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Entwurf von Softwaresystemen

Exercise sheet 6

Objectives of the exercise:

- Process synchronization with Semaphores
- Process synchronization with Await
- Petri Nets

Exercise 1 (Junction (40 points))

Figure 1 shows two streets crossing each other. One street has a one-way lane, the other one two lanes allowing two-way traffic. Turns are not allowed.

For each lane describe an endless process (in pseudo-code) which lets the traffic flow free of collisions, but efficiently (i.e. *lane2a* and *lane2b* in parallel).

To solve the junction problem, use

1. *Semaphores* (15 points) and
2. *Await*-constructs (15 points)

Further give a graph representation (using *action structure* notation (Aktionsstrukturen)) of the junction which is complete and maximal parallel. (10 points)

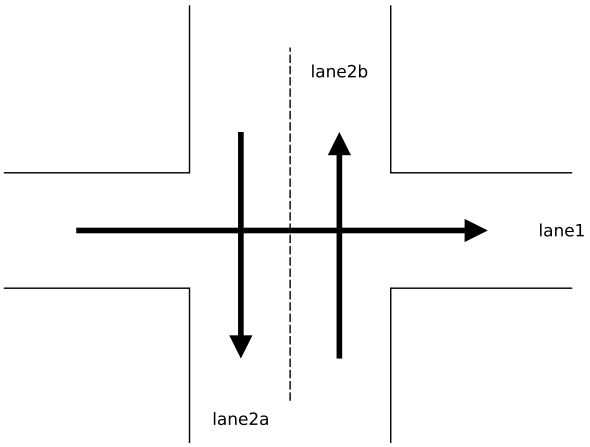

Figure 1: Street crossing with three lanes.

Exercise 2 (Mountain Railway (60 points))

Design a Petri Net which reflects the mountain railway exercise of the previous exercise sheet. Try to build it in a generic way, therefore allowing for different initializations of N and M by just having to provide more or less tokens at certain locations (and not having to redesign it with more or less locations).

Please refer to the detailed description and rules on how the railway works, which have been provided to you in the previous exercise sheet.

Remarks:

- The solution MUST be provided in a compressed file (zip/tar.gz) and sent to your tutor by the day before the next session at 18:00.
- You should be aware that you might have to present your solution to the rest of the class, so the preparation of it is encouraged.