Awesome Warrior Game

Let's play an awesome challenges game! In this game, your warrior character has to surpass several challenges in order to meet the Mighty Wizard, who can grant her with the well-deserved retirement from a life of adventures. On the exact moment the character decides to become a warrior, she receives an initial (positive) amount of energy. Once the warrior reaches a challenge, she must decide on how to surpass the challenge. But beware! Her decisions will affect her amount of energy: while surpassing a challenge in a certain way gives her an extra amount of energy, choosing other options requires the warrior to pay with her own energy points.

For instance, suppose there are 4 challenges in the game, numbered from 0 to 3, and that these are the following:

0 – Defeat the dragon. The warrior can use a sword (and spend 20 units of energy), or run away (and spend 10 units of energy).

1 – Meet the Mighty Wizard. This is the final challenge. The warrior has no options once she reaches the Wizard.

2 – Fish a salmon from the magic lake. The warrior can choose to wait for the fish to jump out of the lake (and spend 0 units of energy), or use a fishing rod (and win 10 units of energy).

3 – Collect poisonous mushrooms from the haunted woods. Once the warrior reaches this challenge, no options are presented. The warrior loses all her energy and the game ends.

These challenges may be presented to the warrior more than once. Also, the next challenge depends on how the warrior surpassed the current challenge. For instance if the warrior fishes a salmon with the fishing rod, she will then meet the dragon, but if she chooses to wait for the fish to jump out of the lake, the next challenge may be another one.

When the warrior meets the Mighty Wizard, the game ends. If the warrior's energy at that time is positive, the warrior manages to retire, and you win the game with that amount

of energy. On the other hand, if at that time the warrior's energy is negative, it is converted to zero and you lose the game, that is, you finish with zero final energy.

The warrior must also be very careful not to fall in *trap* challenges. These challenges never lead her to meet with the Wizard, either because they only lead to more and more challenges in which she is forever trapped in an infinite sequence of (repeated) challenges or because the *trap* challenges cause the game to finish immediately (when no options to surpass the challenge are presented to the warrior, like in challenge 3 in the example). For instance, if the warrior reaches challenge 3 in the example above, the game ends and you lose the game (with zero final energy).

Your warrior is very worried: if she meets the Wizard with negative or zero energy, she knows the Wizard cannot grant her final wish of retiring from her demanding life of adventures. Only if she knew, in advance, all the possible challenges and payment dues, she would be able to anticipate her faith. Can you help her?

Task

Given a description of a game and the initial amount of energy of the warrior, your goal is to find out whether:

- the warrior can meet the Wizard with more energy than she started off with (that is, if she can reach the Wizard challenge with more energy than the initial energy) or, if not,

- what is her maximum possible energy at the end of the game.

A description of the game specifies the different challenges the warrior can take, the options she has to surpass each challenge and whether a subsequent challenge demands energy or provides a boost of energy. Such description also provides the starting challenge of the warrior, as well as the final challenge of meeting the Wizard.

Input

The first line of the input contains two integers, C and D, separated by a single space. C is the number of challenges and D is the number of decisions the warrior can make. With this input format, a decision simply represents which challenge to take next. Challenges are represented by integers ranging from 0 to $C - 1$.

Each of the following D lines is of the form C_1 P V C_2. Here, C_1 represents a just-finished challenge; P is either the string `Pays` or `Gets`, accounting for whether the warrior loses or wins energy to enroll in a new challenge; V is the amount of energy involved in the transaction; C_2 is the new challenge the warrior will face. All elements are separated by a single space.

The last line of the input contains three integers, separated by a single space: the initial challenge S, the ending challenge W (meeting the Wizard), and the initial amount of energy E. Challenge W does not lead to any new challenge.

Output

The output is a single line: either the string `Full of energy`, if the warrior can reach the Wizard with more than the initial energy; or the maximum amount of energy, otherwise.

Constraints

- $2 \leq C \leq 1000$

- $1 \leq D \leq 10000$

- $-100 \leq V \leq 100$

- $100 \leq E \leq 1000$

Sample Input 0

This example uses the game illustrated in the first page (and adds a few details, like making the fishing challenge to be the first challenge). Here there are 4 challenges, as listed above, and the following 4 options:

0 – Use a sword to defeat the dragon (and spend 20 units of energy).

1 – Run away from the dragon (and spend 10 units of energy).

2 – Wait for the fish to jump out of the lake (and spend 0 units of energy).

3 – Use a fishing rod (and win 10 units of energy).

The input sample for this example can be as follows:

```
4 4
2 Pays 0 3
2 Gets 10 0
0 Pays 20 1
0 Pays 10 3
2 1 100
```

Sample Output 0

```
90
```

Sample Input 1

```
6 8
0 Pays 10 1
0 Pays 2 4
1 Pays 50 2
1 Gets 3 3
3 Pays 10 0
3 Pays 40 2
4 Gets 5 5
5 Pays 3 4
0 2 100
```

Sample Output 1

```
53
```

Sample Input 2

```
4 7
0 Pays 10 1
0 Gets 5 3
1 Gets 18 0
1 Gets 40 3
2 Pays 20 0
2 Pays 35 1
2 Gets 50 3
2 3 200
```

Sample Output 2

```
Full of energy
```