Problem G
Extra Transition
Time limit: 3 seconds

You are developing a game consisting of n levels, numbered from 1 to n. Levels are connected by a *transition network* consisting of m transitions, numbered from 1 to m. Transition k connects levels a_k and b_k bidirectionally ($1 \le k \le m$).

A single run of the game starts at level 1. Each time a player enters a new level, the player must complete it and then move to another level that is directly connected by a transition and has not been completed in the run. The run ends successfully when level n is completed.

A sequence of pairwise distinct levels starting from level 1 and ending at level n is called a *successful path* if a player can complete the levels in the order given by the sequence in a single run.

A transition network is *well-designed* if it satisfies both of the following:

- For any level i ($2 \le i \le n-1$), there exists a successful path containing level i.
- For any pair of levels i and j ($2 \le i < j \le n-1$), at most one of the following holds:
  - There exists a successful path containing levels i and j with level i appearing before level j.
  - There exists a successful path containing levels i and j with level j appearing before level i.

Your *first* task is to determine whether the given transition network is well-designed or not.

If the network is well-designed, you have a *second* task. Let S be the set of pairs of integers (i, j) ($1 \le i < j \le n$) such that levels i and j are not directly connected and adding a bidirectional extra transition between them keeps the network well-designed. You are interested in the set S. You are given a sequence of n integers $w_1, \ldots, w_n$. As a summary of S, compute the following sum:

$$\sum_{(i,j)\in S} w_i w_j.$$

Input

The first line of input contains one integer t ($1 \le t \le 50\,000$) representing the number of test cases. After that, t test cases follow. Each of them is presented as follows.

The first line of each test case contains two integers n and m ($3 \le n \le 200\,000$; $n - 1 \le m \le 200\,000$).

The second line contains n integers $w_1, w_2, \ldots, w_n$ ($1 \le w_i \le 5000$ for all i).

The k-th of the next m lines contains two integers a_k and b_k ($1 \le a_k < b_k \le n$; $(a_k, b_k) \ne (a_\ell, b_\ell)$ for all $k \ne \ell$).

The input guarantees that the transition network is *connected*; for any levels i and j ($i \ne j$), there exists a sequence of transitions leading from level i to level j.

The sum of n across all test cases in one input file does not exceed 200 000.

The sum of m across all test cases in one input file does not exceed 200 000.

Output

For each test case, if the transition network is not well-designed, output `bad`. Otherwise, output the sum defined above.

Sample Input #1

```
3
4 4
1 2 3 4
1 2
1 3
2 4
3 4
3 2
2026 3 9
1 3
2 3
10 11
15 51 82 49 1 55 45 5 25 91
7 10
1 6
2 5
4 7
3 8
1 9
4 6
2 10
3 9
5 9
2 8
```

Sample Output #1

```
4
bad
23336
```

Explanation for the sample input/output #1

For the first test case, the given transition network is well-designed. Possible candidates for adding extra transitions (i, j) are $(1, 4)$ and $(2, 3)$.

- For $(1, 4)$, adding a transition between them keeps the network well-designed.
- For $(2, 3)$, on the other hand, adding a transition between them does not keep the network well-designed. There exist two successful paths $(1, 2, 3, 4)$ and $(1, 3, 2, 4)$. The second condition for the pair of levels 2 and 3 is not satisfied.

Thus, the answer is $w_1 w_4 = 1 \times 4 = 4$.

For the second test case, the given transition network is not well-designed because there is no successful path containing level 2.