

## (Adv.) Competitive Programming

Submit until 21.06.2019 13:30, via the [judge interface](#)



### Problem: hacking (1 second timelimit)

*Note:* This is a bonus problem that is harder to solve than usual. Solve the other problems first before spending too much time on this one.

You're hackerman, one of the best hackers in the Hollywood movie universe. To prove that you're *the* best, you want to hack the servers of Hacking Protection Incorporated, the best security firm around. In the process, you want to steal as many of their corporate secrets as you can.

Through several sleepless nights of frantic keyboard clacking you've already found out a lot about their infrastructure: their main cluster consists of  $n$  servers, each storing some secrets. How easy it is to access those secrets depends on how incompetent the admin of the server is. Server 1, called the gateway server, is the only one connected to the internet, so that's where you'll have to start your hack. The rest are connected through a minimalistic  $n - 1$  connections. However, these still allow every server to reach any other.

As you'd expect, there is a lot of security in place. Once you start by hacking the first server, you'll set off a timer that will shutdown the network after some amount of time if you haven't been caught (which of course you won't be). This means you will have to be in and out before that happens. Additionally, every connection is encrypted and will take some time to hack every time you use it to move from one server to the next. Even more annoyingly, each server has an advanced, polymorphic firewall, that begins to block connections once it detects you. For each server, you will only be able to move to one neighboring server before it does. Luckily, it can't block the connections you've already used, so you can still get out the way you came in.

And as if all that wasn't enough, there is also a Chaos Monkey<sup>1</sup> going around in the network. On each server, except gateway, it's randomly blocking access to one of the server's connections. The only exception is the connection that leads from that server to the gateway, which will never be blocked.

Before you start hacking, you want to plan out exactly what you're going to do to maximize the number of secrets you can steal. As you can't predict the Chaos Monkey's actions, you just assume the worst case that could happen.

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<sup>1</sup><https://medium.com/netflix-techblog/the-netflix-simian-army-16e57fbab116>

**Input** The input begins with a line containing  $n$  and  $t$  ( $1 \leq n \leq 10^5, 1 \leq t \leq 10^{18}$ ), the number of servers and the time before the network shuts off. The next line contains  $s_1$  to  $s_n$  ( $1 \leq s_i \leq 10^6$ ), where  $s_i$  is the number of secrets on server  $i$ . Next follows a line containing  $t_1$  to  $t_n$  ( $1 \leq t_i \leq 10^6$ ), the time it takes to hack one secret on that server. Lastly, there are  $n - 1$  lines containing the connections between the servers. For  $i$  from 2 to  $n$ , the corresponding line contains  $j$  and  $d$  ( $1 \leq j < i, 0 \leq d \leq 10^9$ ), where  $j$  denotes the next server when moving from server  $i$  to the gateway, and  $d$  denotes how long it takes you to hack the connection every time you want to move along it. This time is the same regardless of the direction you want to move over the connection.

**Output** Output the maximum number of secrets you can steal, regardless of the Chaos Monkeys actions.

**Sample input**

```
3 20
5 7 5
5 1 3
1 5
1 0
```

**Sample output**

```
7
```

```
3 20
1 5 10
10 2 1
1 0
2 2
```

```
6
```

```
4 20
1 5 7 5
20 5 1 3
1 0
2 5
2 0
```

```
6
```

```
5 10
1 2 5 5 1
10 3 4 2 1
1 1
1 2
2 1
2 2
```

2