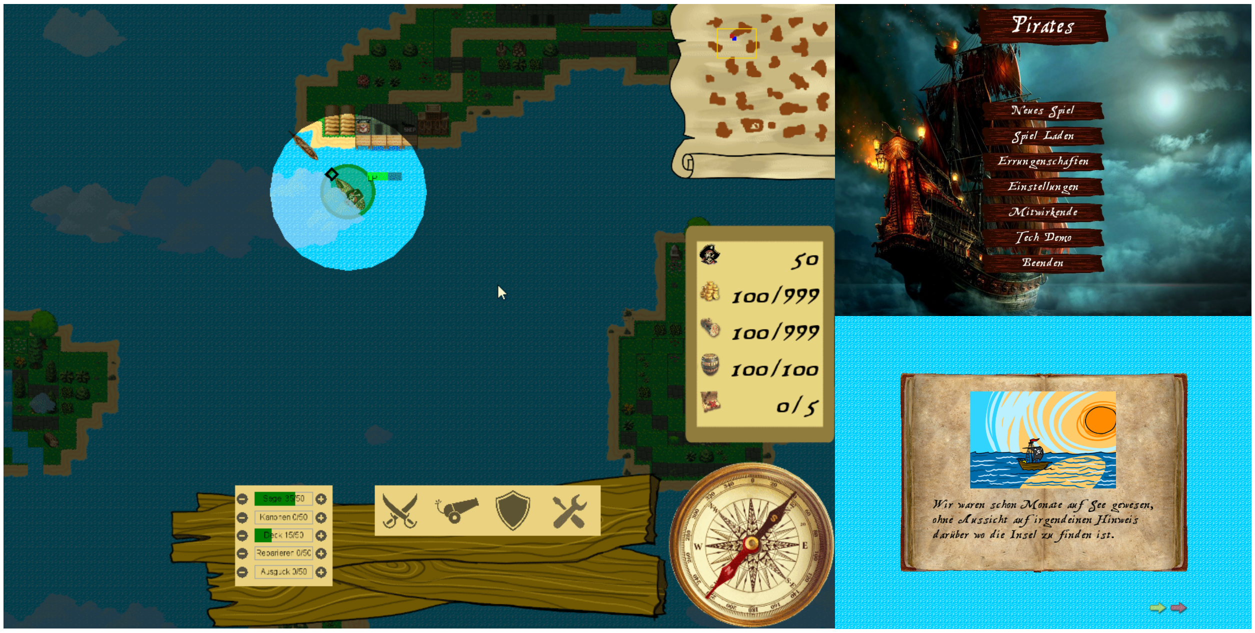
Software Portfolio Christian Breu

In this portfolio I want to show some of my projects that i worked on at university and in my free time.

Pirates



Wir waren schon Monate auf See gewesen, ohne Aussicht auf irgendeinen Hinweis darüber wo die Insel zu finden ist.

Description of the Game:
Pirates is a 2D RPG / strategy game where the player controls a pirate ship with the goal of finding the Island of Happiness. To find this island the player has to obtain map fragments of the treasure map by defeating other pirates or monsters. The player can explore the sea and various islands with his flagship. Through fighting with other pirates or earning money the player can extend and upgrade his fleet.

The main resource of the player are his pirates, these can be transferred freely from ship to ship to strengthen certain skills like damage, speed or repairing. This feature enables the player to adjust his fleet for his needs in different situations.

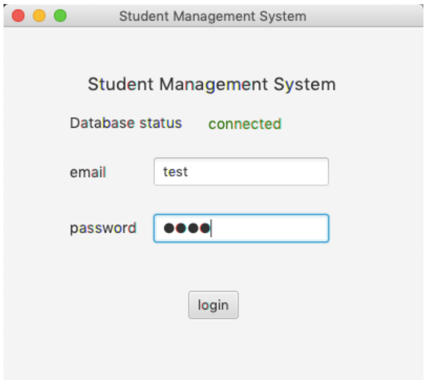
Development of the Game:
For this game C# and MonoGame was used. This is a project that was done with a team of 6 people over the course of 3 months using Scrum, SVN and Jenkins.
There was a weekly meeting to review the current sprint and to plan the next sprint where each team member was assigned to his tasks.
For the daily communication, Slack was used to quickly align on urgent topics and solve problems.
Because of the good communication and teamwork the base game was finished quite early and more time could be spent on debugging and balancing the gameplay.

My responsibilities in this project were the design and implementation of the different Game Objects like ships and the management of the ships and their actions like attacking other ships or moving to a waypoint. Another key task was the development of the enemy ships behaviour and balancing the battle gameplay.

