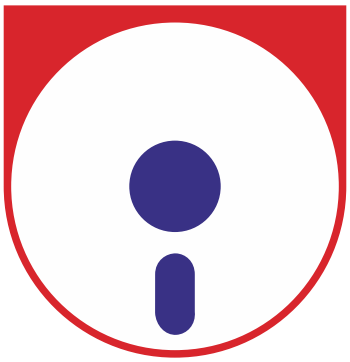


Croatian Open Competition in Informatics

Round 5, February 21st 2026

Tasks

Task	Time limit	Memory limit	Score
Škare	3 seconds	512 MiB	50
Weight	2 seconds	512 MiB	70
Pet	1 second	512 MiB	110
Slaganje	1 second	512 MiB	110
Structure	1 second	512 MiB	110
Total			450

Task Škare

Wanting to perfect his scissors using skills, Fran came up with a new exercise. He got himself a paper strip of length n centimetres and, of course, a pair of scissors. He also asked Lana to assist him for the exercise.

Lana will give Fran k instructions of the following type: "Cut the x-th strip at l centimetres". At the beginning, Fran has one strip. After the first action, he will have two strips: the first strip l centimetres long, and the second one $n - l$ centimetres long (the remainder of the original strip). After that, Fran will cut either the first or the second strip - depending on Lana's instruction. Each time he cuts a strip, the two new pieces replace the original strip in the sequence.

More formally, suppose Fran has m strips of lengths $a_1, a_2, ..., a_m$. If Lana tells him to cut the x-th strip at l centimetres, the new sequence of strip lengths becomes: $a_1, a_2, ..., a_{x-1}, l, a_x - l, a_{x+1}, ..., a_m$.

After performing all cuts, he and Lana want to verify the cutting process. One way to do that is to count how many distinct strip lengths there are at the end. Your task is to compute this number.

Input

The first line contains two natural numbers n and k ($2 \leq n \leq 500, 1 \leq k < n$), the length of the original strip and the number of instructions Lana gives Fran.

Each of the following k lines contains two natural numbers x_i and l_i ($1 \leq x_i \leq i, 1 \leq l_i \leq L - 1$, where L is the length of the x_i-th strip at that moment). These numbers indicate that Fran should cut the x_i-th strip at l_i centimetres (counting strips from the beginning).

Output

In the first and only line, write one number - the number of distinct strip lengths that Fran will be left with after he performs all the cuttings.

Scoring

Subtask	Points	Constraints
1	9	$k \leq 3$
2	6	$l_i = 1$ for all $i = 1, ..., k$
3	13	$x_i = i$ for all $i = 1, ..., k$
4	22	No additional constraints.

Examples

input

```
5 1
1 2
```

output

```
2
```

input

```
6 2
1 4
1 2
```

output

```
1
```

input

```
10 3
1 2
2 3
3 2
```

output

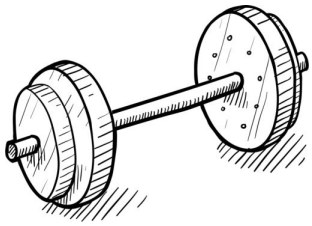
```
2
```

Clarification of the first example:
$[\mathbf{5}] \to [\underline{2, 3}]$

Clarification of the second example:
$[\mathbf{6}] \to [\underline{4, 2}] \to [\mathbf{4}, 2] \to [\underline{2, 2}, 2]$

Clarification of the third example:
$[\mathbf{10}] \to [\underline{2, 8}] \to [2, \mathbf{8}] \to [2, \underline{3, 5}] \to [2, 3, \mathbf{5}] \to [2, 3, 2, 3]$

Task Težina



Strong Karlo is in the gym. An array a of n numbers is given, where each number represents the weight of one item in front of Karlo. An integer k is also given, representing the number of different weights Karlo can use.

