SceTris

A Course Scheduling System

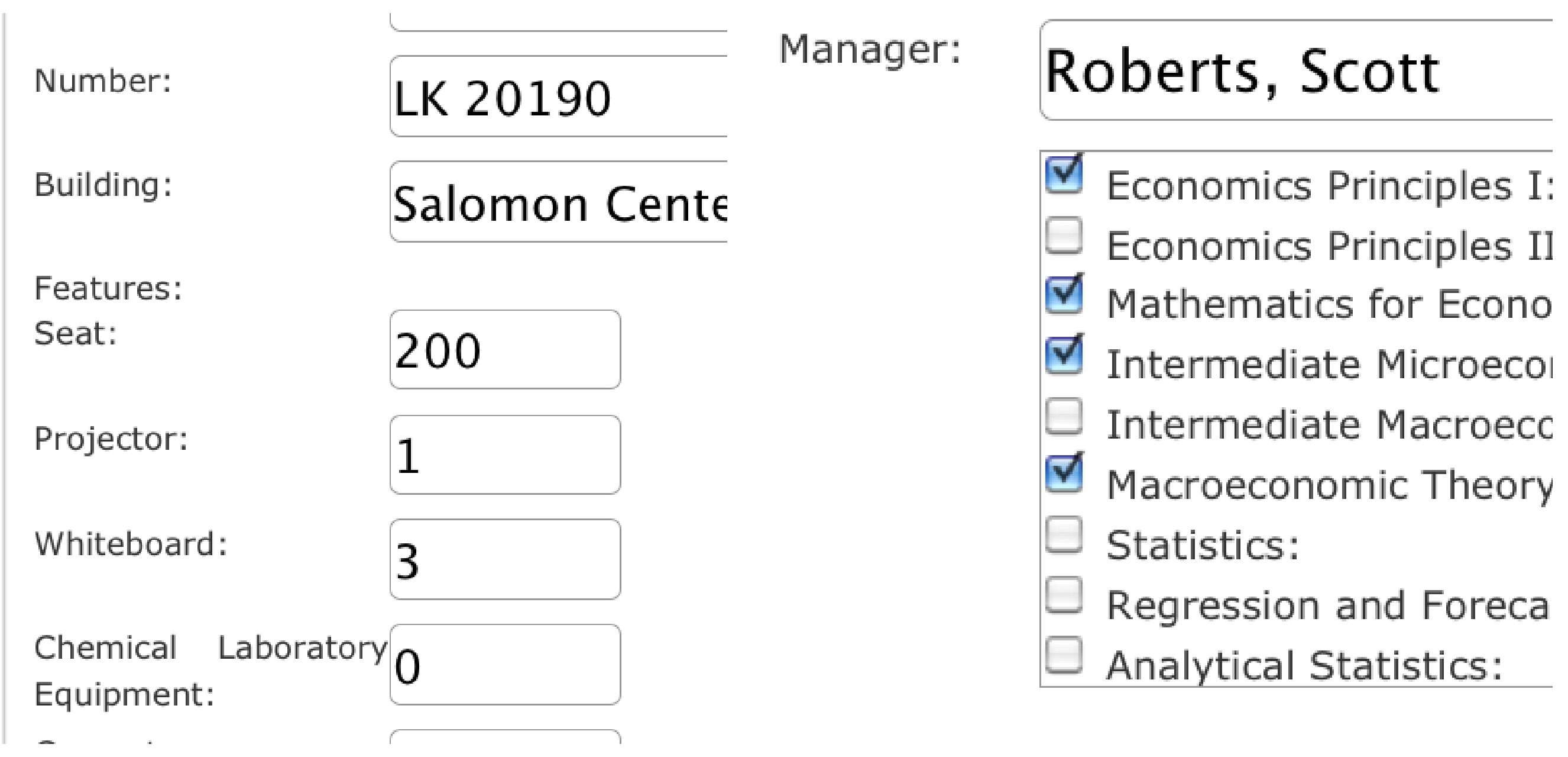
Course scheduling, especially at universites and similiarly large facilities, goes along with complex constraints. With increasing input and more constraints an optimal solution cannot be computed within a reasonable amount of time. The widely used approach of using a genetic algorithm seemed to be promising and was therefore chosen for our project. The genetic algorithm operations, setup, fitness function, crossover, and mutate are best conceived of as core components of the scheduler algorithm.

Konrad Reiche Julian Fleischer David Bialik André Zoufahl

“Yes Virginia, it can schedule all your data sets”

ENTER DATA

With the help of auto-generated forms **data is entered** into the system. The different input masks have a well-thought design for different types of resources.