My contribution to the source code of this project can be found on Github: (https://github.com/ShiroDevC/portfolio/tree/master/c%23/Pirates/src)

Student Management System

This was a small project to learn JavaFX basics. I created a student management system where each student can log in to see in which courses he/she is enrolled as well as basic information about the student like the name, Birthday etc. On login these information are retrieved from a sqlite3 database to display them in the My Page tab. In the Courses tab all available courses in the database are listed. When clicking on a course a dialog window pops up with information about the corresponding course and a button to enter the course or to leave the course depending on the current enrolment status.
Following are a few screenshots of the application showing the log in screen, the student and the course tab.

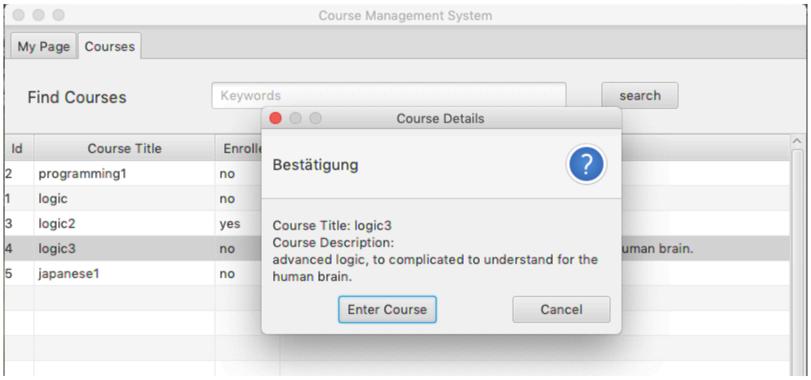


Student Management System

Database status connected

email test

password ●●●●

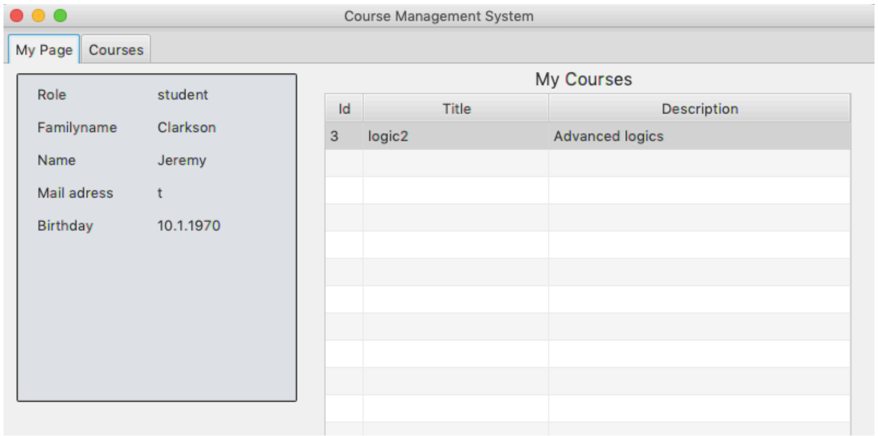


Id	Course Title	Enroll
2	programming1	no
1	logic	no
3	logic2	yes
4	logic3	no
5	japanese1	no

uman brain.

Bestätigung

Course Title: logic3
Course Description:
advanced logic, to complicated to understand for the human brain.



Role	student
Familyname	Clarkson
Name	Jeremy
Mail adress	t
Birthday	10.1.1970

My Courses

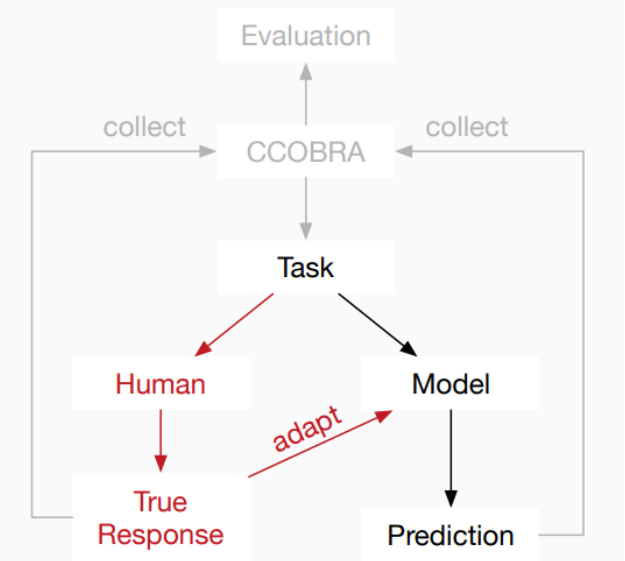
Id	Title	Description
3	logic2	Advanced logics

