BI Programming. Exam. Task 1 samples

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Sample 1

Generate a random list of integer numbers. Number of elements and the generation range should be requested from the user. Print the generated list on the screen. **Without using insertion or deletion**, make a circular shift of all elements 1 step to the right, then print the modified list.

Example

```
Source list:
7 9 2 1

List after a circular shift to the right:
1 7 9 2
```

Sample 2

Request a string, then two integer dimensions n (number of rows) and m (number of columns). Project the string onto the nxm matrix as shown in the example below (letter by letter, on the first column from top to bottom, then on the second column from top to bottom, etc.). If the number of characters in the string is not sufficient, fill the remaining elements of the matrix with "-". If the number of characters in the string is larger than the number of cells in the matrix, take only the first nxm characters. The matrix does not have to be printed in the aligned way as in the example, use the standard "print" function to save time.

Example

```
String: hello world
Matrix dimensions: 5x4

Matrix:
h   d -
e w - -
l o - -
l r - -
o l - -
```

Sample 3

Request a matrix of integer numbers from the user and make sure it is a square one (number of rows = number of columns).

Print the matrix on the screen.

Find the sum of numbers on the main diagonal and on the antidiagonal.

Example

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

Sum of the main diagonal: 12
Sum of the antidiagonal: 14
```

Sample 4

Request a single string from the user. The string may contain any sequence of characters, which form words separated by one or many spaces. Select those words, which can be converted to floating point numbers and find the minimum among them. Note that words can end with one of the following four punctuation marks - dot(.), comma(,), colon(:), semicolon(;). But you can assume that there is always at least one space following it (with the exception of the last word in the sentence)

If there are no floating point numbers in the string, print a corresponding message.

Hint: the simplest way to check whether some word is a floating point number is to try to convert it to a float, catching a potential error with a try-except block.

Example

```
String: -4.5 is smaller than -3. However it is larger than -7.9.

Minimal of floating point numbers: -7.9
```

Sample 5

Input a list of integer numbers from the user. Find the sum of numbers between the first and last occurrences of the minimal element, processing the following edge cases carefully:

- If the last minimum comes directly after the first one, print a corresponding message.
- If the minimal element is repeated only once, print another message.

Example

```
List: [5, 1, 9, 43, 3, 1]
Sum of elements between first and last min: 55

List: [6, 7, 1, 5, 4]
The minimal element is repeated only once

List: [6, 7, 1, 1, 9, 4]
No elements between the first and last minimum
```

Sample 6

1. Generate a random list of integer numbers. The size of the list and the generation range are defined by the user.
2. Print the generated list on the screen.
3. Input an integer number $k > 0$.
4. Build a matrix (ragged array) of k rows that groups elements of the random list by the number of their repetitions: m-th row of the matrix (m = 1, 2, ... k) contains elements from the list that are repeated exactly m times

Example

```
Random list: [5, 1, 9, 43, 3, 1, 2, 2]
k = 3

Repetitions:
[
   [5, 9, 43, 3],  # elements that are repeated once
   [1, 2],         # elements that are repeated twice
   []              # elements that are repeated three times
]
```