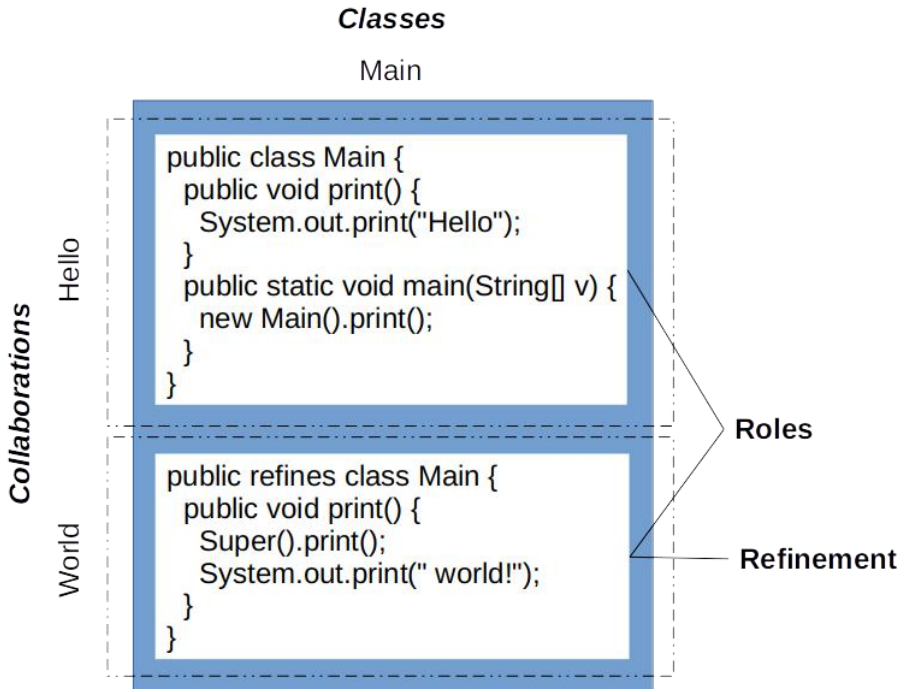
Software Product Line Engineering

Lab Class 8 / Assignment 5

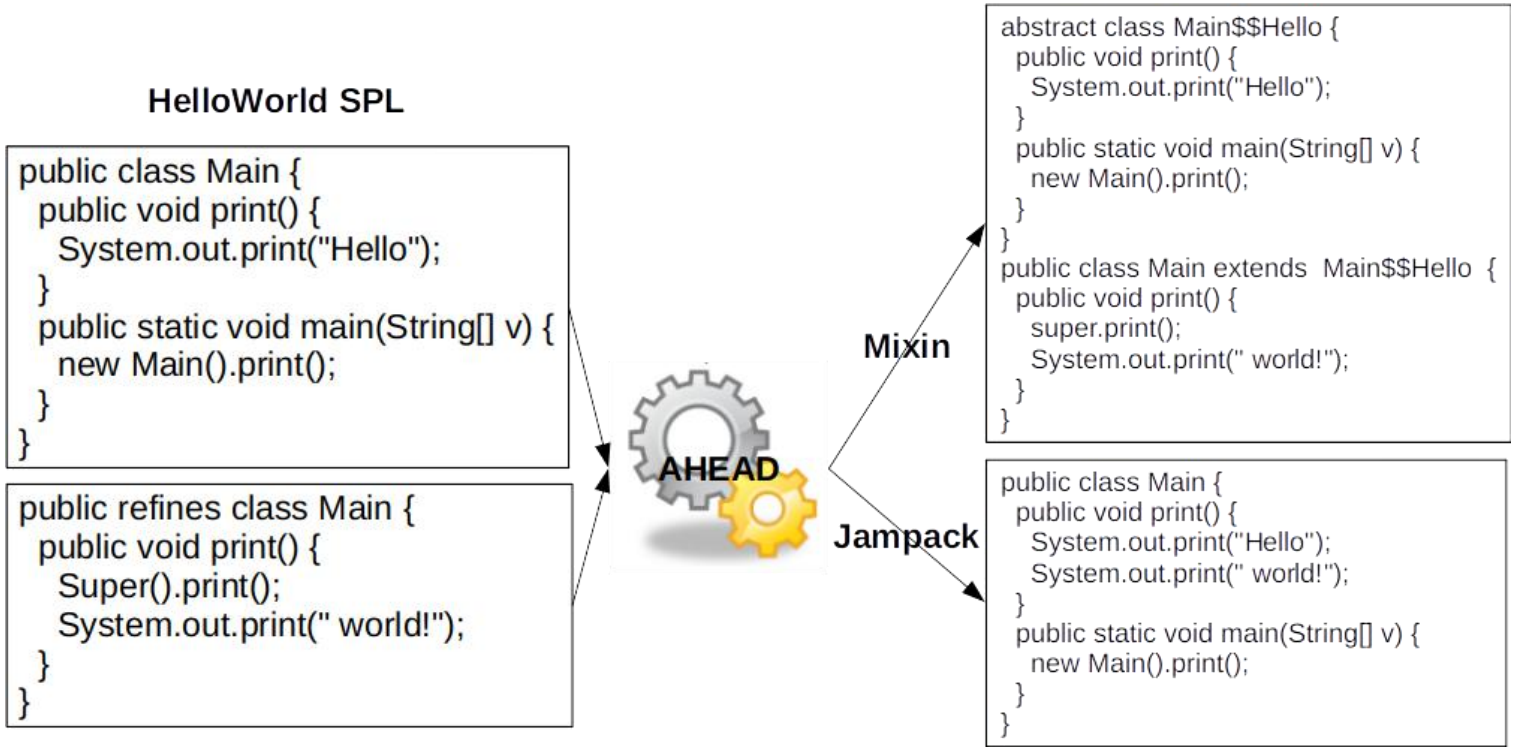
1a) FOP terminology

- Explain the terms feature, collaboration, mixin, jampack, and class

class	abstract model for similar entities
feature	characteristic behavior of a software system
collaboration	interplay of classes/parts thereof that implements a feature
mixin	technique for refinement composing
jampack	technique for refinement composing



1b) Mixins vs Jampaks



- **Mixin**: composition using inheritance
  - easy to implement
  - performance overhead
  - not all languages use inheritance
- **Jampak**: composition using superposition/nesting of ASTs
  - hard to implement
  - no performance overhead
  - uniformity, no inheritance required

1c-d) How does FOP address...

- ... *inflexible extension hierarchies*?
  - Refinements are “applied" automatically on-demand by the composer.

- ... the *preplanning problem*?
  - Refinements are possible on every granularity-level
  - no explicit extension points

