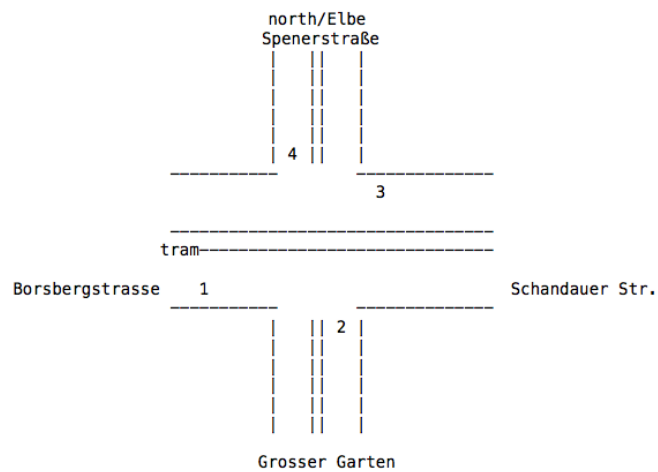


Problem Solving and Search in AI Practical Work

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SS 2015

Consider the crossing Spenerstraße/Borsbergstraße as sketched in the following Figure.



We have the following data for passing cars in a 30 seconds green phase.

Number	Direction	Cars
1)	left	10.30
	straight	12.78
2)	left	5.60
	straight	14.20
3)	left	3.00
	straight	6.40
4)	left	11.25
	straight	8.80

Besides the usual constraints that two conflicting directions can not be green at the same time, there needs to be some green light anywhere, etc., we have several further requirements.

- a) Pedestrian lights need a minimal time of green phase such that a slow walking person can cross. These are the following.
 - Borsbergstraße: 19.20 sec
 - Spenerstraße: 2×6.75 sec
 - Schandauer Str.: 3×7.15 sec
 - Bertolt-Brecht-Allee: 2×8.40 sec

Note, $i \times t$ means that the pedestrian crossing is divided into i parts and for each, one needs t seconds to cross.

- b) It is not allowed to have green lights for pedestrians when the cars can cross their way, except if both go in the same direction. For example,
 - if 1) left is green, the pedestrian light of Spenerstraße needs to be red.
 - If 2) left is green, the pedestrian light of Borsbergstraße needs to be red.
 - If 3) left is green, the pedestrian light of Bertolt-Brecht-Allee needs to be red.
 - If 4) left is green, the pedestrian light of Schandauer Str. needs to be red.
- c) Between switching of green phases consider 3 sec of red phase for all directions.
- d) Consider a maximal waiting time of 2 min always.
- e) The Buses and Trams should always pass when they are scheduled (exact schedule see stop Spenerstraße at <https://www.dvb.de/de-de/fahrplan/haltestellenauskunft/>).
- f) Calculate traffic lights from 6:00 to 21:00 with rush hours 7:30-9:30 and 17:00-19:00.
- g) During rush hour maximize the number of cars passing the crossing with priority on Borsbergstrasse.
- h) During the remaining time minimize the waiting time (red phase) with priority on Borsbergstrasse.

Implement the assignment in one formalism presented in the lecture (excluding the un-informed search algorithms). Work in groups of two (maximal three) students. Register till **7th July** with whom you work together and which formalism you plan to use.

- Each group must present their progress in a 10 min presentation on 14th July.
- **The practical work needs to be completed before the oral exam!!!**