Individualising a Spatial Reasoner for the Mental Model Theory

This is my Bachelor Thesis in which I optimised a Cognitive Reasoning Model to be able to predict experimental results of individual participants more precisely by using the CCOBRA framework. This work is based on the Mental Model Theory for spatial problems. This theory describes how humans build mental representations of information. Various experiments were conducted in this research field. The experiments that this work is based on were about solving a given problem which consists of a number of premises. A premise can be a sentence like “The apple is left of the tree”. By reading these premises one after another humans build a mental model of the situation. The last premise in each problem is a question about a spatial relationship between two objects. This question is answered with yes or no.
Solving such problems is the main functionality of the Cognitive Reasoning Model which I optimised.

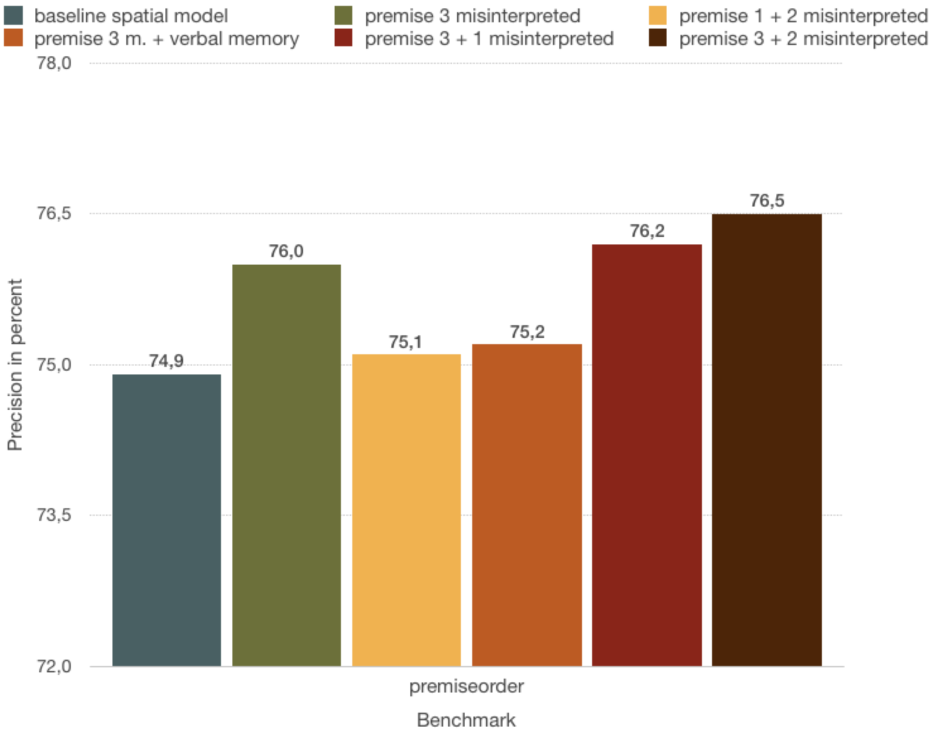
The first step was the reimplementation of the spatial reasoner from LISP to Python and check how the base model predicts the experimental results. Then I analysed the problems of the experiments to find possible mistakes that people would do when solving the problems of the experiment. With the results of this step I created individualisations for the reasoner to model certain mistakes that people could do.
I implemented these individualisations to change the way the reasoner solves the given problems. They can be used in all combinations so the behaviour of the reasoner can be adapted to different individuals.

CCOBRA is a framework that allows comparative testing of cognitive models on real data. With CCOBRA those individualisations could be used as an adaptive model to use the individualisations to predict individual participants data more accurately. The adaptive model learns when to use which individualisation when processing experimental data.



This graphic shows the adaptive processing of CCOBRA models. For each task the model will make a prediction of the human response. This prediction is then compared to the actual response and the model will be adapted accordingly.

The graph below shows the way how different versions of the same spatial reasoner can be executed and compared without much effort. All of these models use the same reasoner program but the individualisations that are used and the learning functions differ. This diagram is very similar to the actual output of the CCOBRA framework. The baseline spatial model is the unmodified reasoner. The other models have one or more individualisations active.



The complete code of the individualised Spatial Reasoner and the adaptive CCOBRA models can be found in github: (https://github.com/ShiroDevC/portfolio/tree/master/python/IndividualizedSpatialModels/ProgramFinal)