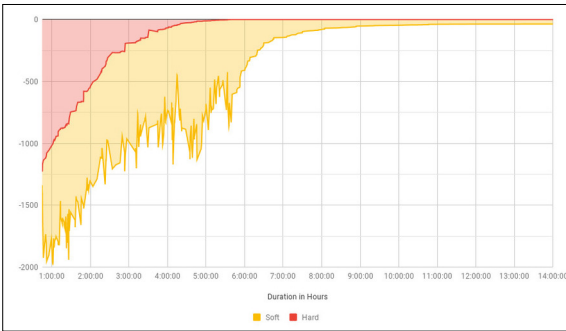


Raphael Jenni



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# Automation of the OST-RJ Examination Scheduling

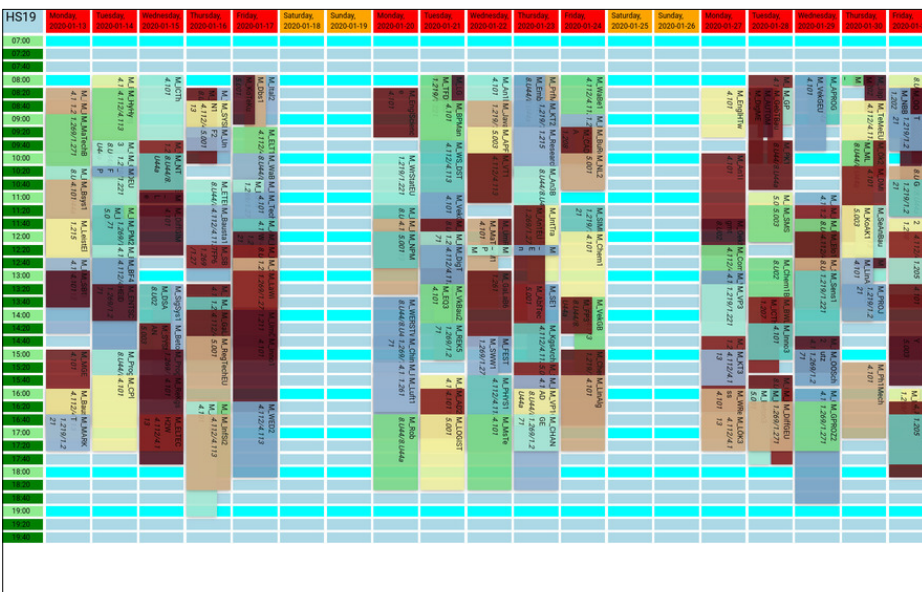


Score improvement while scheduling. If red is 0, the solution is feasible. If yellow is 0, the solution is perfect.

Own presentment

Number of Days with Two Exams	Number of Students with Two Exams on Same Day	
	In Original Schedule	In Generated Schedule
1	170	26
2	20	2
3	2	0
<b>Total</b>	<b>192</b>	<b>28</b>

Comparison of original and generated exam schedule regarding number of students with two exams on same day  
Own presentment



Visualization of a generated exam schedule. Columns represent the days, rows represent the time of the day.  
Own presentment

**Initial Situation:** Exam scheduling is known to be a challenging problem to solve. Manually scheduling the exams was executed in an enormous Excel file and took several weeks. With the help of computer-aided exam scheduling, we provided an initial version of an automated solution for the OST.

**Approach / Technology:** In the exam scheduler's current version, all mandatory rules for feasible schedules are fulfilled. One optimization rule is in place. The rules are defined with a constraint solver called OptaPlanner, an open-source library maintained by RedHat. The exams and students are imported from files, processed, scheduled, and exported as files and visualized in a web application.

**Conclusion:** The current results are not production-ready but provide a reasonable basis for future work. Scheduling the exams becomes much more comfortable. The manual work can be reduced from several hours to an absolute minimum. Comparing a generated examination schedule with the manually created one has shown the potential to create better examination timetables.

To make it production-ready, all the remaining rules need to be implemented. The frontend requires additional features, a design overhaul, and some quality of life features. For performance improvement, the algorithms for scheduling the exams can be optimized. With the continuation of this project, a fully automated scheduling process is possible. It promises significant improvements in the quality of the schedules and the time and iterations it takes to create such a schedule.