

## 5992. Maximum Good People Based on Statements

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There are two types of persons:

- The **good person**: The person who always tells the truth.
- The **bad person**: The person who might tell the truth and might lie.

You are given a **0-indexed** 2D integer array `statements` of size `n x n` that represents the statements made by `n` people about each other. More specifically, `statements[i][j]` could be one of the following:

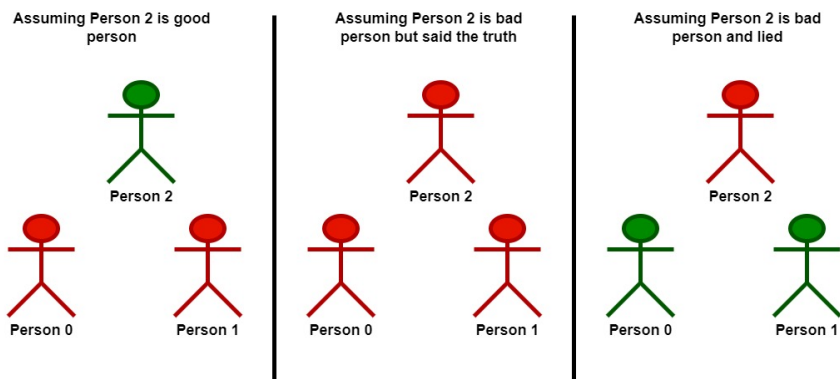
- `0` which represents a statement made by person `i` that person `j` is a **bad** person.
- `1` which represents a statement made by person `i` that person `j` is a **good** person.
- `2` represents that **no statement** is made by person `i` about person `j`.

Additionally, no person ever makes a statement about themselves. Formally, we have that `statements[i][i] = 2` for all  $0 \leq i < n$ .

Return the **maximum** number of people who can be **good** based on the statements made by the `n` people.

User Accepted:	0
User Tried:	0
Total Accepted:	0
Total Submissions:	0
Difficulty:	Hard

### Example 1:



**Input:** `statements = [[2,1,2],[1,2,2],[2,0,2]]`

**Output:** 2

**Explanation:** Each person makes a single statement.

- Person 0 states that person 1 is good.
- Person 1 states that person 0 is good.
- Person 2 states that person 1 is bad.

Let's take person 2 as the key.

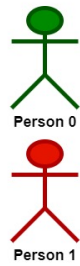
- Assuming that person 2 is a good person:
  - Based on the statement made by person 2, person 1 is a bad person.
  - Now we know for sure that person 1 is bad and person 2 is good.
  - Based on the statement made by person 1, and since person 1 is bad, they could be:
    - telling the truth. There will be a contradiction in this case and this assumption is invalid.
    - lying. In this case, person 0 is also a bad person and lied in their statement.
  - Following that person 2 is a good person, there will be only one good person in the group.**
- Assuming that person 2 is a bad person:
  - Based on the statement made by person 2, and since person 2 is bad, they could be:
    - telling the truth. Following this scenario, person 0 and 1 are both bad as explained before.
      - Following that person 2 is bad but told the truth, there will be no good persons in the group.**
    - lying. In this case person 1 is a good person.
      - Since person 1 is a good person, person 0 is also a good person.
      - Following that person 2 is bad and lied, there will be two good persons in the group.**

We can see that at most 2 persons are good in the best case, so we return 2.

Note that there is more than one way to arrive at this conclusion.

### Example 2:

Assuming Person 0 is good person



Assuming Person 0 is bad person but said the truth



Assuming Person 0 is bad person and lied



**Input:** statements = [[2,0],[0,2]]

**Output:** 1

**Explanation:** Each person makes a single statement.

– Person 0 states that person 1 is bad.

– Person 1 states that person 0 is bad.

Let's take person 0 as the key.

– Assuming that person 0 is a good person:

– Based on the statement made by person 0, person 1 is a bad person and was lying.

– **Following that person 0 is a good person, there will be only one good person in the group.**

– Assuming that person 0 is a bad person:

– Based on the statement made by person 0, and since person 0 is bad, they could be:

– telling the truth. Following this scenario, person 0 and 1 are both bad.

– **Following that person 0 is bad but told the truth, there will be no good persons in the group.**

– lying. In this case person 1 is a good person.

– **Following that person 0 is bad and lied, there will be only one good person in the group.**

We can see that at most, one person is good in the best case, so we return 1.

Note that there is more than one way to arrive at this conclusion.

#### Constraints:

- $n == \text{statements.length} == \text{statements}[i].\text{length}$
- $2 \leq n \leq 15$
- $\text{statements}[i][j]$  is either 0, 1, or 2.
- $\text{statements}[i][i] == 2$

JavaScript



```
1 const bitCount = (n) => { n = n - ((n >> 1) & 0x55555555); n = (n & 0x33333333) + ((n >> 2) & 0x33333333); return
2 ((n + (n >> 4) & 0xF0F0F0F) * 0x1010101) >> 24; };
3
4 const maximumGood = (g) => {
5   let n = g.length, res = Number.MIN_SAFE_INTEGER;
6   outer:
7   for(let i = 0; i < 1 << n; i++) {
8     for (let j = 0; j < n; j++) {
9       for (let k = 0; k < n; k++) {
10        if (g[j][k] == 2) continue;
11        if (i & (1 << j)) {
12          if (i & (1 << k)) {
13            if (g[j][k] == 0) continue outer;
14          } else {
15            if (g[j][k] == 1) continue outer;
16          }
17        }
18      }
19      res = Math.max(res, bitCount(i));
20    }
21    return res;
22  };
```

☐ Custom Testcase

Use Example Testcases

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