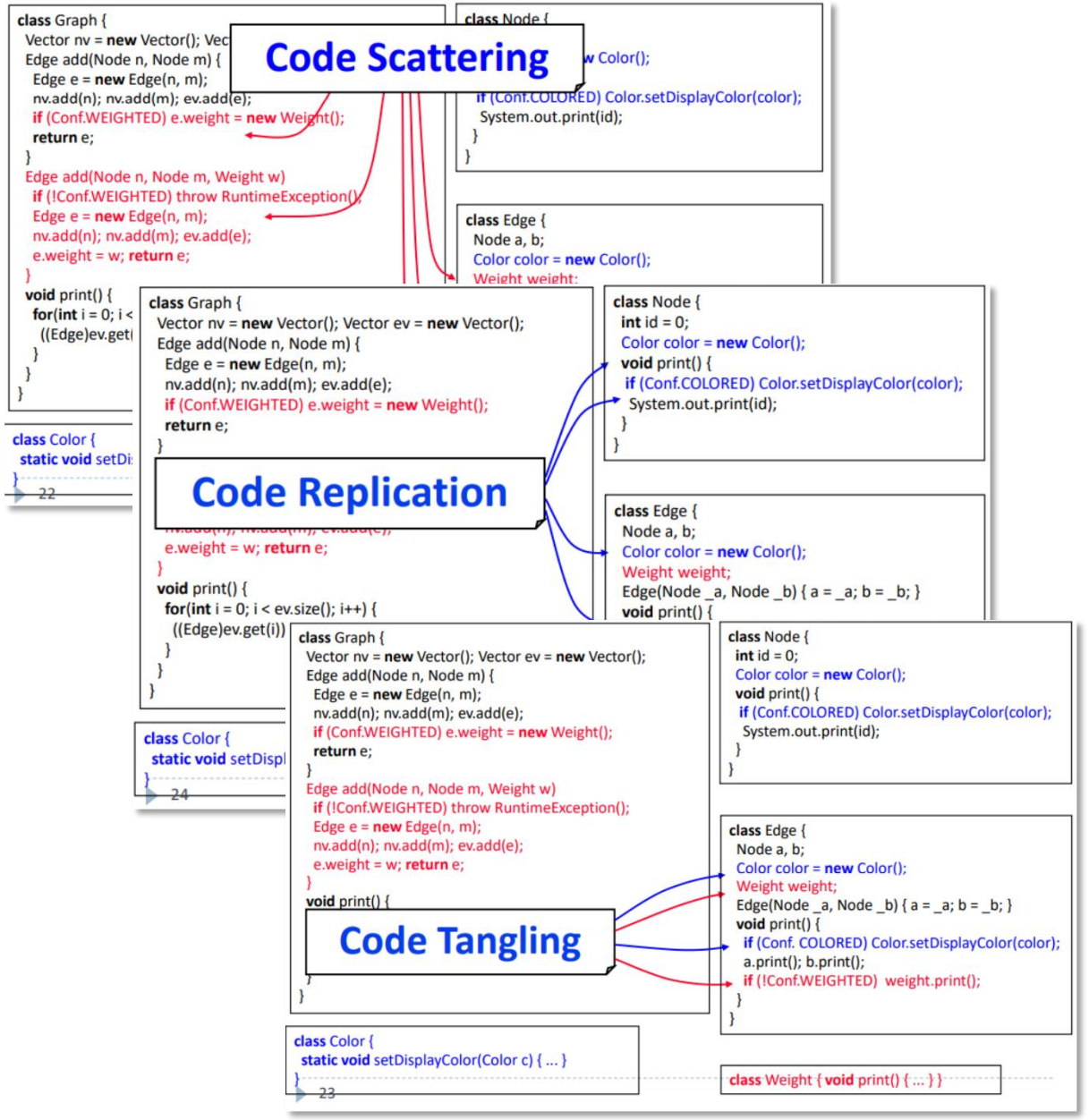
1e-f) Feature Traceability

- Feature Traceability Problem:
  - How to map features to source code?
  - What code belongs to what feature?

- Feature traceability in FOP is achieved by matching features with source code folders per feature

  /features/Base/ClassA.java
  /features/Optional1/ClassB.java
  /features/Optional2/ClassB.java
  ...

