SI 100B Programming Assignment 1

SI 100B Staff

Due Date: 23:59:59 Sep 25th, 2022

Important message on plagiarism

The single most important point for you to realize before the beginning of your studies at ShanghaiTech is the meaning of "plagiarism":

Plagiarism is the practice of taking someone else's work or ideas and passing them off as one's own. It is the misrepresentation of the work of another as your own. It is academic theft; a serious infraction of a University honor code, and the latter is your responsibility to uphold. Instances of plagiarism or any other cheating will be reported to the university leadership, and will have serious consequences. Avoiding any form of plagiarism is in your own interest. If you plagiarize and it is unveiled at a later stage only, it will not only reflect badly on the university, but also on your image/career opportunities.

Plagiarism is academic misconduct, and we take it very serious at ShanghaiTech. In the past we have had lots of problems related to plagiarism especially with newly arriving students, so it is important to get this right upfront:

You may…
• … discuss with your peers about course material.
• … discuss generally about the programming language, some features, or abstract lines of code. As long as it is not directly related to any homework, but formulated in a general, abstract way, such discussion is acceptable.
• … share test cases with each other.
• … help each other with setting up the development environment etc.

You may not …
• … read, possess, copy or submit the solution code of anyone else (including people outside this course or university)!
• … receive direct help from someone else (i.e. a direct communication of some lines of code, no matter if it is visual, verbal, or written)!
• … give direct help to someone else. Helping one of your peers by letting him read your code or communicating even just part of the solution in written or in verbal form will have equal consequences.
• … gain access to another one's account, no matter if with or without permission.
• … give your account access to another student. It is your responsibility to keep your account safe, always log out, and choose a safe password. Do not just share access to your computer with other students without prior lock--out and disabling of automatic login functionality. Do not just leave your computer on without a lock even if it is just for the sake of a 5--minute break.
• … work in teams. You may meet to discuss generally about the material, but any work on the homework is to be done individually and in privacy. Remember, you may not allow anyone to even just read your source code.

With the Internet, "paste", and "share" are easy operations. Don't think that it is easy to hide and that we will not find you, we have just as easy to use, fully automatic and intelligent tools that will identify any potential cases of plagiarism. And do not think that being the original author will make any difference. Sharing an original solution with others is just as unethical as using someone else's work.

0 Introduction: The Ryze Biography - Rune Knows

Widely considered one of the most adept sorcerers on Runeterra, Ryze, is an ancient archmage with an impossibly heavy burden to bear. Armed with strong arcane power and a boundless constitution, he tirelessly hunts for World Runes（世界符文）fragments of the raw magic that once shaped the world from nothingness. He must retrieve these artifacts before they fall into the wrong hands, for Ryze understands the horrors they could unleash on Runeterra.

Ryze spent his life on an endless, thrilling magical journey across the continent of Runeterra, and the thrills and wonders he encountered are recorded enough to become an epic. His assistant, Kyran, recorded it all and made it public......

Take care of the world. If it is a creation, it can be destroyed. Ryze said.

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1 Chapter152: Noxus' Conspiracy

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The air was heavy with a pungent smell of sulfur. Flocks of crows circled up from the corpses around the rotting wood, glancing in the direction Ryze had come from.

"Mage, stand still, give the way to Imperial troops." A white-haired man with demonic power surging from his left hand whispered. The voice was low, but the entire valley echoed. Ryze knew this demon, whose name was a nightmare throughout the Runeterra continent, Jericho Swain, the true leader of Noxus empire, an expansionist nation that worships only power. His ambition has brought countless disasters and wars to the people of Demacia and Ionia.

"*I'm just here to find the world rune.*" Ryze said kindly as he put away his Codex.

"Noxus welcomes any benefits, Mage. My soldiers are willing to clear the path ahead for you." After saying that, Swain took a delicate glass container from his men.

Swain went on, *"We were once able to use sorcery to estimate the probability of victory of the Imperial army. In a magical explosion, however, the core of this sorcery was affected. My sorcerers have rebuilt the core, but it seems that it still does not work properly. We need you to use your magic to help us* **debug** *the sorcery.*"

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1.1 Ryze's Task

You could retrieve all information in debug.py. You have to debug the file to handle this task.

1.1.1 Input Format

The input contains two lines of separate numbers.

The related code has already been written in the file, DO NOT change that part.

1.1.2 Output Format

The function should return a string, which is shown in the file.

1.1.3 Sample

Input:

```
1 4 3 2
4 5 2 1
```

Output:

```
Imperial army has larger median!
```

Input:

```
2 5 7
3 6 9
```

Output:

```
Imperial army has larger median!
```

2 Chapter203: Souls of Ionia

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After the Spell Flux tore the last Noxus soldier apart, Ryze boarded a birch ship without looking back. He left Noxus and sailed north, across the endless sea, and then west. It wasn't long before the sparse tundra beneath his feet turned into lifeless frozen soil. Ryze's boots crunched on the petrified wasteland, and there was only scattered lichen on the earth. The mage's mood was as bleak and desolate as the snowy mountain tops of Ionia.

