Conquering Cities

There exists a kingdom with **N** cities. The evil emperor wishes to rule it. With the help of those who oppose the current ruler, he has managed to take over the capital, which is city number **0**. In this kingdom however, if a city (**u**) receives help (like food, artillery, etc) from any other city (**v**), then **u** cannot be taken over or conquered. It is obvious that if a city is taken over by the evil emperor, then that city will not help any other city fight against the evil emperor.

The capital is at level **0**. A city, **u**, is said to be at level **i** if maximum level of any city, **v**, it receives help from is **i - 1**. To capture a city at the **i**th level, the evil emperor incurs a cost equal to the **i**th prime number. What is the total cost that the evil emperor incurs?

Also, there may be cases when all the cities cannot be captured. This happens when there exists a cycle of cities that help each other.

Input:

The first line of input contains a single integer, **T**, indicating the number of test cases.

The first line of each test case contains two integers, **N** and **M** where **N** denotes the number of cities and **M**, the number of helping relations.

This is followed by **M** lines where each line contains two space separated integers, **u** and **v**. This denotes that **u** receives help from **v**.

Output:

A single integer for each test case (on a new line) which is the total cost that the evil emperor incurs. But, if all the cities cannot be conquered, output the message **"evil emperor loses"** (without double quotes).

Constraints:

$1 \leq T \leq 13$

$1 \leq N, M \leq 5 * 10^5$

$0 \leq u, v \leq N - 1$

Sample Input:
```
1
4 4
1 0
2 0
2 1
3 1
```

Sample Output:
```
8
```

Explanation:

Initially, the capital is captured. Now, **1** has no city to help it. So, **1** is at level 1 and gets captured. Once, **0** and **1** are captured, **2** and **3** have no cities to help them. So, these two cities get captured, and they are at level 2. Hence, the total cost of capturing the cities is (1st prime + 2nd prime + 2nd prime) → 2 + 3 + 3 → 8

Capital

0   Level: 0
     Cost: 0

1   Level: 1
     Cost: 2

2   3

Level: 2   Level: 2
Cost: 3   Cost: 3

u

v

Indicates city v helps city u