Road Destruction

Beachistan is a country situated on a small but warm island. Lea's aunt decided to move to Beachistan some weeks ago because she hoped to have a better life there without worrying too much about money. She got a nice job in the administration of Sandington, Beachistan's capital. Unfortunately, she was wrong: It seems like money is even more important to Beachistanians than to the people at home. On her first day at work, her colleagues asked her to help them with the following problem.

Some years ago, Beachistan's government invested heavily in the country's infrastructure, and lots of new roads were built. Afterwards, people were able to get to other cities much faster, but there was one problem: Upkeeps of the road maintenance depot exploded. Therefore, the prime minister decided to close most of the roads again. He wants to shut down as many roads as possible to cut costs, but it should still be possible to reach each city from every other city. The time needed for travelling is not important since people in Beachistan tend to have lots of free time. Because he wants to be reelected in some years, he needs some nice numbers to talk about and therefore wants to close roads in such a way that the sum of the remaining roads' capacities is as big as possible. Tell him the total capacity of the roads he needs to shut down.

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

Each test case starts with a single line containing two integers n and m. n is the number of cities in Beachistan (called city 1 to city n) and m is the number of roads between them. m lines follow describing the roads. The i-th line consists of four integers a_i, b_i, x_i, and l_i meaning that the i-th road goes from city a_i to city b_i, its length is x_i and it has l_i lanes. All roads may be used in both directions. The capacity of a road is the product of its length and the number of lanes.

Output

For each test case, output one line containing "Case #i: x" where i is its number, starting at 1, and x is the sum of the capacities of the roads to be closed or the string "impossible" if there is no way to close roads in a way that each city is still reachable from each other one. In particular, if no road should be closed but the road network is still connecting all cities with each other, output 0.

Constraints

- $1 \leq t \leq 20$
- $1 \leq n \leq 1000$
- $1 \leq m \leq 10000$
- $1 \leq a_i, b_i \leq n$ for all $1 \leq i \leq m$
- $1 \leq x_i \leq 100$ for all $1 \leq i \leq m$
- $1 \leq l_i \leq 5$ for all $1 \leq i \leq m$

Sample Input 1	Sample Output 1
3 3 3 1 2 100 1 1 3 50 3 2 3 60 3 4 3 1 2 20 2 1 3 30 4 1 4 50 1 3 1 1 2 3 4	Case #1: 100 Case #2: 0 Case #3: impossible

Sample Input 2

```
7
4 9
4 4 68 1
3 2 63 3
1 4 53 1
4 2 70 2
4 2 76 5
1 3 40 4
4 2 70 2
1 3 95 1
4 1 83 1

2 9
2 2 96 3
2 1 7 2
2 2 45 5
1 1 74 3
2 1 87 5
2 2 27 3
2 2 78 2
1 1 28 5
2 1 60 3

4 8
2 4 46 4
2 2 77 5
3 1 83 3
1 3 95 4
3 3 85 1
3 4 87 2
3 2 71 3
3 2 50 1

3 4
3 3 39 1
1 1 84 3
1 3 17 5
3 2 87 2

4 2
2 3 4 1
3 2 30 2

2 6
2 1 34 2
2 2 26 4
1 2 70 3
1 2 86 2
1 2 64 4
1 1 52 3

4 4
2 3 84 1
3 4 84 2
4 2 13 1
1 4 33 5
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Sample Output 2

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Case #1: 579
Case #2: 1306
Case #3: 943
Case #4: 291
Case #5: impossible
Case #6: 710
Case #7: 13
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