# Computer assignment 1

Object-oriented programming in Python, DAT171

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**Grupp 31**

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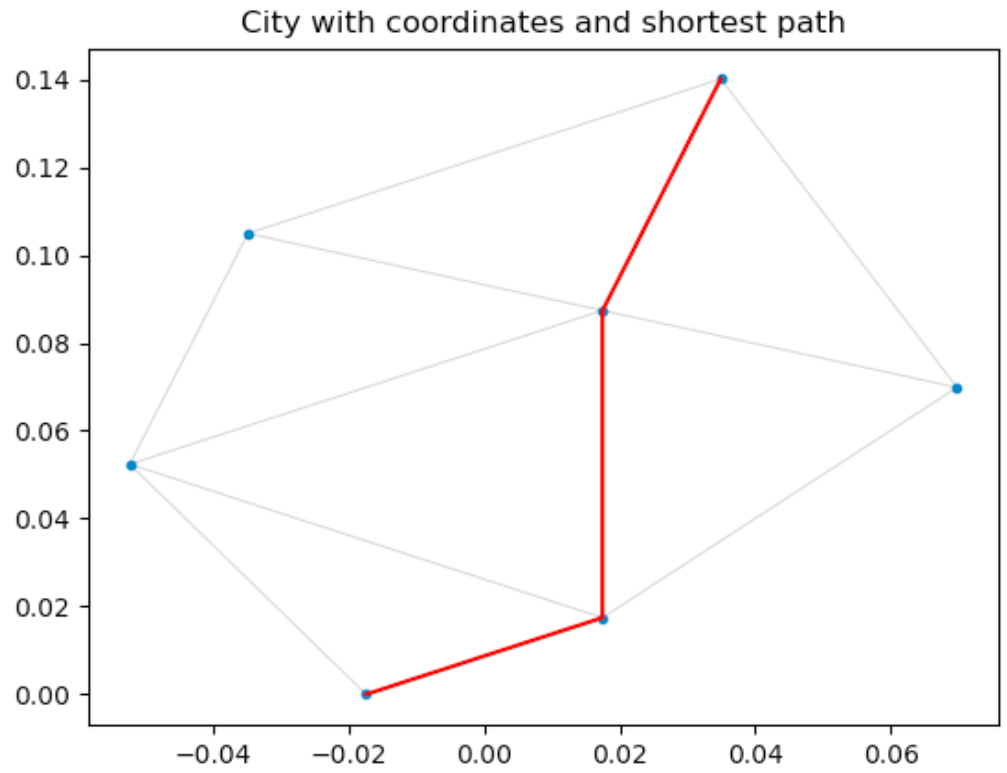
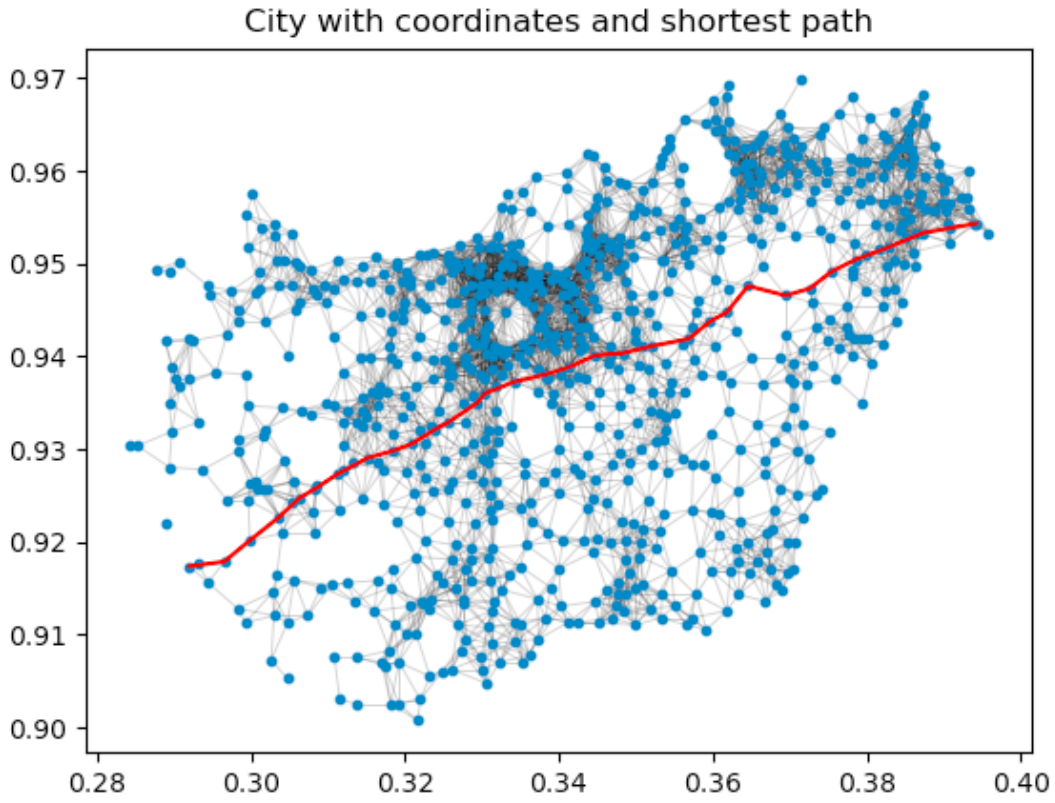
# Innehållsförteckning

