Plano West Wolf Invitational 2020

General Rules

1. Do the problems in any order you like.
2. Problems may each have a different point value, and they are listed on the table of contents and below the title of each problem.
3. Teams will be ranked by their total points first. In case of a tie, teams will be ranked by their total time.
4. Incorrect submissions can be resubmitted, but a team will receive a 10 minute penalty for each incorrect submission, which is added to their total time used.

Lisa Broke Up

5 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Lisa broke up with her boyfriend on Valentine's day. She is very sad and needs to update her social media followers right **NOW**. Since she cannot express her emotion in words, she wants to use an ASCII art sad pepo frog as her caption. Lisa is very particular with her captions. Help Lisa make her sad pepo frog.

Input Format

None

Constraints

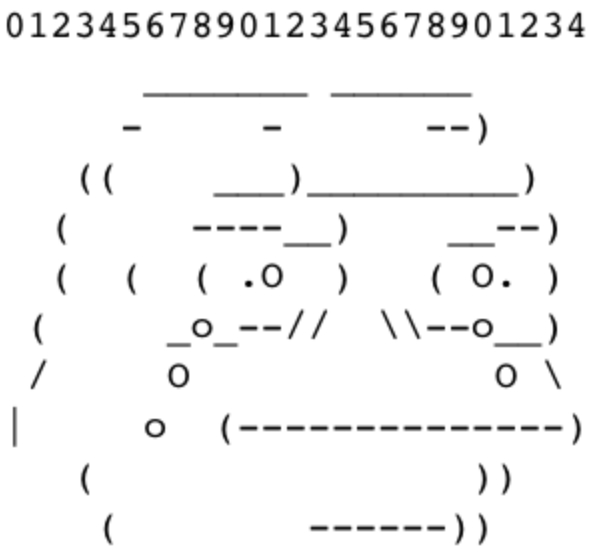
None

Output Format

Print the Ascii art in the packet.

DO NOT PRINT the numbers above the Ascii art.

Sample I/O



Valentine Gift

10 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Danny is making gifts for programmers on Valentine's Day. He has three types of items: necklaces, bouquets of flowers, and chocolates. He has decided that each gift should contain 1 necklace, 2 bouquets of flowers, and 4 chocolates.

However, he has a limited number of each item, so you will help him determine the maximum number of gifts he can make.

Input Format

There will be one line with three numbers. The first number is N, the number of necklaces. The second number is B the number of bouquets of flowers. The third number is C, the number of chocolates.

Constraints

$1 \leq N, B, C \leq 10^9$.

Output Format

Output a single integer, the number of gifts he can make.

Sample I/O

Input	Output
2 3 7	1

Explanation

Danny can only make 1 gift since he needs at least 2 necklaces, 4 bouquets of flowers, and 8 chocolates for 2 gifts.

Oracle

10 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Max is unsure if Kevin loves him or not. To settle his uncertainty, Max visits an oracle and asks "Does Kevin love me?" Oracles are never straightforward, so it answers with "He does not not ... not love you", where there are some number of "not"s in the oracle's response. Max wasn't listening carefully, but you were, so help Max determine what the oracle really means. (Assume that two occurrences of "not" are equivalent to no "not"s at all.)

To complicate matters, however, the Oracle is growing old and sometimes accidentally interjects words other than "not" (for example, "notnot") into its predictions. These do not contribute to the Oracle's meaning.

Input Format

The only line of input will be a sentence of the form "He does [...] love you", where [...] could contain either "not"s or other strings.

Constraints

There will be at least 1 and at most $100,000$ total words in the oracle's response. The oracle is reasonable, you know.

Output Format

Output "LOVE" or "SAD" to indicate the oracle's true meaning.

Sample I/O

Input	Output
`He does not love you`	`SAD`

Explanation

Max is sad because Kevin does not love him.

Hop-scotch

20 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Max was recently rejected by his would-be Valentine. A moment of silence, please.