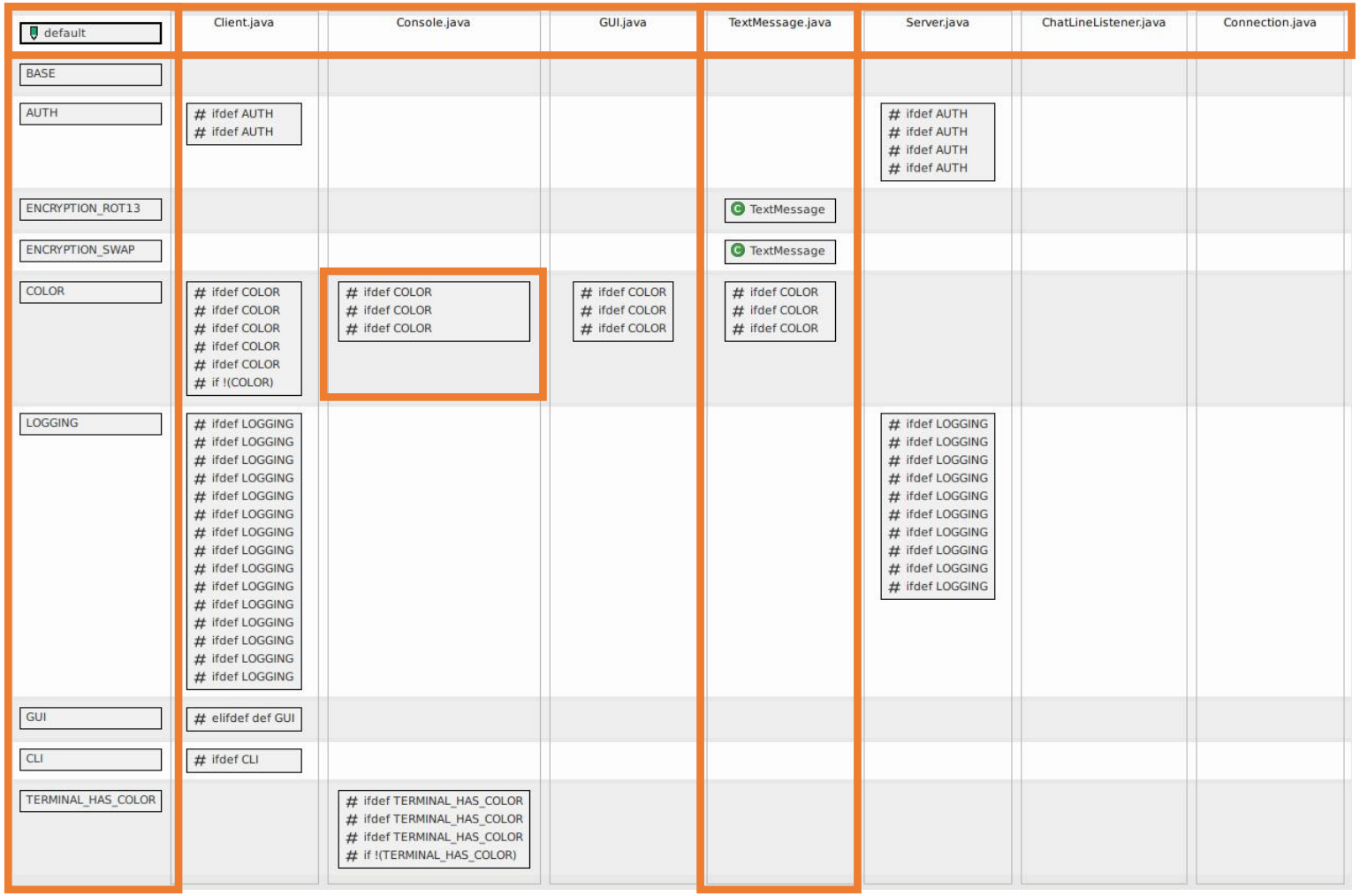
- No feature traceability leads to code scattering, replication and tangling



Detour: Collaboration Diagrams with *FeatureIDE*

Collaboration diagrams show...

- classes
- features
- roles
- collaborations



2) Library Scaling Problem (Components)

- Limited scalability due to opposing properties
  - reusability vs. variability -> performance trade-off
  - reusability:
    - Smaller components are easier to reuse (no unwanted code)
    - Smaller components provide less features and require more glue code (overhead!)
  - variability:
    - Big components provide less variability, but require less glue code
- Mitigation
  - domain analysis!
  - planned systematic reuse (only) within the software product line