Development of a Gamified Application for Programming Education

Leveling-up Computer Science Exercises

Students

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Introduction: Programming exercises are a crucial component in teaching aspiring computer scientists practical knowledge about software development. At OST, many courses offer a wide range of different programming exercises, ranging from algorithm development in Java to artificial intelligence training in Python.

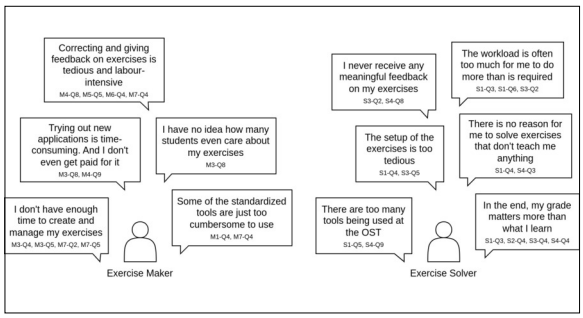
In this semester thesis, we were tasked with bringing gamification into the realm of university exercises. The main goal was to develop a software system that incentivizes students to engage repeatedly and consistently with programming assignments.

Approach: For this thesis, we employed a user-centered design process to evaluate and conceptualize a gamified application for programming exercises. We thereby proceeded as follows:

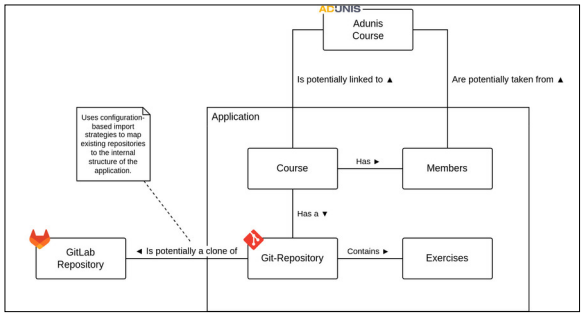
- We defined a user base consisting of 2 user groups
- We conducted 11 user interviews with different people from this user base
- We derived 101 tangible user stories from these interviews
- We conceptualized 5 aspects of an application that addresses these user stories, using existing applications and scientific papers as a foundation for our ideas
- We prototyped different features to ensure their technical feasibility
- We defined 40 functional requirements for our minimal viable product, which will be developed as part of our bachelor thesis

Conclusion: Through this thesis, we have concluded that an application designed to motivate students at OST to engage more regularly with their exercises cannot be developed on the basis of gamification alone. As such, our thesis focuses on the conceptualization of a software system that aims to unify and simplify the process of creating, managing, conducting and evaluating exercises. Such an application, although broader than initially intended, could improve the value of exercises at OST.

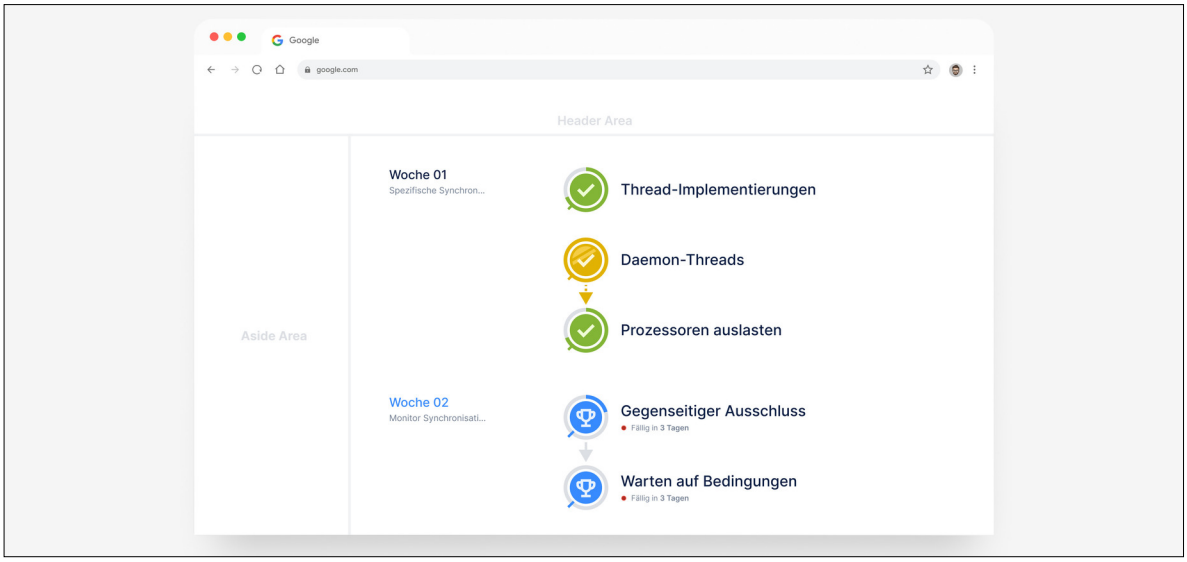
Our user interviews revealed various problems in regard to exercises
Own presentment



Existing tools and processes were taken into account during conceptualization
Own presentment



The planned application improves the exercise workflow
Own presentment



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