To come to terms with his feelings and contemplate his self-worth, Max is playing hopscotch on a special set of stones. These stones are arranged in a circle, and each one is labeled with a positive integer. Max hops across the stones as follows: Max begins on a certain stone. To perform a jump, Max observes the label J_i on his current stone, and moves J_i stones clockwise around the circle. In this way, the stones determine Max's sequence of jumps.

If Max ever lands on his starting stone, he has an epiphany about his identity and stops the game. Your task is to determine if Max ever stops the game.

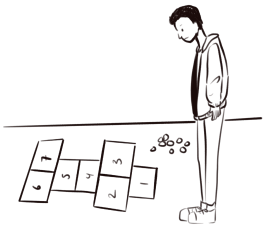
Input Format

The first line of input will contain two space-separated integers N and M, where N represents the number of stones around the circle and M indicates that Max starts on the Mth stone.

The next N lines will contain the integers J_1, J_2, . . . , J_N, where J_i indicates the label on the ith stone in clockwise order around the circle. Note that the J_i are not necessarily at most N.

Constraints

$1 \leq N \leq 10^4$,
$1 \leq M \leq N$,
$1 \leq J_i \leq 10^4$ for each $1 \leq i \leq N$.



Output Format

Output "YES" or "NO" to indicate whether or not Max stops the game.

Sample I/O

Input	Output
5 1 2 4 1 2 1	YES

Explanation

Max begins on the 1st stone, hops twice to reach the 3rd stone, hops once to reach the 4th stone, and then hops twice more to return to the 1st stone.

Jam

20 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Having developed a profound understanding of his strengths and weaknesses, Max decides to celebrate his 18th year of his proud single status. As such, he has baked a delicious, two-dimensional, rectangular cake with integer height H and integer width W. Max would like to decorate it in the following way: first, he will make h horizontal cuts and v vertical cuts. This divides the cake into an uneven grid of rectangular pieces. Then, Max will apply strawberry jam to the pieces in checkerboard fashion: the upper-left piece gets jam, while the pieces beneath it and to its right do not get jam, and so on.

Help Max determine the total area of the cake that he covers with strawberry jam.

Input Format

The first line of input will contain four space-separated integers: H, W, h, and v. The next h lines will contain distinct integers $y_1, \ldots, y_h\,(1 \leq y_i < H)$ to describe the horizontal cuts: Max makes the ith horizontal cut y_i units below the top edge of the cake. The final v lines will contain distinct integers $x_1, \ldots, x_v\,(1 \leq x_i < W)$ to describe the vertical cuts: Max makes the ith vertical cut x_i units to the right of the left edge of the cake.

Constraints

$1 \leq H, W \leq 1000$,
$1 \leq h < H, 1 \leq v < W$.

Output Format

Output an integer indicating the area of strawberry jam that Max will cover.

Sample I/O

Input	Output
5 4 3 2 1 3 4 1 2	9

Explanation

In this example, Max covers three 1x1 pieces and three 2x1 pieces, so he will need 9 square units of strawberry jam.

MooForces

20 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Bessie, being the expert programmer she is, has recently created her own competitive programming platform, whose premise she believes is completely original: MooForces! Clearly, users of MooForces are spending their time wisely instead of, say, chasing hopeless romance.

MooForces hosts contests on a somewhat regular basis, during which programming enthusiasts from all over the world log on to solve challenging algorithmic problems. However, Bessie may not be as good at programming as she thinks; she is having trouble coming up with an algorithm to determine the winners of each contest.

The final placement for each player i is first determined by his/her integer score S_i (higher is better). Tiebreakers are as follows, in order of precedence: number of incorrect submissions I_i (lower is better), and time of last submission T_i (lower is better). If all numeric metrics are identical between several players, output them in alphabetical order.

Given that, in a certain contest, N people participate ($1 \leq N \leq 5 \cdot 10^5$) and only M people will win prizes at the end ($1 \leq M \leq N$), help Bessie write an algorithm that accepts data about each competitor and outputs the names of the M winners in sorted order.

Input Format

The first line of input contains N and M.
Each of the next N lines each contain integers A_i, S_i, I_i, and T_i.

