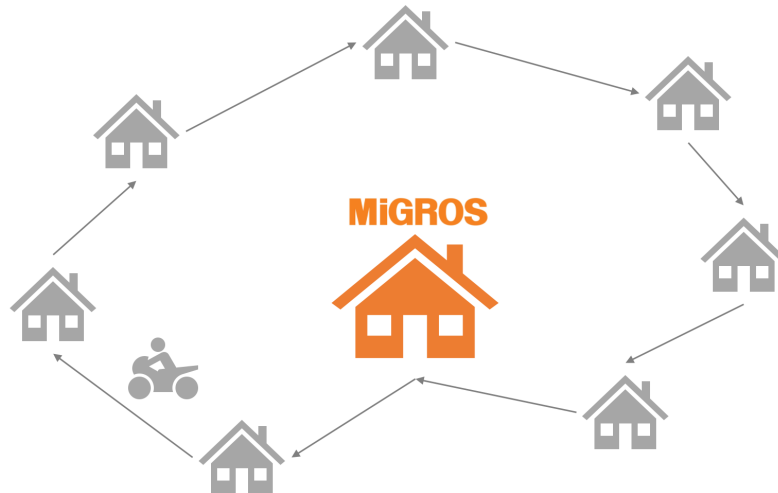


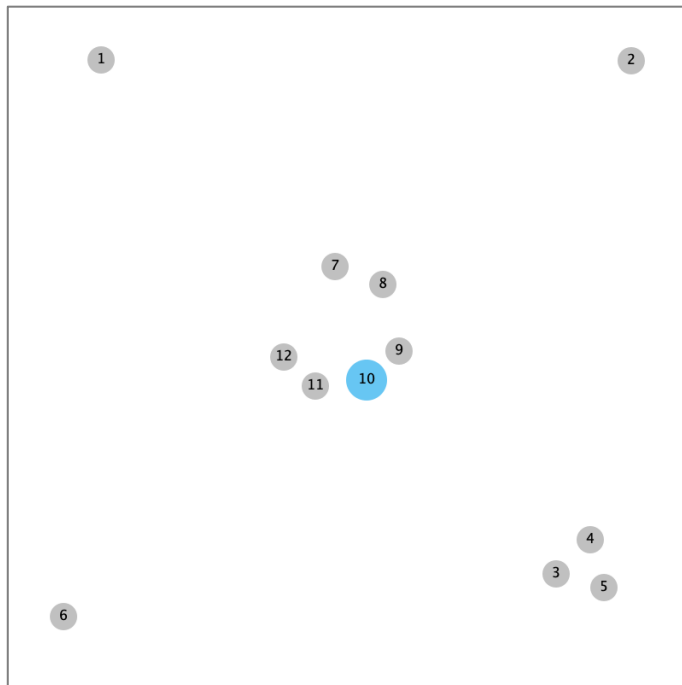
# Assignment 1 Migros Delivery

Due: April 25<sup>th</sup>, 2020 (6 am)

SWE 510



In this assignment, you are asked to write a Java program which finds the quickest delivery route of a Migros delivery car. In the map (See Figure 1a), there is a Migros store, denoted by the blue circle, and several houses, denoted by the gray circles. Each house placed an order from the Migros. The delivery car should visit each of them *once* to deliver the foods ordered. Coordinates of houses and Migros are given in an input text file as shown in Figure 1b where the first line refers to the first house etc. If a line in the text file contains "Migros" at the end of the line, it means that place is the Migros. Delivery car should start its trip from Migros and should return to the Migros. During the delivery, each house should be visited at most once. Your program should find the shortest route. See Figure 2.



(a)

Format of an input data file:

```
0.1363,0.9225
0.9125,0.9213
0.8025,0.1700
0.8525,0.2200
0.8725,0.1500
0.0813,0.1075
0.4788,0.6200
0.5488,0.5938
0.5725,0.4962
0.5250,0.4538,Migros
0.4500,0.4450
0.4038,0.4875
```

(b)

Figure 1. (a) Migros (blue circle) and houses (gray circles) and (b) sample format of the input file.

