  $C_i$ . The total amount of salaries paid to them should be within a budget  $M$ . Moreover, in order to send instructions, you have to choose a ninja as a manager who can send instructions to all dispatched ninjas. When instructions are sent, a ninja who is not dispatched may also mediate the transmission. The manager may or may not be dispatched. If the manager is not dispatched, he will not be paid.

For each  $1 \leq i \leq N$ , the manager numbered  $i$  has a leadership level  $L_i$ . You would like to maximize the satisfaction level of the client as much as possible within the budget. The satisfaction level of the client is calculated as the product of the total number of dispatched ninjas and the leadership level of the manager.

## Input

- The first line contains  $N$  and  $M$ , the number of ninjas in the sect and the budget respectively.
- $i^{\text{th}}$  of the next  $N$  lines contains three integers,  $B_i, C_i$  and  $L_i$  respectively. The value  $B_1 = 0$  has to be ignored.

## Output

Print a single line containing the maximum possible satisfaction level of the client.

## Test Data

In all inputs,

- $1 \leq N \leq 10^5$
- $1 \leq M \leq 10^9$
- $0 \leq B_i < i$
- $1 \leq C_i \leq M$
- $1 \leq L_i \leq 10^9$

**Subtask 1 (30 Points):**  $N \leq 3000$

**Subtask 2 (70 Points):** No additional constraints.

## Sample Input

```
5 4
0 3 3
1 3 5
2 2 2
1 2 4
2 3 1
```

### Sample Output

6

If we choose ninja 1 as a manager and ninja 3, 4 as dispatched ninjas, the total amount of salaries is 4 which does not exceed the budget 4. Since the number of dispatched ninjas is 2 and the leadership level of the manager is 3, the satisfaction level of the client is 6. This is the maximum value.

### Limits

Time: 1 second

Memory: 512 MB