Constraints

$1 \leq N \leq 5 \cdot 10^5$,
$1 \leq M \leq N$.

Output Format

Output M lines, each containing a player's name. The names should be sorted such that the first-place winner is at the top and the last-place winner is at the bottom.

Sample I/O

Input	Output
5 3 Bessie 15 2 126 Elsie 12 5 161 Max 12 3 45 Daniel 9 10 190 Kevin 3 15 34	Bessie Max Elsie

Explanation

Bessie scores the most number of points. While Max and Elsie tie in points, Max makes fewer mistakes.

Align

30 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Max's mind has been fuddled by lovely thoughts of a certain someone! Help Max clear his mind (so he can focus on self-care).

Max's thoughts are represented by a string of angle-brackets (< or >). His clarity of thought depends on the longest set of contiguous, same-direction angle brackets: the longer it is, the more aligned he is with his inner self. To help Max, you are allowed to pick one character and toggle it: change a < to a > or vice versa. Determine the length of the maximum possible contiguous set of same-direction angle brackets in the resulting string. Note that you may choose not to toggle any character.

Input Format

The only line of input will be a string of angle brackets of length N.

Constraints

$1 \leq N \leq 10^6$.

Output Format

Output an integer representing the length of the maximum achievable contiguous set of same-direction angle brackets.

Sample I/O

Input	Output
<><><><>><	5

Explanation

Max can flip the 7th character from > to <.

Busy Day

30 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Max is very busy today. In a single 24-hour period (beginning at time 0 and ending at time 24), he has M errands to run. To complicate things, Max has a date with his girlfriend today! (passerby would later remark that they noticed a lonely young man waiting at a local Starbucks that day.) Max can take care of his errands whenever he is free, but the time and duration of the date is fixed. Help Max determine if he can accomplish all of these tasks in 24 hours. Assume that Max must finish a task completely if he begins it, but once he finishes he can switch to another task instantaneously.

Input Format

The first line of input will contain M.

The second line will each contain two space-separated numbers A, B, indicating that the date occurs from time A until time B. Note that A, B are not necessarily integers.

The final M lines will contain $E_1, E_2, \ldots, E_M$, indicating the time it takes Max to run each errand. Note that the E_i are not necessarily integers.

Constraints

$1 \leq M \leq 15$,
$0 \leq A < B \leq 24$,
$0 < E_i \leq 5$ for each $1 \leq i \leq M$.

Output Format

Output "YES" or "NO" to indicate whether Max can complete all tasks in the 24-hour period.

Sample I/O

Input	Output
3 22.5 23 20 0.5 2	YES

Explanation

Max can finish the first and third errand before the date, and then he can finish the second errand after the date.

Escape Valentine

40 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Danny is eager to reach his Valentine. However, he's stuck in a complicated maze, which is a rectangular grid containing a number of walls and a number of teleporters.

Danny is starting at the position labeled with @, and his Valentine is located at $. Grid squares occupied by walls are labeled as #, and walkable spaces are labeled as '.' In one step, Danny may move one square up, left, right, or down to a walkable space within the grid.

A teleporter is a pair of locations in the grid occupied by the same capital letter. If Danny makes a step to a teleport letter, he is instantaneously teleported to the same letter located elsewhere. (A teleporter will act only if Danny steps on the letter from a different square; so, for example, stepping on a teleport letter will not incur in an infinite teleportation loop.) It is guaranteed that each capital letter (A through Z) will either occur twice or not at all.

Please find the fewest number of steps Danny must take to reach his Valentine's location.

Input Format

The first line contains two integers N and M, denoting the number of rows and columns in the maze respectively.

The next N lines contain a string of M characters, which show the maze.

Constraints

$1 \leq M, N \leq 1000$.

Output Format

Print one integer, the fewest number of steps Danny must take to reach his Valentine.

If it is not possible for Danny to reach his Valentine, print "Rip Valentines!"

Sample I/O

Input	Output
5 5 #$... #.C#. ..#.. .#@#. ...C.	4

Explanation

Danny makes one step south, one step east (which teleports him from the lower 'C' to the upper 'C'), one step north, and one step west.

