Java Development Homework 1&2

Due before 2025 March 26 11:59pm

Notes

1. Before answering, make sure you are familiar with the operation process of the online judge (automated grading system).
2. The online judge will evaluate the code submitted to Moodle after the deadline. Once you have completed your code, be sure to submit it to Moodle.
3. The online judge has a code similarity detection system, and both the person who plagiarizes and the one whose code is plagiarized will receive a score of 0.
4. If you have any questions about the problem, please contact the teaching assistant.

Submission

Please archive your source code to STUDENT_ID.zip (download the example zip file from Moodle) and **upload to Moodle Homework 1** before deadline.

Your zip file should follow the following format.

STUDENT_ID.zip

|- src

|- META-INF

| |- MANIFEST.MF

All the source files (*.java) are put in the src directory.

The entry point (i.e. main class) of the program is specified in the MANIFEST.MF file.

No late submission is accepted.

Homework 1

Problem Description

Problem: Sudoku Validation

Description:

Given a completed Sudoku solution in the form of a 9x9 string of numbers, please validate the correctness of the solution.

A Sudoku solution must satisfy all of the following rules:

1. Each row must contain the numbers 1-9 exactly once.
2. Each column must contain the numbers 1-9 exactly once.
3. Each 3x3 subgrid must contain the numbers 1-9 exactly once.

Notes:

1. Each test case is guaranteed to be a filled Sudoku grid.

Sample Input and Output

Keyboard Input	999999999 999999999 999999999 999999999 999999999 999999999 999999999 999999999 999999999 645783912 921465387 387921564 864197253 573642891 192358746 756834129 418279635 239516478
Output	Case 1: False. Case 2: True.

Explanation:

In this problem, each test case consists of 9 lines of strings, with each line containing 9 characters. Test cases are separated by a blank line.

Each test case needs to be validated, and based on the validation result, the corresponding judgment should be output:

- If the test case is valid, output True.
- If the test case is invalid, output False.

The output format should follow this specification:

“Case {caseNumber}: {answer}.”

Notes:

- Please use java.util.Scanner to handle input.
- Only numeric characters from "1" to "9" will be present.

Homework 2

Problem Description

There are n cars at given kilometers away from the starting position 0, traveling to reach the kilometer target.

You are given two integer array position and speed, both of length n, where `position[i]` is the starting mile of the ith car and `speed[i]` is the speed of the `ith` car in kilometers per hour.

A car cannot pass another car, but it can catch up and then travel next to it at the speed of the slower car.

A car fleet is a car or cars driving next to each other. The speed of the car fleet is the minimum speed of any car in the fleet.

If a car catches up to a car fleet at the mile target, it will still be considered as part of the car fleet.

Return the number of car fleets that will arrive at the destination.

Sample Input and Output

Keyboard Input	12 10 8 0 5 3 2 4 1 1 3 100 0 2 4 4 2 1
Output	Case 1: 3. Case 2: 1.

Explanation:

In this problem, each test case consists of 3 lines of strings, the first line is target position, second line is the start position of each car, the last line is the speed of each car, test cases are separated by a blank line. Output the number of total car fleets.

The output format should follow this specification:
“Case {caseNumber}: {answer}.”

Notes:

- Please use java.util.Scanner to handle input.