

# The Value of Friendship

You're researching friendships between groups of  $n$  new college students where each student is distinctly numbered from 1 to  $n$ . At the beginning of the semester, no student knew any other student; instead, they met and formed individual friendships as the semester went on. The friendships between students are:

- *Bidirectional*. If student  $a$  is friends with student  $b$ , then student  $b$  is also friends with student  $a$ .
- *Transitive*. If student  $a$  is friends with student  $b$  and student  $b$  is friends with student  $c$ , then student  $a$  is friends with student  $c$ . In other words, two students are considered to be friends even if they are only indirectly linked through a network of mutual (i.e., directly connected) friends.

The purpose of your research is to find the maximum total value of a group's friendships, denoted by *total*. Each time a direct friendship forms between two students, you sum the number of friends that *each* of the  $n$  students has and add the sum to *total*.

You are given  $q$  queries, where each query is in the form of an unordered list of  $m$  distinct direct friendships between  $n$  students. For each query, find the maximum value of *total* among all possible orderings of formed friendships and print it on a new line.

## Input Format

The first line contains an integer,  $q$ , denoting the number of queries. The subsequent lines describe each query in the following format:

1. The first line contains two space-separated integers describing the respective values of  $n$  (the number of students) and  $m$  (the number of distinct *direct* friendships).
2. Each of the  $m$  subsequent lines contains two space-separated integers describing the respective values of  $x$  and  $y$  (where  $x \neq y$ ) describing a friendship between student  $x$  and student  $y$ .

## Constraints

- $1 \leq q \leq 16$
- $1 \leq n \leq 10^5$
- $1 \leq m \leq \min(\frac{n \cdot (n-1)}{2}, 2 \times 10^5)$

## Output Format

For each query, print the maximum value of *total* on a new line.

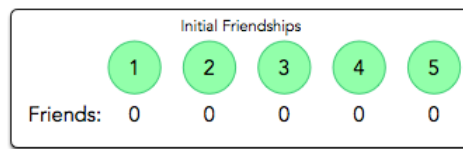
## Sample Input 0

```
1
5 4
1 2
3 2
4 2
4 3
```

## Sample Output 0

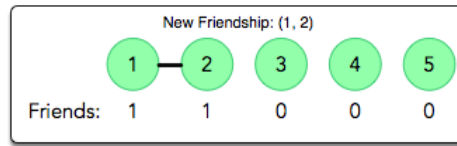
```
32
```

## Explanation 0



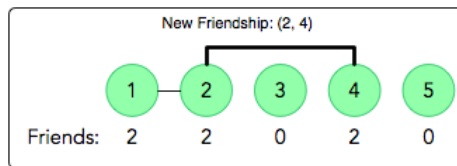
The value of **total** is maximal if the students form the  $m = 4$  direct friendships in the following order:

1. Students **1** and **2** become friends:



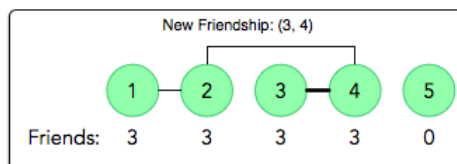
We then sum the number of friends that each student has to get  $1 + 1 + 0 + 0 + 0 = 2$ .

2. Students **2** and **4** become friends:



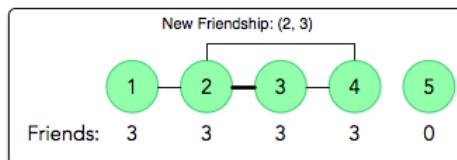
We then sum the number of friends that each student has to get  $2 + 2 + 0 + 2 + 0 = 6$ .

3. Students **3** and **4** become friends:



We then sum the number of friends that each student has to get  $3 + 3 + 3 + 3 + 0 = 12$ .

4. Students **3** and **2** become friends:



We then sum the number of friends that each student has to get  $3 + 3 + 3 + 3 + 0 = 12$ .

When we add the sums from each step, we get **total** =  $2 + 6 + 12 + 12 = 32$ . We then print **32** on a new line.