Valentine Street

50 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Danny lives on an infinitely long street with houses that are one unit of distance away from each other (just like a number line). Since Valentine's Day is a time to show love for those who support you, Danny has decided to give his several good friends (who live on this street) each a bouquet of roses.

Danny lives on house number 1, and he wants to distribute his N bouquets of roses to his N friends in the fastest way. However, Danny can only carry K bouquets of roses at once. After distributing all of his roses, he must return to his house, which is labeled number 1.

Please determine the minimum distance Danny has to travel to distribute the bouquets of roses to all of his friends.

Input Format

The first line contains two integers, N and K.

The second line contains N integers a_1,a_2,...,a_n($2 \leq a_i \leq 2000$), where a_i denotes the position of the ith friend.

Constraints

$1 \leq N,K \leq 2000$,
$1 \leq a_i \leq 2000$.

Output Format

Print one integer, the shortest distance Danny has to travel to make sure all his friends receive a bouquet of roses.

Sample I/O

Input	Output
3 2 2 3 4	8

Explanation

Danny can first carry two bouquets to his friend labeled at 2, drop both of them off, and then return to his house, for a distance of 2.

Then, he can pick up one more bouquet from home, pick up one of the bouquets he dropped off at house 2, give one to house 3, give one to house 4, and then return home, for a distance of 6.

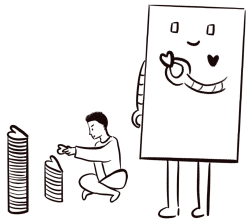
So, $2 + 6 = 8$, which is the shortest distance Danny has to travel.

Candy Tower

50 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output



Problem Statement

There is a game called Heart Stacking on Valentine's Day where students are challenged to stack the tallest tower in a minute using heart shaped candies.

Danny has decided to play a variation of this game. In this new variation, there are N heart shaped candies, each possibly with a different size. There is a machine that dispenses candies one at a time, and each time Danny receives a candy, he immediately decides to either discard the candy or place it on top of his stack. Once a candy is placed, it cannot be moved.

There is another rule: candies with a larger area cannot be placed atop candies with a smaller area. (If two candies have the same area, they can be placed on top of one another.)

Because Danny can see the future, he knows the exact order the machine will dispense the candies. Please find the maximum possible height of the tower Danny can stack.

Input Format

The first line contains an integer N, the number of candies that the machine will dispense.

The next line contains N integers $S_1, \ldots, S_N$, the sizes of the candies that will be dispensed (in that order, from left to right).

Constraints

$1 \leq N \leq 1000$,
$1 \leq S_i \leq 10^9$ for all $1 \leq i \leq N$.

Output Format

Please print the maximum height Danny can build out of the candies dispensed by the machine.

Sample I/O

Input	Output
5 20 1 2 10 3	3

Explanation

Danny can build tower of 20, 10, 3, which is a height of 3.

Tower Elevators

60 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Plano West Senior High School is planning to build a new wing, a tower with N floors, numbered $1, 2, \ldots, N$. The building could potentially be very tall, and the students would like to be able to see their *friends* and express *sincere gratitude* for their *friendship* and *support*. So, the administrators would like to connect M pairs of floors with elevators, to be erected on the sides of the tower. It is guaranteed that each floor will be connected to at most one other floor.

The tower only has two sides– a front and a back. This raises potential issues: perhaps the elevators will not fit! No two elevators can occupy the same elevation on the same side of the building. For example, an elevator connecting $(2, 5)$ will not fit on the same side of the building as an elevator connecting $(1, 3)$ nor an elevator connecting $(1, 6)$. Luckily, this is the only potential concern.

Your task is to determine whether or not it is possible to choose a side of the building, front or back, for each planned elevator in such a way so that all elevators can be constructed without an issue.

Input Format

The first line contains two space-separated integers N and M, the total number of floors planned for the building and the number of pairs of floors to be connected by elevators, respectively.