For each weight type from 1 to k and for each item in the array, Karlo does the following:

1. Divide the item's weight by the weight type and record the **integer part of the division** (discard the fractional part).
2. Multiply the obtained integer by the item's weight increased by 2. If the resulting number is greater than 10^8, Karlo replaces it with 10^8.
3. Sum all obtained numbers for that weight type. The obtained sum is called the **strength** of that weight type.

Karlo is interested in the sum of strengths of all weight types in the gym. Since Karlo does not have time to calculate it, help him solve his problem.

Input

The first line contains the natural numbers n and k ($1 \leq n, k \leq 10^5$), the number of items in front of Karlo and the number of weight types Karlo can use.

The second line contains an array of n numbers ($1 \leq a_i \leq 10^5$), the weights of the items in front of Karlo.

Output

Print a single number, the answer to the question from the problem statement.

Scoring

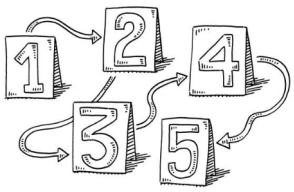
Subtask	Points	Constraints
1	17	$k \leq 300$
2	19	The array a will contain at most 300 distinct values.
3	34	No additional constraints.

Sample tests

input	**input**	**input**
1 2 2	2 1 3 4	7 19 1 2 3 4 5 6 7
output	**output**	**output**
12	39	414

Clarification of the second sample test: Karlo will transform the number 3 into $3 \cdot 5 = 15$, and the number 4 into $4 \cdot 6 = 24$. Their sum equals 39.

Task Pet



Frog Maša is in a lake represented by a matrix with n rows and m columns. The cells of the matrix are marked with 0 (water) or 1 (water lily). From one water lily, Maša can jump to any other water lily in the same row or column. If in the previous jump Maša changed the column she was in, then in the next jump she must change the row she is in. If in the previous jump Maša changed the row she was in, then in the next jump she must change the column she is in. After Maša jumps from the water lily she is currently on, it sinks and can no longer be jumped on.

Maša likes to have fun and wants to visit a total of 5 water lilies along her path (including the starting water lily).

Help her and calculate in how many ways she can do this if she can choose any water lily as her starting point. Two paths are considered different if the positions of their first, second, third, fourth, or fifth water lilies differ.

Input

The first line contains the natural numbers n and m ($1 \leq n, m \leq 2000$), as described in the problem statement.

In each of the following n lines there are m characters, which are either 0 or 1 and represent the cells of the lake.

Output

Print a single number, the answer to the question from the problem statement.

Scoring

Subtask	Points	Constraints
1	8	$n, m \leq 4$
2	27	$n, m \leq 10$
3	58	$n, m \leq 400$
4	17	No additional constraints.

Examples

input

```
2 3
111
110
```

output

```
4
```

input

```
4 4
1111
1111
1111
1111
```

output

```
2304
```

input

```
2 5
11110
01111
```

output

```
48
```

Clarification of the first example: The 4 possible jump paths on water lilies are:
$[1,1] \to [2,1] \to [2,2] \to [1,2] \to [1,3]$

$[1,2] \to [2,2] \to [2,1] \to [1,1] \to [1,3]$

$[1,3] \to [1,2] \to [2,2] \to [2,1] \to [1,1]$

$[1,3] \to [1,1] \to [2,1] \to [2,2] \to [1,2]$

Task Slaganje

Mr. Malnar has ordered a tree with N vertices labeled with integers $1, 2, ..., N$. Unfortunately, there was a misunderstanding between Mr. Malnar and the sender so Mr. Malnar recieved N copies of the ordered tree.

While waiting for an answer from the sender, Mr. Malnar started placing trees around a regular polygon with N vertices also labeled with integers $1, 2, ..., N$. More precisely, he placed every vertex of every tree on some vertex of the polygon such that no two vertices belonging to the same tree were placed on the same vertex of the polygon.

Mr. Malnar quickly realized that all diagonals and all sides have been covered by edges. To make sure it was not a coincidence, he tried achieving the same result again from scratch. This turned out to be too difficult for him so Mr. Malnar asks for your help!