Number:	LK 20190
Building:	Salomon Cente
Features: Seat:	200
Projector:	1
Whiteboard:	3
Chemical Laboratory Equipment:	0

Manager: Roberts, Scott

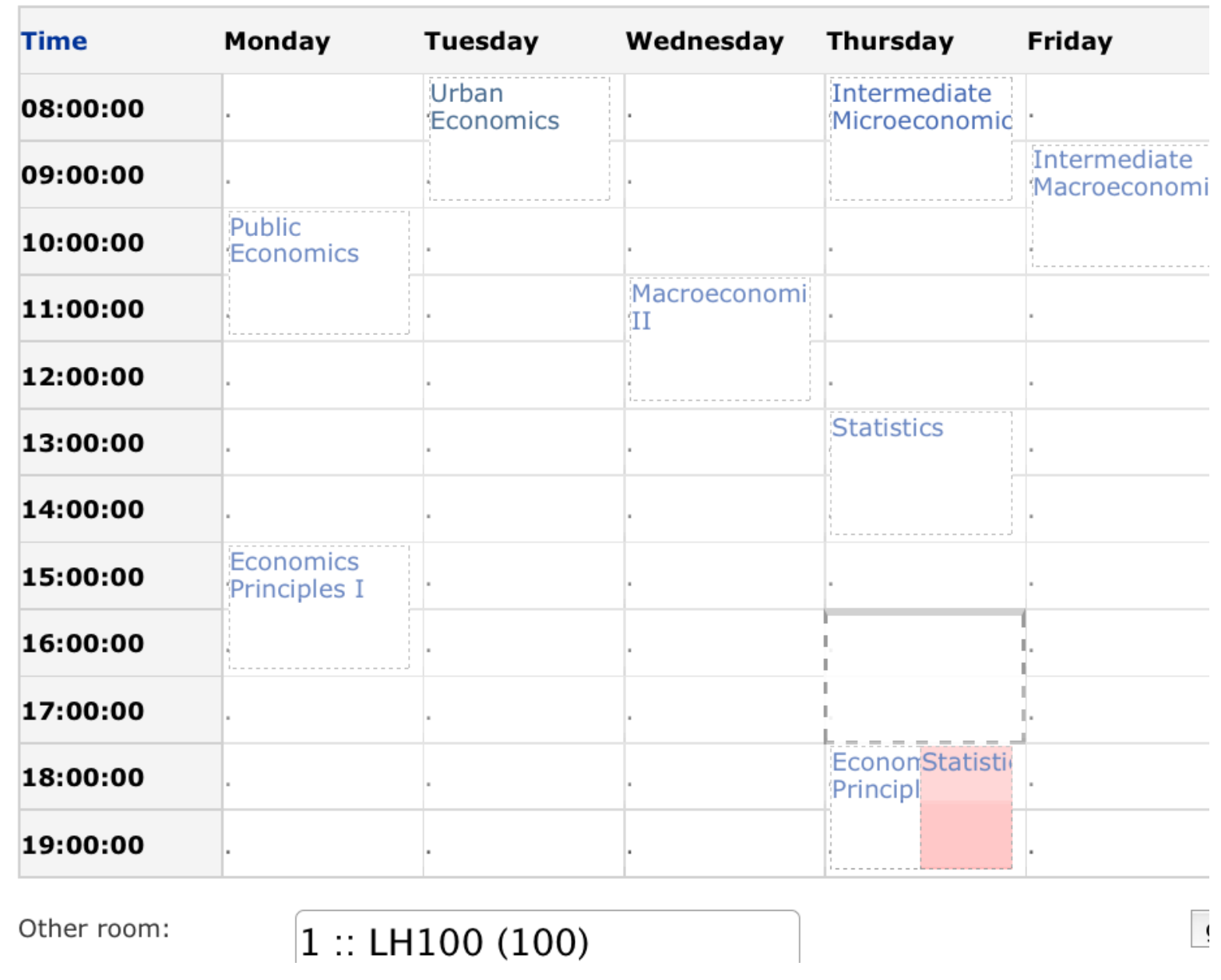
- ☑ Economics Principles I:
- ☐ Economics Principles II
- ☑ Mathematics for Econo
- ☑ Intermediate Microeco
- ☐ Intermediate Macroecc
- ☑ Macroeconomic Theory
- ☐ Statistics:
- ☐ Regression and Foreca
- ☐ Analytical Statistics:

GREEDY SETUP

Greedy Setup generates the initial population of candidate solutions by using a Greedy algorithm. Every course is allocated by placing it to the room which fits its constraints best, for instance the requirement for a specified amount of seats. In order to avoid overlapping in space and time the courses are placed one after another in the timetable.

