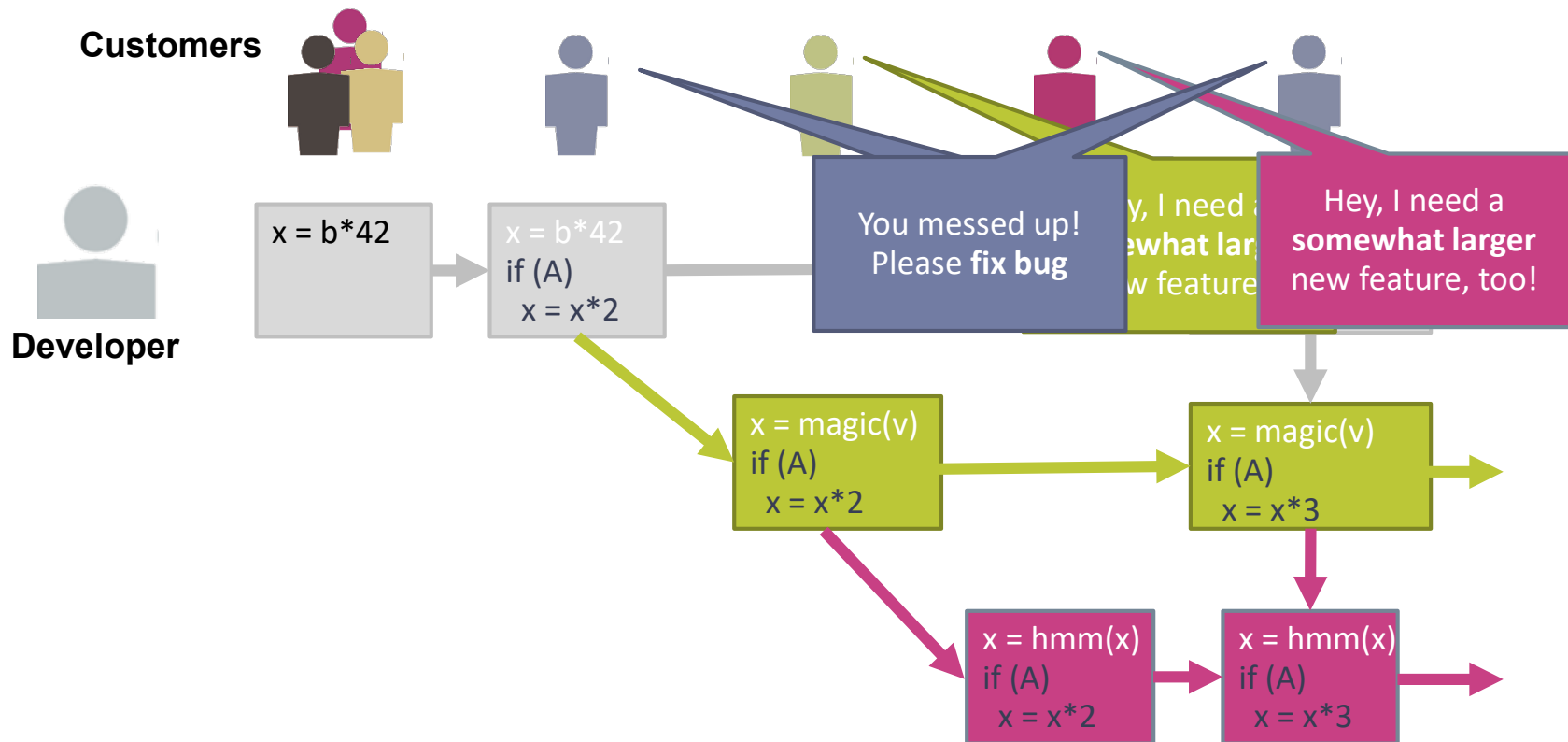


Software Product Lines

Organizational Matters

Daniel Strüber, Radboud University

Developing custom-tailored software



How to develop custom-tailored software efficiently?

