

Development of a Gamifiable Application for Programming Education

Creation & Implementation of Codable

Graduate



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Introduction: In this Bachelor's thesis, we were tasked with the creation and implementation of Codable. Codable is a new user-centered application for creating, managing and solving exercises in an academic environment. Its main goal is to improve the organizational and qualitative problems of exercises in the Department of Computer Science, which were identified in the preceding semester thesis written by Lukas Messmer and Mathias Fischler.

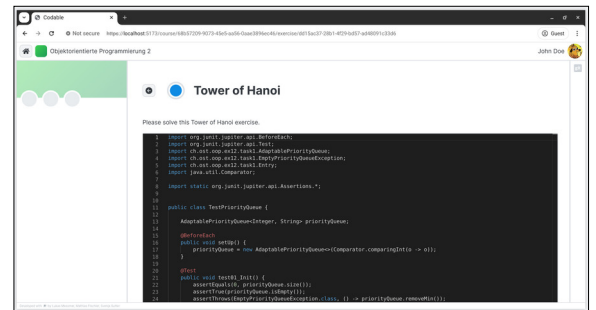
Result: In its current state, Codable allows the creation and management of exercises by lecturers and assistants. Exercises are structured into courses and can be granularly configured both in terms of their content (i.e. what the exercise should contain) as well as their logic (i.e. how the exercise should be evaluated). At the same time, the application provides a uniform interface for students to solve and submit exercises either locally with Git or via the browser.

The main strength of Codable comes from its modular plugin system, which allows lecturers to extend the functionalities of the application with regard to the exercise contents by implementing a dedicated C# interface. In addition, the application enables modeling exercise logics using a flow-engine-like system, which means that sophisticated workflows can be created that automatically run when students submit their exercises. Both of these features facilitate the streamlining of exercises across different courses, making it easier for students to solve and submit exercises even when complex tools or evaluation processes are required in the background.

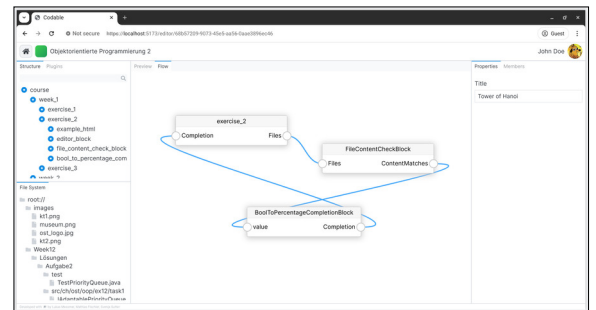
Conclusion: Codable is intended to be used productively in the coming semesters at the Eastern Switzerland University of Applied Sciences. If the application is well received, further development

might take place to improve upon its current features. We are confident that Codable can considerably increase both interest and engagement in exercises if adequate resources are provided to ensure the sustainable growth of the system.

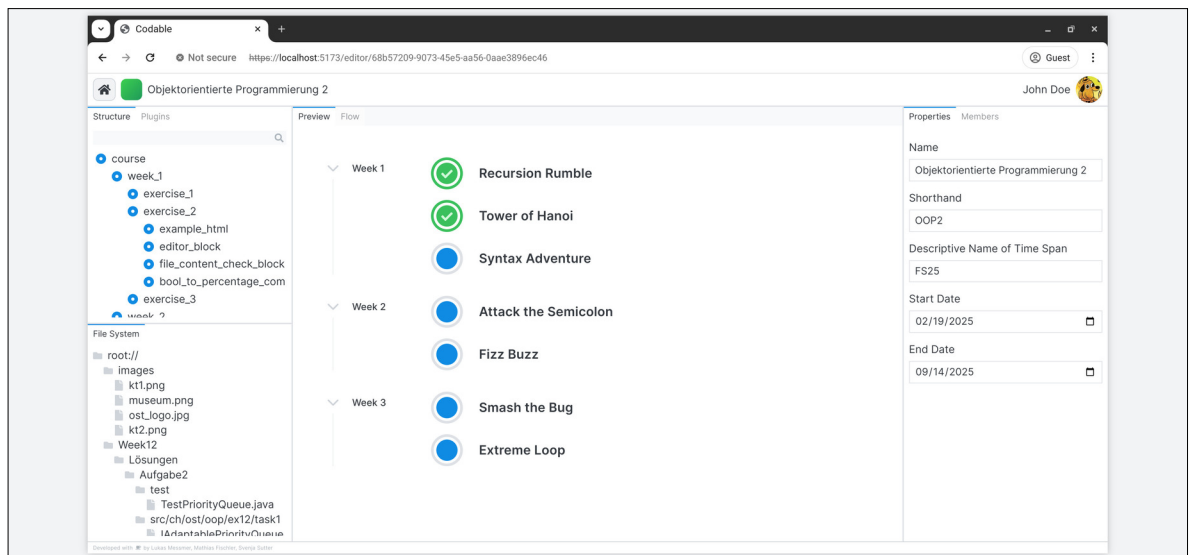
All exercises can be solved in the browser or locally using Git. Own presentation



Sophisticated exercise workflows can be modeled directly in the application using a flow-engine-like system. Own presentation



Exercises can be extensively customized in terms of their content and logic. Own presentation



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Subject Area
Application Design,
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