The next M lines will each contain two space-separated integers X, Y $(1 \leq X < Y \leq N)$, indicating that the administrators wish to connect floor X and floor Y with an elevator.

Constraints

$1 \leq N \leq 10^5$,
$1 \leq M \leq 50,000$.

Output Format

Output "YES" or "NO" to indicate whether or not the construction is possible.

Sample I/O

Input	Output
6 2 1 4 2 5	YES

Explanation

The tower has 6 floors and 2 planned elevators, (1,4), and (2,5). These two elevators can (and must) be built on opposite sides of the building.

Stations

60 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Because Danny and Dimmy have no dates for Valentines, they decided to play a game called Stations instead.

In this game, there is a field length of N that is divided into $N+1$ stations numbered $0, 1, \ldots, N$ from left to right. At station N (the last station), there is a piece of chocolate. A nonnegative integer X is given.

The two players take turns, and Danny goes first. During each turn, the player can move the chocolate $1, 2$, or X stations to the left (for example, if the chocolate is located at station 5, it can be moved to station $4, 3$, or $5 - X$). The chocolate cannot move to the right or outside of the field (for example, if the chocolate is at station 1, it can only move to station 0). The player that can't make a move in the end loses.

Which player would win if both players play the game optimally?

In order to pass the time, the players would like to play several games, and you need to find the winner of each game.

Input Format

The first line contains an integer G, the number of games, and the next G lines contain one game per line. All games occur independently of each other.

Each of the G lines contain two integers N and X.

Constraints

$1 \leq G \leq 1000$,
$0 \leq N, X \leq 10^9$.

Output Format

Print one line, the number of wins Danny has and the number of wins Dimmy has after N games in the following format:

Danny's wins:Dimmy's wins.

Sample I/O

Input	Output
3 0 3 3 3 3 4	1:2

Explanation
In the first game, the length of the field is zero, so there is one station labeled 0, which is also where the chocolate is placed. Since Danny makes the first move, he has to either move the chocolate 1, 2, or 3 stations to the left, which cannot be done as it will exit the field. Therefore, he can't make a move, so he loses.

In the second game, Danny can move the chocolate from station 3 directly to station 0 after the first move because X is 3. When it's Dimmy's turn, he can't make a move, so he loses.

In the third game, Danny can only move the chocolate to station 1 or 2 after the first move. Dimmy can always move the chocolate to station 0 after his turn if he plays optimally. When it's Danny's turn again, he can't make a move, so he loses.

N-Gon

60 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Valentine's Day is a time to show some love, so Max decides he will show himself some love by being healthy and doing some exercise. It's time to take a walk outside.

Arranged in the Cartesian plane are N chocolates, which form a regular N-gon. Max walks around this N-gon counterclockwise and labels the chocolates he encounters with $1, 2, \ldots, N$, in sequence. Given the coordinates of chocolate 1 and chocolate 2, determine the coordinates of all N chocolates.

Input Format

The first line of the input file contains N. The next line contains two space-separated numbers x_1, y_1 representing the Cartesian coordinates of chocolate 1. The third line contains two space-separated numbers x_2, y_2 representing the Cartesian coordinates of chocolate 2.

Constraints

$3 \leq N \leq 15$,
$-100 \leq x_1, y_1, x_2, y_2 \leq 100$.

Output Format

Output N lines, each containing two floating-point numbers: the kth line should give the coordinates of chocolate k. Your answer will be accepted if all coordinates are accurate to within 10^{-3} absolute error.

Sample I/O

Input	Output
4 0 0 1 0	0 0 1 0 1 1 0 1

Explanation

In this example, the chocolates are arranged in a square.

Branch Me Up, Please!

70 Points

Time limit: (According to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

After years of unfortunate dating experiences, you've decided to summon a hydra to devour all the Valentines chocolates you've bought but never gifted over the years! The hydra begins with a single head. However, since you have a large number of chocolates, the hydra will need for its head(s) to split in order to eat them efficiently. You are interested in the number of possible ways for the hydra's heads to split.