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Ryze meets Karma, the guardian and supreme being of the land. Karma brings Ryze to the lotus pond and tells him, with a worried twist of the jade ring on her finger, that her persistent resistance to Noxus has injured countless people of Ionia. Some soldiers had fallen into decades-long comas because of Noxus' curses and sorcerous blows. So now she needs Ryze to use his rune powers to complete a séance to ask the ancient gods of Ionia to descend so the souls of the injured soldiers could return to Karma's Lotus Pond. Although Karma does not have the World Rune, she can point Ryze in the direction of the World Rune.

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The ancient gods speak disconnectedly, and Ryze's runic array integrate the spells they are saying. The magic he uses is as follows:

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2.1 Ryze's Task

There is no extra description for this task.

2.1.1 Input Format

The only line of input is a string which aims to represent the two dimensional list inside, and the elements of such list include fixed values such as numbers, letters, and strings.

Hint: You can use **eval(input())** to transform the input string to a two dimensional list.

2.1.2 Output Format

The only line of output contains a string composed of all elements in the input two dimensional list.

2.1.3 Sample

Input:

```
[["ARC", "ANE MAS"], [""], [], ["TERY"], ["!"]]
```

Output:

```
ARCANE MASTERY!
```

Input:

```
[["Hello", " "], ["S", "I1"], [], ["0"], [0,"B"]]
```

Output:

```
Hello SI100B
```

3 Chapter332: Twisted in Twisted Treeline

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Twisted Treeline is a dense, dark forest located between Zaun and the northern beaches of Runeterra, one of the few untouched forests near Zaun that once thrived before the rise of Zaun and the Rune Wars. But magical abuse, mainly from Zaun, and of course from the numerous battles of the Rune Wars, has distorted the forest's verdant ecology, turning it into a strange and exotic landscape.

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Ryze lost too much power in his fight with Maokai against the ghosts from the Shadow Isles to make a long-distance Transport, and now he is lost in a maze of countless matrices of different sizes, and he has to keep using Realm Warp to move through the twisted jungle. He will find his way through these matrix mazes in the form of a spiral forward. As the blue light floods in, Ryze moves closer and closer to the portal in the center of the maze.

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3.1 Ryze's Task

3.1.1 Input Format

The only line of input contains two positive integers: The first one indicates the number of rows of the maze, while the second one indicates the number of columns of the maze.

3.1.2 Output Format

The only line of output contains a specific two-dimensional list.

3.2 Sample

Input:

```
4 3
```

Output:

```
[[1, 2, 3], [10, 11, 4], [9, 12, 5], [8, 7, 6]]
```

Hint:

It looks like this:

1	2	3
10	11	4
9	12	5
8	7	6

Input:

```
1 1
```

Output:

```
[[1]]
```

4 Chapter478: Conversation with the Wise in Piltover

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Dr. Heimerdinger's office is located on the cliffs adjacent to Zaun City, overlooking the sea, where a fleet of ships crosses the huge gulf gorge below the office, loaded with goods from all over the world. The office is an important part of the Piltover Council, dazzling Ryze with its piles of drawings and Hextech products.

"Mr. Ryze, Piltover appreciates the energy you bring to Hextech. In return, the council can reveal to you how to unlock your first world rune." Dr. Heimerdinger said as he sat in a large swivel chair looking up at the taller Ryze. "The World Rune is not just magic, it's a collection of this world. Science is part of Piltover, and Piltover is part of the Runeterra continent, so science is part of the Runeterra continent. The World Rune needs science to be unlocked."

"But..." Ryze said......

......

"Try this! Enter the characteristic numbers you found from different regions and the most concise result you get may be the answer you are looking for!" Dr. Heimerdinger wrote a formula on the blackboard.......

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4.1 Ryze's Task

4.1.1 Input Format

The only line of input contains k non-negative integers denoted as $a_0, a_1, a_2 \ldots, a_{k-1} (k \geq 2)$, separated by spaces.

4.1.2 Output Format

The only line of output contains two integers n, m, separated by a space, satisfying the below equation:

$$\frac{n}{m} = a_0 + \cfrac{1}{a_1 + \cfrac{1}{a_2 + \cfrac{1}{a_3 + \cfrac{1}{\ldots}}}} \tag{1}$$

where the last item of $\frac{1}{\ldots}$ is $\frac{1}{a_{k-1}}$ (the denominator will not be 0).

Note:

1.$\frac{n}{m}$ is an irreducible fraction in which the n and m are integers that have no other common divisors than 1 (m and n are both positive). If $\frac{n}{m}$ equals to an integer, then we set m = 1, n equals to such integer. (Shown in the last sample.)

2.Among all test cases, the value of m will **not exceed 100.**

3.You may not use **as_integer_ratio()** or **fractions.Fraction()** to get n or m. There are a lot other methods for you to get them. If you use **as_integer_ratio()** or **fractions.Fraction()**, you may get no score of this question. (TAs will view your code manually to check if you violate this rule.)

4.2 Sample

Input:

```
3 2 0 2
```

Output:

```
13 4
```

Input:

```
1 2
```

Output:

```
3 2
```