Noctem Virtual II Sample Problems

1. The contest will contain two divisions: Division 1 (harder) and Division 2 (easier).

2. These problems should be used to gauge the general difficulty of each division.

Problem:
Anuj is struggling on his Java test and wants to get good. There are N ($1 \leq N \leq 10^5$) problems in the contest that each take 1 unit of time to solve, and the i-th problem is initially worth P_i ($1 \leq P_i \leq 10^9$) points and degrades D_i ($1 \leq D_i \leq 10^9$) points per unit of time. Anuj receives the points of a problem after he solves it. Since Anuj cannot figure it out himself, help him find the maximum score he can achieve if he solves the problems in an optimal order. Note that nothing prevents Anuj from getting a negative score.

Input Format:
The first line contains N ($1 \leq N \leq 10^5$), the number of questions. Each of the next N lines contains P_i and D_i ($1 \leq P_i, D_i \leq 10^9$).

Output Format:
The maximum score Anuj can achieve if he solves the questions in an optimal order.

Sample Input:
3
69 5
2 7
13 2

Sample Output:
61

Credits: Steven Tan

Division 1 - Hedge Maze

Problem:
Anuj has constructed a large hedge maze with dimensions N ($1 \leq N \leq 2000$) by M ($1 \leq M \leq 2000$). However, he is trash at designing mazes and has made one very minor error : the entrance and exit are not connected. He goes in one opening and is determined to leave the other. He can cut down any hedge in his way except for the ones on the perimeter. Find the minimum number of hedges he must cut down in order to have a clear path from start to finish. It is guaranteed that there are only two holes in the outermost hedges. He **must** go in one and leave the other. **FREE MY MANS**

Input Format:
The first line contains N ($1 \leq N \leq 2000$) and M ($1 \leq M \leq 2000$), the dimensions of the maze. The next N lines contain M characters that are either an uppercase character X, representing a hedge, or an uppercase character O, representing an empty space.

Output Format:
The minimum number of hedges to cut down.

Sample Input:
4 5
X X X O X
X O O O X
O X X O X
X X X X X

Sample Output:
1

Credits: Marco Frigo