The hydra is obedient: when you clap your hands, each existing head will independently perform a split. Hydra heads split in a particular way: when a head splits, the number of heads that emerges belongs to $\{a_1, a_2, \ldots, a_S\}$, for some given set of S positive integers. You will clap your hands M times, yielding a number of possible configurations of heads depending on each head's splitting choices at each clap. However, some of these configurations are extraneous– in particular, the configuration obtained by reflecting the hydra over its central axis (i.e. the neck for its original head) is counted as the same configuration as the original. See the diagram in the sample case if this is unclear.

Given M, S, and $\{a_1, \ldots, a_S\}$, count the number of distinct configurations of hydra heads you can have.

Input Format

The first line contains N, the number of test cases.

Each test case begins with M and S, the number of times you clap and the number of possibilities when a hydra head splits, respectively. The next line contains S space-separated integers $a_1, \ldots, a_S$ indicating heads' splitting possibilities.

Constraints

$1 \leq N \leq 10$,
$1 \leq M \leq 4$,
$1 \leq S \leq 40$,
$1 \leq a_i \leq 40$ for each $1 \leq i \leq S$.

Output Format

For each test case, output the number of unique trees, modulo $10^9 + 7$.

Sample I/O

Input	Output
2 2 2 1 2 3 1 3	5 1

Explanation

For the first test case, there are 6 possible hydras. However, by the diagram below, hydras 5 and 6 are mirrors of each other and therefore are counted as a single configuration.

For the second test case, there is only one possible hydra that can form.

Roses

80 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Max wants to rearrange his roses (certainly not to impress anyone or anything). He has a line of N pots, and each pot holds at most one rose. Initially, the arrangement contains a number of roses.

In a single day, Max may change the arrangement in one of two ways. He may pick an empty pot and plant a rose. Alternatively, he may select a set of roses in one or more consecutive pots, unroot them all, and plant a rose in the empty pot immediately to the right of those pots (if there is no pot immediately to the right, i.e. Max is at the end of the line, nothing happens after the roses are unrooted). After performing one of these actions, Max rests for the day.

Wingman Kevin suggests a particular arrangement of flowers to Max, one which is different from Max's initial arrangement. Help Max determine the minimum number of days it will take him to arrange his flowers to match Kevin's suggestion. Observe that Max's task is always possible.

Input Format

The first line of input will contain N. The second line will contain an N-length string of 0s and 1s, where a 0 represents a rose and a represents an empty pot, to describe Max's initial arrangement of roses. The third line will contain a different N-length string of 0s and 1s to describe Kevin's suggestion.

Constraints

$1 \leq N \leq 20$.

Output Format

Output the minimum number of days it will take Max to rearrange his roses.

Sample I/O

Input	Output
10 0101100000 0000010000	2

Explanation

On the first day, Max can uproot the rose in pot 2 and plant a rose in pot 3. On the second day, he can uproot the roses in pots 3, 4, and 5 to plant one in pot 6.

Daniel's Sandwich

90 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

While Sandra is enjoying her time at Daniel's house, she is served a disgusting sandwich "made with love" that's way too big to eat! Because Sandra doesn't want to hurt her crush's feelings, she's determined to finish the sandwich - but in the fewest number of bites possible.

However, Sandra takes a quirky approach to eating sandwiches; in one bite, she's only able to consume contiguous subsections of the same ingredient. Also, Sandra is willing to eat sections in any order, meaning she could possibly start by eating items in the middle, if she so chooses. Given this, please help Sandra compute the minimum number of bites it will take for her to finish Daniel's sandwich.

Input Format

The first line contains N, the total number of ingredients in Daniel's sandwich.

The next N lines each contain a string of length at most 10. Together, they represent the order in which the N ingredients appear in the sandwich.

Constraints

$1 \leq N \leq 500$.

Output Format

Output the minimum number of bites needed to eat the sandwich.

Sample I/O

Input	Output
7 Bread Ham Roaches Ham Bread Roaches Bread	4

Explanation

Sandra can consume Daniel's sandwich by 1) eating the first piece of roaches, 2) eating the second piece of roaches, 3) eating the resulting contiguous group of ham, and 4) finishing off the remaining contiguous piece of bread.

