UNIVERSITÄT ZU LÜBECK
INSTITUT FÜR
THEORETISCHE INFORMATIK

Algorithmics, winter term 2023/2024

Project: The Nordic Film Days

Deadline 22/01/2024

Kim-Manuel Klein, Zacharias Heinrich, Jeremy Boy, Lennart Ostendorf

Remarks

- The project is to be submitted individually.
- The time frame for working on the project is from 18/12/23 to 22/01/24.

Flavor Text As every year, the Nordic Film Days[1] took place. (1/11/23 – 5/11/23)
Since you heard a lot of good about the Film days, you don't want to miss them next year. You, however, face the following problem: The films aren't screened one after another but rather simultaneously at different venues. Also, some films are shown repeatedly.
Following much to-ing and fro-ing, you decided to optimize your visit of the film festival by the following criteria: You are to watch as many *different* films as possible (no duplicates). Furthermore, you want to enjoy your time, that is, you prefer *good* films. Because you don't know the films yet, you rely on the IMDb[2] rankings. From these you derive that you want to reach an overall rating (sum of the ratings of the movies you watched) as high as possible over the entire time of the film festival. As you are unfortunately not able to teleport yourself back and forth between venues, you find that your bike is the second best option. Partially short distances and the fact that you can still join the screening up to 60 seconds after it started (hopefully) make up for this nuisance. Also, you consider different visit options e.g. only children's films.

Problem Description Basically, this is a scheduling problem but with duplicates. Given a set of films with the following parameters: title, weekday, start time, duration, location, and rating. A schedule is a subset of the films having the highest overall rating where two films mustn't overlap and no film may occur multiple times. It must also take into account delays caused by changing locations. See Table 1 for the delays. It is allowed to arrive up to one minute after the screening started.

from \ to	Filmhaus	InfinityDome	Kolosseum	Koki	Stadthalle
Filmhaus	0	3	6	2	4
InfinityDome	3	0	4	2	1
Kolosseum	7	4	0	8	2
Koki	4	3	7	0	4
Stadthalle	4	2	2	5	0

Table 1: Travel times (in minutes) between different venues by bike. Screens *CineStar* 1 – 7 are situated in the *Stadthalle*.

Exercise To pass the project, we expect you to present the following points convincingly in your final submission:
You find a ZIP-file *important datasets* with multiple realistic datasets in the Moodle. Create a diagram which includes the best reachable rating for each schedule (i.e., dataset).
Describe your approach in detail (in about two to five A4 pages).
Write down (1) how much time you spent working on the project and (2) the runtime(s) of your program(s).
Submit all relevant files in a ZIP-file in the Moodle. Also make sure the file name includes both your name and student registration number (Matrikelnummer).

You can use the *small datasets* for evaluation purposes. You can find the results in the *results* file.
Bonus Task: Can you also solve the *big datasets* (in reasonable time)?

[1] https://www.nordische-filmtage.de/en
[2] https://www.imdb.com