UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

Bachelor/Master Project

Educational Role Management in UML-MX©

Term: Winter term 2024/25

Language: English

Lehrstuhl für Wirtschaftsinformatik und Unternehmensmodellierung

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Motivation

The UML faces shortcoming which impede its suitability for teaching object-oriented modeling. With the UML and common UML modeling tools, it is not possible to model object diagrams as run-time instances of class diagrams. To counteract this problem, an adapted version of the UML has been developed, called UML++ (Maier and Schwarz 2024), which supports the instantiation and execution of UML models at run time. UML++ is supported by the modeling tool UML-MX (Frank and Maier 2024), which is an adapted version of the multi-level-modeling tool XModelerML (Clark and Frank 2020).

UML-MX currently offers modeling class and object diagrams, and offers learning units so that students are supported in exploring and experimenting with relevant topics of object-oriented modeling. However, the actual use in an educational setting calls for an extended version of UML-MX. This especially concerns the addition of *educational roles*, such as students, instructors, or administrators. A realm of literature concerning course management systems, interactive learning environments, tutoring systems, and related concepts can be consulted to identify suited roles.

Description

The core of this project is the identification of relevant roles in combination with rights that each role occupies. Following the analysis of relevant roles and rights, specific functionality to support different roles should be implemented (e.g., user log-in, add new modeling exercise, etc.). The scope of new functionality that should be implemented depends on the group.

You will be given access to the actual UML-MX source code so that you can develop all new functionality on a separate branch. You are asked to develop the code in Java.

Expected Outcomes

- Project report that contains
    - List of identified roles and rights
    - Justification of relevant implementation choices
- Implementation of new features in the UML-MX
    - Implementation of fundamental user-management features (log-in window, user database, …)
    - Implementation of role-specific tool access (e.g., students may not manipulate modeling exercise)
    - Implementation of role-specific functionality (e.g., teachers may add new modeling exercises)

Introductory Literature

- Clark, T., Frank, U.: Multi-Level Modelling with the FMMLx and the XModelerML. In: Bork, D., Karagiannis, D., Mayr, H.C. (eds.) Modellierung 2020 Proceedings, pp. 191–192 (2020)
- Frank U, Maier P (2024) UML-MX©: Boosting Power of Object-Oriented Modeling and Enriching User Experience.
- Maier P, Schwarz T (2024) UML++: Enhancing Student Learning of Object-Oriented Modeling through Executable Objects. In: *ACM/IEEE 27th International Conference on Model Driven Engineering Languages and Systems (MODELS Companion '24), September 22–27, 2024, Linz, Austria.*

Application Procedure:

Please apply via email to the supervisor. Please attach a short letter of motivation (approximately ½ A4 page) and a recent performance record ('Leistungsnachweis'). You can apply individually or in a group of **2-4 participants** (in this case each person should still send a separate e-mail, however point to the other members of the group).

All applications must be send to pierre.maier@uni-due.de

Important Dates:

01 Oct: Publication of project

14 Oct: Application deadline

18 Oct: Notification of acceptance decision

23 Oct: Kick-Off Event

28 Oct, 12:00pm: Final confirmation by project group (after this stage, cancellation will be marked as a failed exam)