

Arrangement

SEASON 6 – ROUND TWO – 150 points



A few days ago Ivancho's lab was destroyed and now he must rebuild it. For this purpose he has N shelves, i -th shelf consists of A_i spaces. He wants to put on them his new M flasks.

Because of the fact that the flasks contain suspicious substances, it is a good practice to put flasks on the same shelf as far from each other as possible. The distance between two flasks is the number of free spaces between them – for example, two flasks on adjacent spaces are 0 distance away from each other.

But because, as always, something has to get messy, Ivancho is now facing another problem. The new shelves are not chemically neutral and influence the substances in the flasks. More precisely, the j -th space of the i -th shelf has a coefficient of chemical reactivity B_{ij} . The negative coefficients have low reactivity and the positive – high reactivity. For safety reasons, Ivancho wants the sum of coefficients of all spaces where flasks are placed to be negative.

Each arrangement of the flasks on shelves is characterized by the minimal distance between any two flasks (the distance between the closest flasks). Ivancho wants to know the maximal such distance among all valid arrangements. He also wants to know the minimal sum of coefficients of chemical reactivity for this maximal distance.

Input

The first line of the input file `arrange.in` contains the integers N and M . N lines follow. Each of them starts with a positive number A_i , determining the number of spaces in the current shelf, followed by A_i numbers, setting the coefficients of chemical reactivity - B_{ij} .

Output

In the output file `arrange.out` write two integers separated by a space – the maximal distance and the minimal sum of coefficients of chemical reactivity which can be reached for this maximal distance.

If Ivancho cannot arrange his laboratory at all, output -1.

Constraints

$$1 \leq N \leq 100$$

$$N \leq M \leq 1000$$

The sum of all sizes of shelves does not exceed 1000.

The absolute value of the coefficients of chemical reactivity does not exceed 1000.

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Time limit: 1 sec

Memory limit: 256 MB

Example

Input (arrange.in)	Output (arrange.out)
2 3 5 10 1 1 1 -1 5 -1 1 1 -1 2	2 -3
1 10 10 -1 -1 -1 -1 -1 -1 -1 -1 -1 9	-1

Explanation

First example: Ivancho will place his three flasks on 5th position on the first shelf and on 1st and 4th position on the second shelf. In this way, the minimal distance between any two flasks is the distance between the second and the third flask and equals 2.

Second example: In order to have enough space, Ivancho would need to place a flask on every position of the shelf and so the sum of coefficients of chemical reactivity would equal 0, which does not satisfy the safely condition.