17-708: Software Product Lines

Assignment 7: FOP/AOP Implementation

Task 1

Reimplement the Chat system from Assignment 3 (not Assignment 4 or 5) as a product line, using **either** feature-oriented programming **or** aspect-oriented programming. Aim at moving all feature code to feature modules or aspects, such that they are not compiled when the feature is not selected.

For Java code, we recommend using FeatureHouse integrated in FeatureIDE for FOP and AspectJ for AOP.

Task 2

Add a new feature *Sound* that plays a sound whenever a message is sent or received. Consider potential interactions with other features.

Task 3

Reflect on the implementation, especially the following two aspects:

1. Effort: Was the creation of the product line a difficult task? What were the challenges? Was adding a new feature challenging? How much planning was required? How does it relate to your experience with frameworks (HW4) and preprocessors (HW5)?

2. Modularity: Are features easy to understand in isolation? How can you reason about interactions? Are they fragile toward changes in other parts of the system?

A good reflection document does not only present facts but also interprets them in depth and adds additional value by adding judgments from experience or opinions. Do not merely recite textbook opinions but discuss whether your experience aligns with them. A good reflection document will include concrete statements about lessons learned, with clear supporting evidence, such as examples, to support the claims. For example, "It is easy to understand in isolation." is weakly supported. One could strengthen it with examples from the development experience as follows: "One source of difficulty was the integration of components A and B, because the API for A was similar but slightly different from that of B… In the a larger system, this could have the following consequences.. Once could try to use … instead."

Deadlines, Technicalities, and Hints

Finish the implementation and reflection document by Nov 23, 11:59pm.

Create a branch “aop” or “fop” in the provided GitHub repository. Provide brief mapping from features to names (e.g. macro names, flags) used in the implementation in a README file in the root of the repository.

Add the reflection document to the root of the directory. Both .pdf files and pure text files (e.g. Markdown) are acceptable. Create explicit subsections in that document for the two aspects. The entire reflection document should not exceed 1000 words (soft limit).

At the deadline, we will take a snapshot of your GitHub repository.

Grading

We expect

- A fop-based or aop-based product-line implementation of the chat (both client and server if needed), including the new feature
- A reflection document with two subsections discussing in-depth the stated questions.