
CODESPRINT 2021 PROBLEMS

April 13, 2021

Max Execution Time: 1 second (all problems)

Use standard input (all problems)

PROBLEM A – Lisa And Her Laser Lights

Lisa wants to draw a large hollow diamond in the sky by using laser lights. However, she needs help from you. She will tell you the size s of one of the diamond's sides, and then you just need to draw it with whatever character c she demands!

Input Format

The input consists of two lines.

The first line contains a single integer, s (Input s always satisfies the constraint: $0 \leq s \leq 100$).

The second line contains a single character, c (any character).

Output Format

The shape of the diamond using the characters.

Sample Input	Sample Output
4 k	k k k k k k k k k k k k k k

PROBLEM B – Hu-U?

The company Hu-U has 5 employees and the company's job is to know whether they have information regarding the person they are asked about is available in their database. Their basis is that if at least half of their employees know the particular person, then they have enough information and they should be able to find the file. Note that they are asked about p persons each day.

Input Format

The input consists of $p + 1$ lines.

The first line contains a single integer, p , the number of persons (Input p always satisfies the constraint: $0 \leq p \leq 1000$).

The next p lines contain where series of integers, either 0 or 1, that are separated with a single space. 0 is for the employees that do not know the person, and 1 is for the employees that know the person.

Output Format

A single integer should be printed: the number of available information (files) they have given away on that particular day.

Sample Input	Sample Output
4 0 0 0 1 1 1 1 1 0 1 1 1 0 0 1 1 0 0 0 1	2

PROBLEM C – Mario Is Not Just A Plumber

Mario is stuck in a 1-dimensional world where the k th planet is represented by string G , consisting of either: a walkable ground, represented by character '1'; or void blocks where he can be sucked into the 0th dimension, represented by character '0'. Note that string G will always start with 1.

His objective is to go through each of the N planets starting from left to right, avoiding the void blocks, with limited S stamina. A void block takes a point of stamina, and to replenish his stamina to full, he either needs to be (1) completely exhausted or (2) lacking the stamina to make the jump across void blocks.

Your goal is to know the minimum number of times he needs to rest... or tell him if he cannot go through at all because of a particular planet. Note that if Mario cannot land on a solid ground block, then he cannot pass through and is counted as an impossible jump.

Input Format

The first line consists of integer S as his stamina points (*Input constraint: $1 \leq S \leq 10000$*).

The second line consists of integer N to determine the number of planets (*Input constraint: $0 \leq N \leq 1000$*).

The next N lines consist of string G to represent the structure of the ground for each planet.

Output Format

Print an integer: the number of times Mario should rest.

However, if Mario cannot go through or cannot land the jump at all on at least one planet, output on the first line the string "IMPOSSIBLE JUMP" (without the quotation marks), and on the next line, output the first k th planet as integer where he could not jump over.

NOTE: k starts from 1.

Sample Input 1	Sample Output 1
5 3 1110000 1000000001 111111	IMPOSSIBLE JUMP 1
Sample Input 2	Sample Output 2
4 2 11100001 10001001	2

PROBLEM D – Mario Is Not Just A Plumber... but in 2D space?

Mario is now in a 2-dimensional world after successfully escaping the 1-dimensional world, however, he is faced with another problem... he's stuck in space. To get enough power for his hot-air-balloon-shaped spaceship to travel a very long distance, he needs to connect at most N moons with his special wiring technology and form an enclosed polygon (a shape that has no intersecting lines; a shape that contains the cycle of moons), enclosing all the other moons (if some of the moons aren't used), starting from his spaceship and ending with this spaceship as well, to harvest the optimal amount of energy.

The spaceship's radar only shows you the coordinates (X, Y) of each moon in its front and note that the spaceship is at $(0,0)$, meaning no moons will be detected at $-Y$, but there will always be at least 2 moons in front.

Input Format

The first line contains an integer N , the number of moons seen by the spaceship's radar (*Input constraint: $2 \leq N \leq 1000$*).

