Software Product Line Engineering

Summer 2019, Assignment 5

Bauhaus-Universität Weimar

Prof. Dr.-Ing. Norbert Siegmund
Stefan Mühlbauer, M. Sc.

Assignment issued: Friday, 7 June, 2019
Submission due: Thursday, 20 June, 2019, 23:59 CEST
Presentantion: Friday, 21 June, 2019

Task 1: Theory of Feature-Orientation (14 marks)

(a) Explain the terms *feature*, *collaboration*, *mixin*, *jampack*, and *class* as well as the relations between them. (5 marks)

(b) What are the advantages and disadvantages of *mixins* and *jampacks*, under which conditions would you use which technique? (3 marks)

(c) In object-oriented programming, *inflexible extension hierarchies* can arise when implementing variability. How does feature-oriented programming address and bypass this problem? (1 mark)

(d) How does the AHEAD composer address the *preplanning problem*? (2 mark)

(e) What is the *feature traceability problem*? (1 mark)

(f) Is the feature traceability problem prevalent in your implementations of the chat SPL from the previous assignments? If so, what are the consequences? (2 marks)

Task 2: Components and Features (DE students only, 5 marks)

(a) Why is it hard to find the appropriate size for components (library scaling problem)? Which properties of a component are opposing each other in this context? (3 marks)

(b) How can the library scaling problem be addressed? (2 marks)

Task 3: Feature-Oriented Implementation (12 marks)

(a) Re-implement the chat application SPL from the previous assignments using feature-oriented programming and the AHEAD composer. The application should have the following features, which can have a simplistic realization: Color, Authentication, GUI (no command line interface required!), Logging (8 marks, 2 marks per feature)

(b) Extend the implementation with a new optional feature *UserNames*. The feature adds support for user names (e.g., `/username bob` → login of user bob) and provide the possibility to send private messages to other users (e.g., `/msg alice Hi, My name is bob!` → sends "Hi, My name is bob!" to Alice) (4 marks)

Note: *The AHEAD composer is designed for and compatible with Java 1.4. Therefore, some features from more recent Java versions may not be supported. To change the Java version of an Eclipse project right click on the project, select "Properties" -> Java Compiler -> Enable checkbox "Enable project specific questions" -> Set "Compiler compliance level" to the desired version and rebuild the project.*

Submit your answers (PDF) and implementation (FeatureIDE project) as an archive with name and matriculation number until 20 June, 23:59 CEST to `stefan.muehlbauer@uni-weimar.de`.