# Sum of Cubes

Problem Code: **SUMCUBE**

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You are given an undirected graph **G** = (**V**, **E**). We define a function **f**(**s**) for **s** ⊆ **V** to be the number of edges in the induced subgraph (https://en.wikipedia.org/wiki/Induced_subgraph) of **s**.

The problem asks you to calculate the sum of $\mathbf{f}(\mathbf{s})^{\mathbf{k}}$ over all **s** in $2^{|\mathbf{V}|}$ subsets of **V**.

As the answer could be very large, output it modulo ($10^9+7$).

## Input

The first line of input contains an integer **T** denoting the number of test cases.

For each test case, the first line contains three space-separated integers **n** = |**V**|, **m** = |**E**| and **k**.

Then **m** lines follow, each line contains two space-separated integers **u**, **v** denoting an edge (**u**, **v**) is in **E**.

## Output

For each test case, output one line containing one integer, the answer modulo ($10^9+7$).

## Constraints

- **1 ≤ T ≤ 100**
- **2 ≤ n ≤ $10^5$**
- **0 ≤ m ≤ $10^5$**
- Sum of each of **n, m** over all test cases ≤ **3 * $10^5$**
- **1 ≤ u, v ≤ n**.
- **1 ≤ k ≤ 3**.
- The graph is simple, i.e., doesn't contain self loops and multiple edges.

## Subtasks

- **Subtask #1 (8 points)**: **T, n ≤ 15**
- **Subtask #2 (7 points)**: **k = 1**
- **Subtask #3 (9 points)**: **k = 2**
- **Subtask #4 (15 points)**:
  - **k = 3**.
  - Sum of **n** over all test cases ≤ **300**
  - Sum of **m** over all test cases ≤ **300**

- **Subtask #5 (24 points)**:
  - **k = 3**.
  - Sum of **n** over all test cases ≤ **3000**
  - Sum of **m** over all test cases ≤ **3000**

- **Subtask #6 (37 points)**: Original Constraints

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## Example

```
Input:
3
3 3 1
1 2
2 3
3 1
4 5 2
1 2
2 3
3 4
4 1
2 4
5 4 3
1 2
1 3
1 4
2 5

Output:
6
56
194
```

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## Explanation

**Example case 1.**

**f**(emptyset) = **f**({1}) = **f**({2}) = **f**({3}) = 0;

**f**({1, 2}) = **f**({2, 3}) = **f**({3, 1}) = 1

**f**({1, 2, 3}) = 3.

So the answer is 1 + 1 + 1 + 3 = 6.

**Example case 2.**

The nonzero **f**'s are as follows

**f**({1, 2}) = **f**({2, 3}) = **f**({3, 4}) = **f**({4, 1}) = **f**({2, 4}) = 1

**f**({1, 2, 3}) = **f**({1, 3, 4}) = 2

**f**({1, 2, 4}) = **f**({2, 3, 4}) = 3

**f**({1, 2, 3, 4}) = 5

So the answer is $5 * 1^2 + 2 * 2^2 + 2 * 3^2 + 5^2 = 56$.


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Date Added: 4-08-2017

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