The following N lines contain the coordinates (X, Y) of the K th moon. X and Y are integers and are separated by a single space (*Input constraint: $-1000 \leq X, Y \leq 1000$*).

Output Format

Print the number of the moons that Mario should be going for.

If the radar detected a moon behind the spaceship, output the string "RADAR ERROR" (without the quotation marks).

Sample Input 1	Sample Output 1
4 3 1 1 3 -2 5 5 -6	RADAR ERROR
Sample Input 2	Sample Output 2
5 3 2 5 0 0 6 -2 2 6 5	4

PROBLEM E – Patrick’s Bizarre Adventures

During the IICS week, Patrick decided to travel, visiting every place one by one until he reaches his desired destination. Throughout his journey, he will be visiting cities wherein these cities are named by a series of lowercase letters from a to z. Since Patrick is a perfectionist and at the same time, he wants to experience and visit every city, he decided to visit them in alphabetical order. Cities are ordered in such a way that:

- City ‘a’ is followed by city ‘b’ then city ‘c’ and so on.
- City ‘z’ is followed by city ‘aa’ then city ‘ab’ and city ‘ac’ and so on.

During the whole travel, Patrick decided that he wants to have a stopover in the middle of his journey such that if he is travelling from city ‘a’ to city ‘e’, his stopover will be on city ‘c’.

Using your expert coding skills, help Patrick identify the city where he will have his stopover.

Input format

The first line of input contains a single integer t which denotes the number of travels then t lines follow wherein each line contains two space-separated lowercase strings a and b that denotes city a (city of origin) and city b (destination).

Constraints

- $1 \leq t \leq 10$
- $1 \leq |a|, |b| \leq 100$
- The number of strings between a and b inclusive is always odd.
- String a and b will never be equal.
- String a will always come before string b .

Output format

For each test case, output the string in the middle of a and b .

Sample Input	Sample Output
3 a e bb aab z ab	c no aa

PROBLEM F – Two Iconic Abenjers Heroes Are Having A Problem

In the spirit of this year's IICS week, Steb Rogers A.K.A Captain Philippines and Tony Slark A.K.A Iron Tambay, was invited to a meet-and-greet. Steb and Tony are known to be very impatient and because of this, they wanted to avoid the traffic in EDSA through riding the MRT (May Riles na Tren). When they went to the MRT station, the trains were not operating at the moment because the route was missing and only a matrix was left. Tony Slark, being the engineer that he is, wanted to help the operator to get the train running.

A matrix is 2-dimensional array the contains either alphanumeric characters (0-9, A-Z, a-z) which represents the different MRT stations, and tracks (-, |, +) that connect these stations together. Station x and station y is connected if there is a track the connects then either horizontally (-, +) or vertically (|, +).

A sample matrix would be:

```
- A - + B
++ C 1 -
a - | 2 -
++ + D E
| - s - -
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In the matrix above, station A and station B are connected because tracks – and + connects a straight line between them. Same as to station C and station s wherein they are connected by tracks | and +. Station A and station C are not connected by the + track since connections are exclusively either horizontal or vertical only.

Help Tony Slark find all the connecting stations using the matrix.

Input format

The first line of input contains integer t which denotes the number of test cases. The remaining lines contains the next t test cases. The first line of input for each test case contains two space separated integers r and c which represents the number of rows r and columns c the matrix has. Then r lines follow with each line containing c characters (0-9, a-z, A-z, -, |, +).

Constraints

- $1 \leq t \leq 100$
- $1 \leq r, c \leq 100$

Output format

For each test case:

- On the first line, output a single integer x that denotes the number of connections found.
- On the next lines, if $x > 0$, print all x pairs wherein each pair is not separated by a space and the first character should be lexicographically smaller than the other. Print all pairs separated by a space and print them in lexicographical order. If $x = 0$, print "NO TRAINS FOR TODAY", without the double quotes.

Sample Input	Sample Output
2 5 5 -A-+B ++C1- a- 2- +++DE -s- 3 3 AB+ CD -12	2 AB Cs 0 NO TRAINS FOR TODAY