Problem F
Battle Calculator
Time limit: 3 seconds

In most of the fighting games, players can use a variety of moves to knock down opponents. The player wins when the opponent's blood (HP) dropped to 0 or below. When these moves, according to a certain order (combo), cause a lot of damage and make it impossible for the opponent to fight back, the player could get a quick victory. In order to make the game diverse, the game designer limited the moves to be launched according to previous move. For example, if the opponents blood is 1000, you have 3 moves ($fistpunch, kick, poke$) to choose from. $Fistpunch$ can knock down opponents blood for 150 and it takes 200 millisecond to launch, the move that can be followed is $kick$. $Kick$ can knock down opponents blood for 500 and it takes 1000 millisecond to launch, the move that can be followed is $fistpunch$. $Poke$ can knock down opponents blood for 20 and it takes 20 millisecond to launch, the move that can be followed is $poke$. To knock down the opponent, if the move orders are $fistpunch, kick, fistpunch$, then $kick$, which cause 1300 points of damage in 2400 millisecond, it is not as good as $kick, fistpunch$, then $kick$ because the latter one cause 1150 points of damage in only 2200 milliseconds. Now you are offered the moves data of one character in a game, please calculate a set of the fastest solution to beat up your opponent. In the case of tie of time, sort the output sequence of moves as string (blank between each move is included) and output the one with smallest lexical order.

Input Format

The first line of the input is a positive integer n ($n \leq 20$) indicating the number of test data. The first line of each data has two integers s ($0 < s \leq 30$) and HP ($0 < HP < 11000$) represent total number of moves and the components blood (HP) left at present respectively. Then, it is followed by s lines, each line contains the following information separated by a space.

- The name of the move (no more than ten characters without any space)

- The damage the move can cause ($0 < damage < 1200$). Each damage is supposed to reduce the components HP.)

- The time in millisecond (< 1050) needed for each move.

- The names of the next possible moves after the previous move (at least one and at most five, separating by a space if there are more than one.)

Output Format

Each test data output two lines. The first line is the moves sequence (each move separated by a space). The second line contains two integers, the total time needed to launch the moves, then the damage caused. If there is no way to beat it up or more than ten moves are needed, please output "impossible" (no quotation marks) in the first line and two zero in the second line.

Sample Input

```
3
3 1000
fistpunch 150 200 kick
kick 500 1000 fistpunch
poke 20 20 poke
2 2000
poke 20 20 poke push
push 20 20 push poke
2 1000
AAA 250 500 AAA
BBB 500 1000 BBB
```

Sample Output for the Sample Input

```
kick fistpunch kick
2200 1150
impossible
0 0
AAA AAA AAA AAA
2000 1000
```