

# COCI '13 Contest 4 #6 Utrka

**Time limit:** 2.0s    **Memory limit:** 32M

Mirko and Slavko are the only two contestants at the Grand Prix of Dabrovina Donja which is driven through nearby villages. The villages are connected via **one-way** roads, and for each road  $i$  we know  $M_i$  and  $S_i$ , the time necessary for Mirko and Slavko to cross that road. The race itself is circular (meaning it starts and begins in the same village), but the route itself hasn't been determined yet.

Mirko has bribed the organisers of the race so they'd pick a route in his favour. Specifically, the organisers are going to pick **the shortest route** (containing the minimal number of roads) such that Mirko is strictly faster than Slavko on that route. If, by any chance, there are several such routes, the organisers choose the one where Mirko gains **maximal** advantage.

## Input Specification

The first line of input contains two integers  $N, M$  ( $2 \leq N \leq 300, 2 \leq M \leq N \times (N - 1)$ ), the number of villages and the number of connecting roads.

Each of the following  $M$  lines contains 4 integers  $A_i, B_i, M_i, S_i$  ( $1 \leq A_i, B_i \leq N, A_i \neq B_i, 0 \leq S_i, M_i \leq 10^6$ ). Respectively, the initial and ending village of the  $i^{\text{th}}$  road, the time necessary for Mirko and the time necessary for Slavko to cross that road. There won't exist two different roads that connect the same pair of villages in the same direction.

## Output Specification

The first and only line of output must contain two integers: the shortest possible route (with the minimal number of roads) such that Mirko wins, and the maximal advantage Mirko can gain on a route of the shortest length.

**Please note:** The input data will be such that a route which meets the conditions from the text will always exist.

## Sample Input 1

```
3 4
1 2 3 0
2 3 3 0
3 1 0 100
2 1 0 4
```

## Sample Output 1

```
2 1
```

## Sample Input 2

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```
5 7
1 2 4 1
2 3 5 1
3 1 1 6
1 3 15 5
2 4 7 5
4 5 1 4
5 3 1 0
```

## Sample Output 2

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```
5 2
```