Problem B - Fishmans Fear

Fred Fishman, the director of a big aquarium, has a problem: Due to the inflation, the costs for keeping and feeding animals are exploding. Especially some of the bigger animals like the crocodiles and sharks are extremely expensive to care for, but also penguins, otters, nutrias and several others are high in costs. Meanwhile, the number of visitors decreased in the last years, because of the lockdowns during COVID19-pandemia. Thus, Fred comes to the sad conclusion, that the only way to continue with his aquarium is, to sell some of the animals. As he really loves his animals, Fred wants to sell as few animals as possible and he wants to say goodbye to each one personally. Fortunately, Fred's team has already calculated the monthly costs for every animal. So he has all information to know if he can save at least d euros by selling not more than k animals.

Input

The input consists out of:

- One line with three integers n, d and k where
  - n ($1 \leq n \leq 10000$) is the number of animals in the aquarium
  - d ($1 \leq d \leq 10^9$) is the amount of money that Fred has to save at least
  - k ($1 \leq k \leq n$) is the number of animals that Fred can sell without getting depressive
- n lines containing a string s_i and an integer c_i, where
  - s_i ($1 \leq s_i \leq 7$) is the name of the i-th animal
  - c_i ($1 \leq c_i \leq 100000$) are the monthly costs for the i-th animal

  Further, all s_i only contain uppercase and lowercase letters of the English alphabet and all s_i are distinct.

Output

If it is not possible to save at least d euros per year by selling at most k animals, output `impossible`.

If there is a possibility to save at least d euros per year by selling at most k animals, then the output consists of:

- one line with a single integer x ($1 \leq x \leq k$), where a is the number of animals to be sold
- x lines containing the string s_i`, I'm sorry. Goodbye!`, where s_i is the name of the i-th animal to be sold.

Make sure that the order of names in the output is equal to the order of the names in the input. When there are multiple solutions, return the one that firstly has the lowest number of animals, and secondly gives Fred the most money.

Sample Input 1	**Sample Output 1**

`5 2000 3`
`John 999`
`Lyndon 450`
`Richard 1234`
`Gerald 1001`
`Jimmy 300`
	`2`
	`Richard, I'm sorry. Goodbye!`
	`Gerald, I'm sorry. Goodbye!`

Sample Input 2	**Sample Output 2**

3 5555 2 Ronald 1000 George 2000 Bill 3000	impossible