Formally, Mr. Malnar is looking for integers (p_{ij}) $1 \leq i, j \leq N$ such that for every $i = 1, ..., N$ the array $a_j := p_{ij}, 1 \leq j \leq N$ is a permutation of integers $1, 2, ..., N$ and that for every $1 \leq i < j \leq N$ there exists an integer k such that the edge between vertices p_{ki} and p_{kj} is a part of the ordered tree.

It can be proven that such a collection of integers exists for every tree.

Input

The first line contains an integer N $(3 \leq N \leq 2000)$, the number of vertices in the tree/polygon.

Each of the following $N-1$ lines contains two integers u and v $(1 \leq u, v \leq N)$, labels of vertices connected by an edge in the tree.

Output

Output integers (p_{ij}) in N rows.

In the i-th row output integers $p_{i1}, p_{i2}, ..., p_{iN}$ in that order.

Scoring

Subtask	Points	Constraints
1	10	There exists a vertex u that is a part of every edge.
2	15	$N \leq 10$
3	20	The tree is a path graph.
4	25	$N \leq 300$
5	40	No additional constraints.

Examples

input

```
3
1 2
1 3
```

output

```
2 3 1
1 2 3
3 1 2
```

input

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

output

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

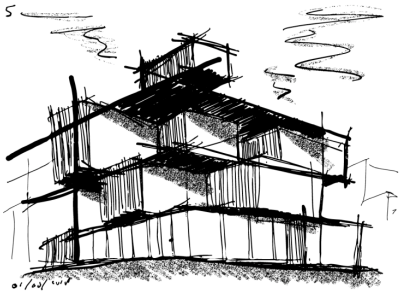
input

```
8
1 2
1 3
2 4
2 5
3 6
4 7
5 8
```

output

```
8 1 5 4 3 6 2 7
4 3 6 2 7 8 1 5
2 7 8 1 5 4 3 6
1 5 4 3 6 2 7 8
3 6 2 7 8 1 5 4
7 8 1 5 4 3 6 2
6 2 7 8 1 5 4 3
5 4 3 6 2 7 8 1
```

Task Struktura



Petar and Ivana are bored during a long winter afternoon, so they decided to invent a game with numbers.

Petar takes a sheet of paper and randomly writes down n numbers. Each number is chosen **completely at random and independently** among the integers from 1 to k. Using this procedure, Petar creates an array a of n numbers.

Ivana says that she especially likes some arrays because they have a "hidden balance", and she calls them structures. An array is a structure if the following conditions are satisfied:

- Every number from 1 to n appears in the array exactly once.
- For every index i ($1 \leq i \leq n$), it holds that $|a_i + i - n - 1| \leq 1$.

Ivana is interested in the probability that Petar, choosing the numbers completely at random, constructs an array that is a structure.

It can be proven that the answer can always be represented as a fraction $\frac{P}{Q}$, where P is an integer and Q is a positive integer not divisible by $10^9 + 7$. In that case, output $P \cdot Q^{-1} \pmod{10^9 + 7}$.

Input

The first line contains the natural numbers n and k ($1 \leq n, k \leq 10^9$), the numbers from the problem statement.

Output

Output a single number, the answer to the question from the problem statement.

Scoring

Subtask	Points	Constraints
1	17	$n, k \leq 7$
2	23	$n \leq 7, k \leq 100$
3	19	$n \leq 20, k \leq 100$
4	25	$n, k \leq 10^6$
5	26	No additional constraints.

Examples

input	**input**	**input**
2 1	2 2	7 94
output	**output**	**output**
0	500000004	100976822

Clarification of the second example: The arrays a that Petar can construct are: $(1, 1)$, $(1, 2)$, $(2, 1)$, $(2, 2)$. The arrays that are structures are $(1, 2)$ and $(2, 1)$. The probability that Petar completely at

random obtains an array that is a structure is $\frac{2}{4}$, i.e. $500000004 \pmod{10^9+7}$.