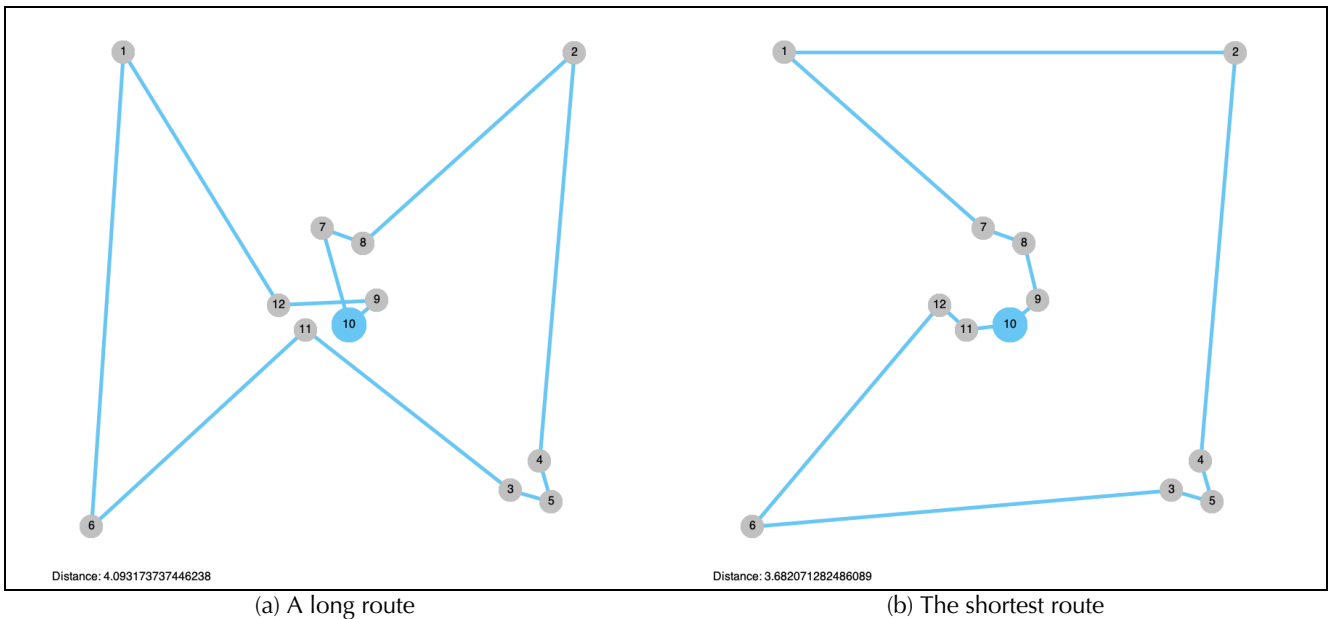


Figure 2. Two possible routes for the Migros delivery car. The route given in (a) is not the shortest route whereas the solution given in (b) is the shortest path with a total distance of 3.68207.

When the program runs, it should output the best route and the total distance to the command line, as shown below. Notice that the best route should always start with Migros (with a place number of 10, see Figure 1) and should end with Migros. This implies that the delivery car starts its route from Migros, visits the houses and returns back to Migros.

Sample output

```
Shortest Route: [10, 9, 8, 7, 1, 2, 4, 5, 3, 6, 12, 11, 10]
Distance: 3.682071282486089
```

You will be given multiple different input files. In your report:

1. Briefly explain your solution method to find the shortest route.
2. Provide console outputs for each input file as shown above.

### Bonus (20 pts):

Draw the shortest routes as shown in Figure 2b. For plotting, you are not required to use Java.

## Evaluation Criteria and Grading for Assignments

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### Code

20% Compliance to programming style, e.g., naming conventions, indentation, comments.

70% Correctness of the solution

### Report

10% Completeness of the report, compliance to the report format, correctness of the content and language.

## Submission Guide

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### Submission Files

Submit a single compressed (.zip) file to Moodle.

Name your zip file as name\_surname.zip.

Zip file should contain all source codes (under the \code directory), and report (in PDF format, under the \report directory).

Name the main code which is used to run your assignment as name\_surname.java.

Name your report as name\_surname.pdf.

Contents of each Java file should start with your name, student ID, date, and a brief code summary in a comment block.

### Mandatory Submission

Submission of assignments is mandatory. If you do not submit an assignment, you will fail the course.

### Late Submission Policy

Maximum submission delay is two days. Late submission will be graded on a scale of 50% of the original grade.

Submission is mandatory even if you submit your assignment late.

### Plagiarism

Plagiarism leads to grade F and YÖK regulations will be applied