



BITWISE 2011



Traffic Safe City (Points: 300)

Mr. Bean had an exciting trip so far in his Cricket World Cup tour of India. Having seen some very interesting games so far, Mr. Bean now moves into New Delhi, the capital of India to watch the league match between India and Sri Lanka. But he's afraid of the busy roads of Delhi. So he decides to do an analysis to determine whether Delhi is traffic safe or not.

He downloads the road network of Delhi. The road network consists of some landmarks and several straight roads connecting any two landmarks. Some survey data also gives him the maximum number of cars that can be accommodated on any road of the network (approximated to the nearest power of 10) and the average number of cars at that road on a particular day. He divides the latter by former and calls it the traffic coefficient of the road. Then his decision of going to the match is based on the following conditions:

1. He does the traffic analysis only if the sum of traffic coefficients of all the roads is *equal* to $N - 1$ where N is the number of landmarks in the road network.
2. Once he decides to do the traffic analysis, he says that the road is safe if and only if, for every non-empty subset of landmarks S , the sum of traffic coefficients of all the roads whose both the ends lie in S *does not exceed* $|S| - 1$.

Input Format:

The first line gives the number of test cases T . For each test case, the first line of input contains two integers M and N . M is the number of landmarks in the network and N is the total number of roads. The landmarks are numbered from 1 to M . The next N lines contains four integers P , Q , R , S where each line represents a road. P and Q denote the endpoints of the road, R the average number of cars on that road on the day of the match and S , the maximum number of cars that can be accommodated.

Limits: $1 \leq T \leq 10000$, $1 \leq M, P, Q \leq 30$, $0 \leq N \leq 2500$, $1 \leq R, S \leq 10000$.

Output Format:

For each test case, output a single integer on a new line. Print 1, if he decides *not* to do the traffic analysis. If he decides to do the traffic analysis, then print 0 if condition (2) is satisfied and print 2 if it is not satisfied.

Sample Input:

```
3
3 3
1 2 100 100
```

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

```
2 1
1 2 99 100
```

```
4 6
1 2 20 100
1 3 20 100
1 4 2 10
2 3 8 10
2 4 8 10
3 4 8 10
```

Sample Output:

```
0
1
2
```

Instructions

- Your program should not print anything other than what is specified in the output format. A program with extraneous output (even a single space) will be treated as incorrect!
- While submitting your code, please select the language carefully *gcc/g++*. Using the wrong language will lead to compiler error.
- The only input/output functions allowed are `printf`, `scanf`, `cin`, `cout`. Perform all read/write operations through `stdin/stdout`. The solutions will be checked using command line redirection only.

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