# More Exercises: Lists Advanced

This document defines the additional exercises for the ["Python Fundamentals" course at @Software University.](https://softuni.bg/trainings/4379/programming-fundamentals-with-python-january-2024)

Please submit your solutions (source code) to all the below-described problems in [Judge](https://judge.softuni.org/Contests/1732/Lists-Advanced-More-Exercises).

***Note: All the exercises are excluded from your homework!***

## Social Distribution

*A core idea of several left-wing ideologies is that the wealthiest should support the poorest, no matter what, and that is exactly what you are called to do for this problem.*

On the first line, you will be given the **population** (numbers separated by comma and space **", "**). On the second line, you will be given the **minimum wealth**. You should **distribute** the wealth so that no part of the population has **less than the minimum** wealth. To do that, you should always take wealth from the **wealthiest part of the population**.

There **will be cases** where the distribution will **not be possible**. In that case, print: **"No equal distribution possible"**.

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2, 3, 5, 15, 75  5 | [5, 5, 5, 15, 70] |
| 2, 3, 5, 15, 75  20 | [20, 20, 20, 20, 20] |
| 2, 3, 5, 45, 45  30 | No equal distribution possible |

## Take/Skip Rope

Write a program, which reads a **string** and **skips** through it, extracting a **hidden message**. The algorithm you should implement is as follows:

Let us take the string "skipTest\_String044160" as an example.

Take every **digit** from the string and **transfer it** somewhere. After this operation, you should have **two lists of items** - a **numbers list** and a **non-numbers list**:

* Numbers' list: [0, 4, 4, 1, 6, 0]
* Non-numbers: [s, k, i, p, T, e, s, t, \_, S, t, r, i, n, g]

After that, take every digit in the **numbers list** and split it up into a **take list** and a **skip list**. In the **take** list, you should keep all digits at an **even** index. In the **skip** list, you should keep all digits at an **odd** index.

* Numbers' list: [0, 4, 4, 1, 6, 0]
* Take list: [0, 4, 6]
* Skip list: [4, 1, 0]

Afterward, **iterate over both lists**:

* **First**, **take m** characters from the **non-numbers list** and store it in a **result string**
* **Then,** **skip** n characters from the **non-numbers list**

Note that the skipped characters are **summed up** as they go. The process would look like this:

1. Current string: **"skipTest\_String"**. Take **0** characters and skip **4** characters:

* Taken string: **""**
* Skipped string: "skip"

1. The remaining string looks like this: **"**Test\_String". Take **4** characters and skip **1** character:
   * Taken string: **"Test"**
   * Skipped string: **"\_"**
2. The string looks like this: **"**String**"**. Take **6** characters and skip **0** characters:
   * Taken string: **"String"**
   * Skipped string: **""**
3. The final string is **"TestString"**.

After that, print the **final string** on the console.

### Constraints

* The count of digits in the input string will **always be even**.
* The encrypted message will contain any printable ASCII character.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| T2exs15ti23ng1\_3cT1h3e0\_Roppe | TestingTheRope |
| O{1ne1T2021wf312o13Th111xreve!!@! | OneTwoThree!!! |
| this forbidden mess of an age rating 0127504740 | hidden message |

## Kate's Way Out

*Kate is stuck in a maze. You should help her to find her way out.*

On the **first line,** you will be given how many **rows** there are in the maze. On the **following n lines,** you will be given the **maze itself**. Here is a legend for the maze:

* **"#"** - means a **wall**; Kate cannot go through there
* **" "** - means **empty** space; Kate can go through there
* **"k"** - the initial **position of Kate**; start looking for a way out from there

There are two options: Kate either gets out or not:

* If Kate **can get** out, print the following:   
  **"Kate got out in {number\_of\_moves} moves"**.

**Note:** If there are **two or more** **ways** out, she **always** chooses **the longest one**.

* Otherwise, print: **"Kate cannot get out"**.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 4  ######  ## k#  ## ###  ## ### | Kate got out in 5 moves |
| 5  ######  ## k#  ## ###  ######  ## ### | Kate cannot get out |

## Battle Ships

You will be given a number **n** representing the number of **rows of the field**. On the following **n** lines, you will receive **each field row** as a **string** with **numbers separated by a space**. Each number greater than zero represents a **ship** with **health** equal to the **number value**.

After that, you will receive the **squares** that are being **attacked** in the format: **"{row}-{col} {row}-{col}"**. Each time a square is being attacked, if there is a ship (number greater than 0), you should **reduce its value by 1**. If a ship's health **reaches zero**, it is **destroyed**. After the attacks have ended, print **how many ships** were **destroyed**.

### Example

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comment** |
| 3  1 0 0 1  2 0 0 0  0 3 0 1  0-0 1-0 2-1 2-1 2-1 1-1 2-1 | 2 | States after each attack:  First attack -> 1 ship destroyed  0 0 0 1  2 0 0 0  0 3 0 1  Second attack -> reduce ship health  0 0 0 1  1 0 0 0  0 2 0 1  Third attack -> reduce ship health  0 0 0 1  2 0 0 0  0 2 0 1  Fourth attack -> reduce ship health  0 0 0 1  2 0 0 0  0 1 0 1  Fifth attack -> another ship destroyed  0 0 0 1  2 0 0 0  0 0 0 1  Sixth and Seventh attack -> no ship destroyed |
| 5  1 0 5 0 1  6 3 9 0 0  7 9 4 3 2  1 0 0 4 9  5 6 0 3 5  0-1 0-2 0-2 0-2 0-2 0-2 3-0 | 2 |  |

## Dots

You will be given a number **n** representing the number of **rows of a board of dots and dashes**. On the following **n** lines, you will receive **each row** of the board as a **strin**g with symbols (dots and dashes only), separated by a **single space**.

Your task is to find and print the **largest count of** **dots** that could be connected **at once**. You could only connect **horizontally or vertically.**

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  . . - - -  . . - - -  - - - - -  - - - . .  - - - . . | 4 |
| 6  . . - . - .  - . . . . .  - . - - - -  - . . - - -  - . . . . -  - - - . . - | 18 |
| 4  - . - . . –  . - . . - .  . - - - - -  - - - . - - | 4 |