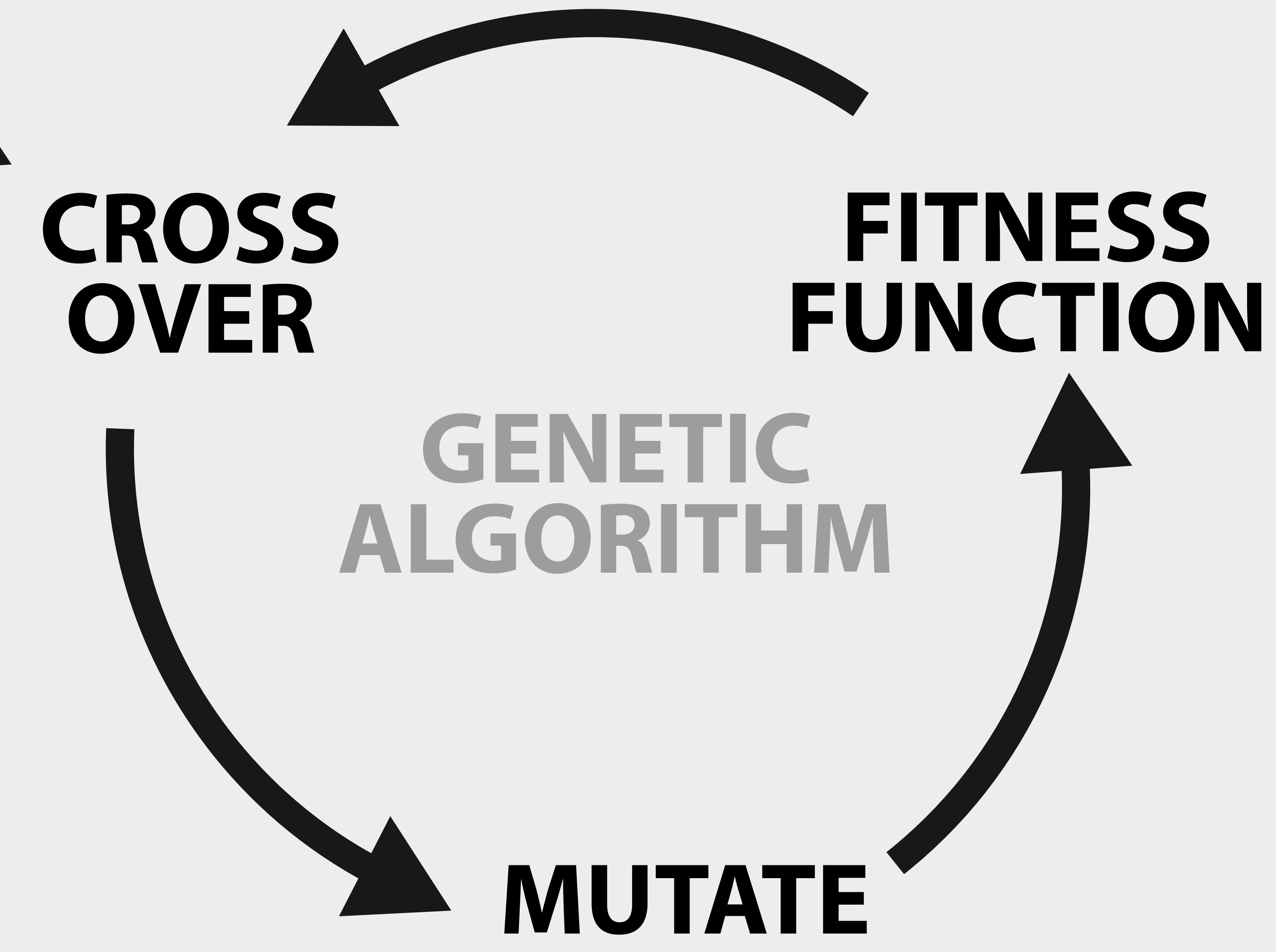
RESOLVE CONFLICTS

Remaining conflicts are visualized in the timetables. The user has to resolve the **conflicts** by adjustriung the courses.



Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:00:00		Urban Economics		Intermediate Microeconomic	
09:00:00					Intermediate Macroeconomi
10:00:00	Public Economics				
11:00:00			Macroeconomi II		
12:00:00					
13:00:00				Statistics	
14:00:00					
15:00:00	Economics Principles I				
16:00:00					
17:00:00					
18:00:00				Econon Principl Statisti	
19:00:00					

Other room: 1 :: LH100 (100)



CROSS OVER

FITNESS FUNCTION

GENETIC ALGORITHM

MUTATE

Crossover creates a new candidate solution by mixing and matching parts of two given candidate solutions. How the mixing and matching is done depends to the representation of a candidate solution. As our representation is a mapping of courses to allocated rooms and times, these allocations are mixed and matched.

Fitness function rates the candidate solution assigning it a score. The score is mapped to the number of constraints satisfied. The more constraints are satisfied the higher the candidate solution is scored.

Mutation creates a new candidate solution by taking a given candidate solution and changing a specified amount of course allocations to new, randomly chosen, course allocations. Selection iterates the given candidate solutions and keeps only the μ best solutions. The solutions are selected, according to the score given by the fitness function, through dropping the rest of the candidate solutions.

Team

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