# Exercise Sheet 03

Deadline for submission is Friday May-20-22, 23.59h at your Olat course

Task 1 *Dijkstra Algorithm*

8 p.

Consider the subgraph $\bar{G} = (\bar{V}, \bar{E})$ given by the set of nodes $\bar{V} = \{20, 21, ..., 32\} \subset V$. Using Dijkstra's algorithm, calculate the distance from node 27 to all other notes and, in particular, determine the shortest path from node 27 to node 29. Use the notation (table) from the lecture.
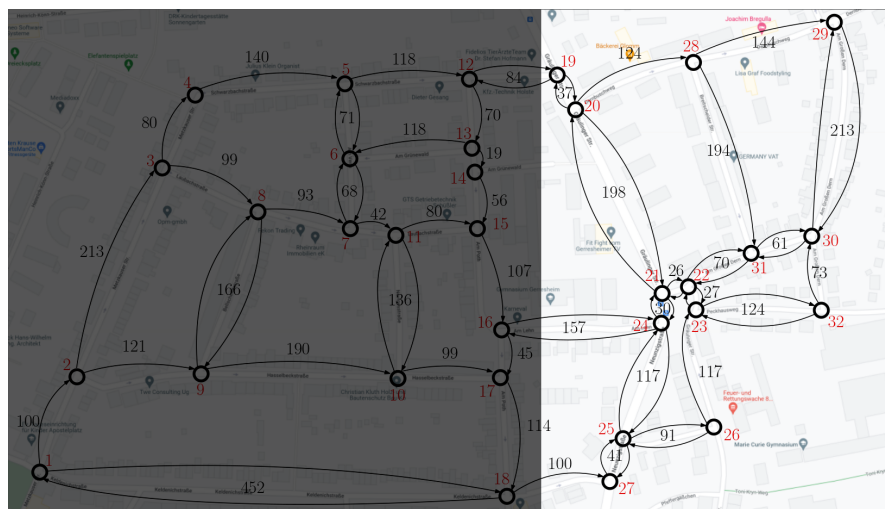
Task 2 *Bellman-Ford Algorithm*

8 p.

You go shopping and realize in the store that you only have 2.5 € with you. Using the Bellman-Ford algorithm, find an optimal selection of the following items so that you can buy them.

Item i	Price a_i	Benefit b_i
1: Bread	1.5 €	4
2: banana	0.5 €	4
3: Cookies	1 €	3
4: Rice	1.5 €	5
5: Spinach	1 €	4

Task 3 *Bellman-Ford Theorem*

4 p.

Prove Theorem 3.5 on the Bellman-Ford algorithm from the lecture.

Task 4 *Bellman-Ford*

2 p.

Calculate the running time of the Bellman-Ford algorithm from the lecture.

Task	1	2	3	4	total
Points	8	8	4	2	22
reached					