Crossing Paths

110 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

In Friendville, there are N homes numbered 1,2,...,N connected by a set of roads so that, for any two homes, there is exactly one path of roads connecting them (a path possibly visits other homes along the way, but never visits the same home more than once).

It is Valentine's Day, so the citizens of Friendville are busy writing and delivering letters of friendship and appreciation! To manage traffic between homes, Mayor Max would like to know whether two paths $A \to B$ and $C \to D$ intersect, i.e. if there is a common home (possibly one of A, B, C, or D) that must be visited both when traveling $A \to B$ and when traveling $C \to D$. Your task is to help Max with queries of this type.

Input Format

The first line of the input file contains A and Q, the number of homes and the number of queries, respectively.

The next N - 1 lines each contain two distinct integers i and j with $1 \leq i, j \leq$ N, indicating a road between homes i and j.

The last lines each contain four distinct integers A, B, C, and D, with $1 \leq A, B, C, D \leq N$ a query asking if the paths $A \to B$ and $C \to D$ intersect.

Constraints

$4 \leq N \leq 750$,
$1 \leq Q \leq 10^5$.

Output Format

Output Q lines, each "YES" or "NO", answering the path queries.

Sample I/O

Input	Output
5 2 1 4 2 4 3 4 3 5 1 3 4 2 3 5 1 2	YES NO

Explanation

For the first query, the path $1 \to 3$ traverses homes 1, 3, 4. The path $4 \to 2$ traverses 4, 2. These paths share home 4, so this query should be answered YES. For the second query, $3 \to 5$ traverses 3, 5 and $1 \to 2$ traverses 1, 4, 2, so this query should be answered NO.

Fill

120 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

Max is decorating a two-dimensional rectangular cake again. The cake has integer height H and integer width W, and it is divided into $H \times W$ unit grid cells. Max places strawberries in some of these cells, and the strawberries cannot be removed. In each of the remaining cells, Max would like to place either an 'X' or an 'O' symbol (symbolic of all the hugs and kisses he receives from friends and family).

However, Max understands that balance is the key to a positive lifestyle. A row or column of the cake is considered balanced if exactly half of its open cells (cells unoccupied by strawberries) have Xs, and the other half of its open cells have Os. Help Max fill his cake with Xs and Os so that every row and column is balanced. It is guaranteed to be possible.

Input Format

The first line of input will contain two space-separated integers H and W. The next H lines will each contain a string of length W, where each character of the string is either 'B' or '*'. These $H \times W$ characters represent the cake, where 'B' indicates a cell with a strawberry and '*' indicates an open cell.

Constraints

$1 \leq H, W \leq 300$ and $H \cdot W \leq 3600$.

Output Format

Output the cake grid with each '*' replaced by either an 'X' or an 'O'. There will be more than one valid answer; output any one of them.

Sample I/O

Input	Output
3 3 *B* B** **B	XBO BOX OXB

Explanation

Each row and column is balanced.

Date Night

20 Points

Time limit: (according to HackerRank's environment)

Standard Input, Standard Output

Problem Statement

The writer spent the night with his girlfriend instead of creating problems, so we don't have a description ;)

Input Format

The only line of input will contain ten space-separated integers.

Constraints

See input format.

Output Format

A floating-point number rounded to five decimal places.

Sample 0 I/O

Input	Output
`1 1 1 1 1 1 1 1 1 1`	`0.1000`

Sample 1 I/O

Input	Output
`3 3 3 3 3 3 3 3 3 3`	`1968.30000`

Sample 2 I/O

Input	Output
`1 2 3 4 5 6 7 8 9 10`	`65978.18182`

Sample 3 I/O

Input	Output
`2 7 8 6 9 1 3 4 10 5`	`65978.18182`

Sample 4 I/O

Input	Output
`1 1 2 1 1 1 1 1 1 1`	`0.18182`

Explanation

The writer is late to his date so there are no explanations.