## 1. Plots for the input files

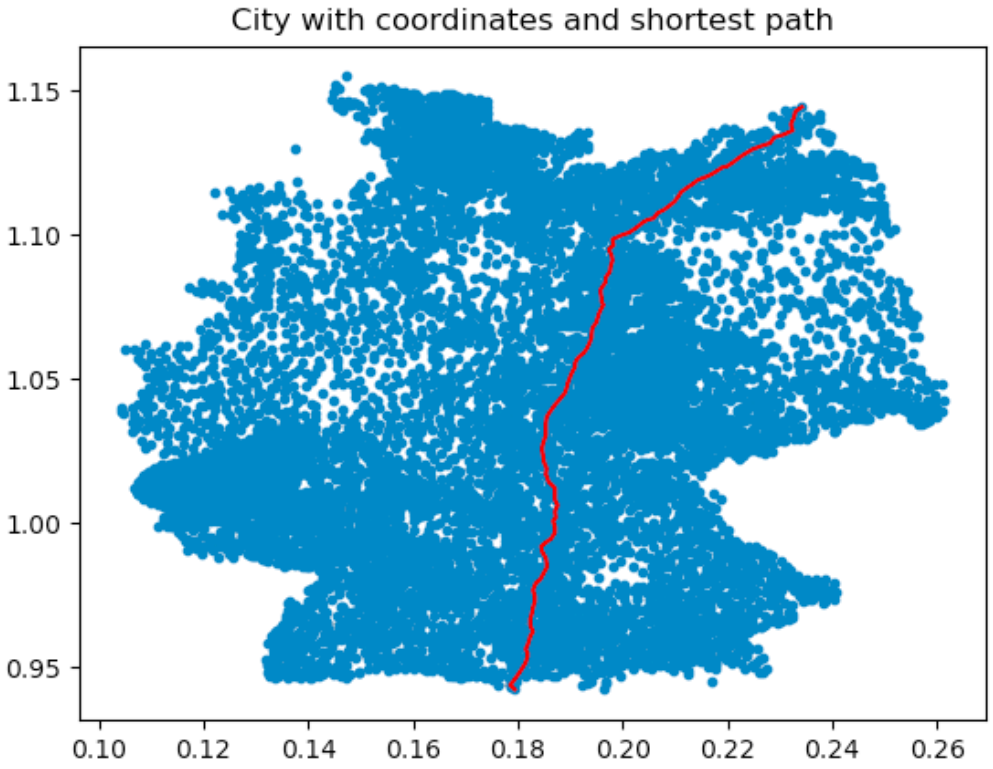
Sample coordinates:




Hungary:



Germany:


City with coordinates and shortest path
1.15
1.10
1.05
1.00
0.95
0.10
0.12
0.14
0.16
0.18
0.20
0.22
0.24
0.26

## 2.The results for the input files

**Sample coordinates:**

The shortest way is: [0, 4, 3, 5]

The total distance is: 0.16446989717973515

**Hungary:**
The shortest way is: [311, 19, 460, 629, 269, 236, 781, 50, 193, 571, 624, 402, 370, 153, 262, 554, 126, 251, 368, 221, 827, 300, 648, 253, 836, 73, 35, 219, 503, 789, 200, 702]

The total distance is: 0.11144861188215308

**Germany:**
The shortest way is: [1573, 7014, 2499, 3182, 2958, 4197, 4448, 2269, 5634, 3467, 6172, 4656, 4390, 3610, 3776, 4850, 6846, 764, 5614, 7656, 6251, 5004, 5932, 6906, 7571, 4712, 3700, 270, 4160, 2522, 2738, 2376, 4399, 3987, 4890, 2266, 5813, 6473, 6062, 6048, 11572, 8765, 8847, 3995, 9989, 10105, 10232, 4325, 7418, 3122, 7115, 10160, 9311, 4084, 10561, 4135, 4806, 629, 4652, 5762, 6162, 9350, 8352, 1112, 4887, 4699, 6987, 4651, 5513, 9104, 7083, 9513, 9338, 5357, 11054, 10743, 4728, 10971, 10152, 7472, 9467, 11126, 10789, 5970, 7292, 8473, 9856, 11780, 9570, 10476, 10078, 9956, 9998, 738, 10403, 9172, 11716, 6329, 7826, 8148, 6807, 9578, 7733, 7197, 7863, 9346, 10784, 8538, 11378, 10872, 5444, 4289, 6980, 6434, 7064, 7841, 9729, 10362, 7958, 10584]

Total distance: 0.22311918536607608

## 3. Timing information

The timing info for the different cities including the sample coordinates.

Information about the computer that the code been executed on:
MacBook Air (M1, 2020)
Krets: Apple M1
Minne 8GB
macOS Big Sur

**Sample coordinates:**

```
read_coordinate_file: 0.00031 seconds
construction_graph_connections: 0.00005 seconds
construct_fast_graph_connections: 0.00000 seconds
construction_graph: 0.00115 seconds
find_shortest_path: 0.00216 seconds
plot_points: 0.14136 seconds
```

**Hungary:**

```
read_coordinate_file: 0.00314 seconds
construction_graph_connections: 0.38524 seconds
construct_fast_graph_connections: 0.00000 seconds
construction_graph: 0.00229 seconds
find_shortest_path: 0.00333 seconds
plot_points: 0.11854 seconds
```

**Germany:**

```
read_coordinate_file: 0.04173 seconds
construction_graph_connections: 82.93153 seconds
construct_fast_graph_connections: 0.00000 seconds
construction_graph: 0.01206 seconds
find_shortest_path: 0.01105 seconds
plot_points: 0.72447 seconds
```