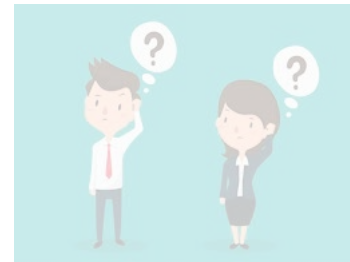
Why custom-tailored software?



Personalization



Resource
constraints



Usability



Security

Companies rely on custom-tailored software



Sources: Software Product Lines Hall of Fame <https://splc.net/fame.html>
+ TiCToC <https://tictoc.cs.ru.nl/Partners>

Printer firmware



On-board systems for boats



Practical context of this lecture

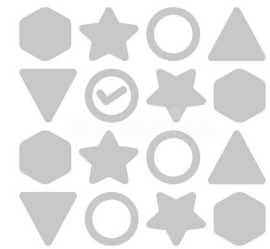
A software product line is...



a family of software-intensive systems



satisfying the needs of a particular market segment (*domain*)



built from a common set of core assets (*implementation artifacts*)

Learning objectives

By the end of the course, students should be able:

1. to reason about advantages and disadvantages of classic as well as advanced programming methods, including preprocessors, version control systems, components, frameworks, aspect-oriented programming and feature-oriented programming
2. to evaluate, select and apply programming methods, particularly with regard to the development of software product lines
3. to develop a configurable system by using advanced programming methods with their available tool support, including specialized IDEs, configuration tools and modeling tools
4. to reflect on characteristics of configurable systems, the use of software product line methods, and the implications for the development process

Agenda

- ▶ Formal and organizational matters
- ▶ A short introduction to the topic
- ▶ Development proces for software product lines
- ▶ Variability modeling

Formal and organizational matters

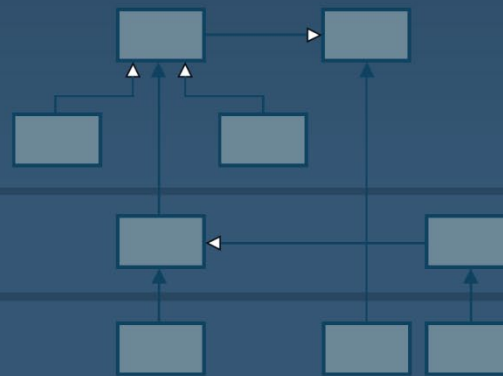
Course with close ties to research

- ▶ Relatively young research area
- ▶ We will cover recent research results
- ▶ Literature
 - ▶ Recommended text book
 - ▶ Research papers
 - ▶ Reference lists at the end of each chapter
- ▶ Potential opportunities for own research: MSc theses, research internships, PhD theses

Sven Apel · Don Batory
Christian Kästner · Gunter Saake

Feature-Oriented Software Product Lines

Concepts and Implementation



 Springer

Required knowledge

- ▶ Required

- ▶ Basic knowledge in object-oriented programming and Java

- ▶ Optional

- ▶ Basic knowledge in C
 - ▶ Basic principles of software engineering (modularity, version control, design patterns, development process models)

Course schedule

- ▶ 6 ECTS
- ▶ Schedule stretches over KW1+KW2
 - ▶ KW1 + (parts of) KW2: lectures and assignments
 - ▶ KW2: 4-week group project
- ▶ Weekly sessions on Monday afternoon
 - ▶ Monday 13:30-13:15: Lecture
 - ▶ Monday 15:30-17:15: Tutorial (only this week: Lecture)

Lecture sessions

- ▶ **Monday 13:30 – 15:15**

- ▶ Generally via Zoom

- ▶ Presentation and discussion of lecture contents
- ▶ Slides will be made available on Brightspace before lecture

Tutorial sessions

- ▶ **Monday 15:30 – 17:15**
 - ▶ Generally via Zoom
 - ▶ active participation is expected
- ▶ Live exercises
- ▶ Home assignments

Home assignments

- ▶ In groups of 3 people
 - ▶ Group formation: we will use a part of today's 15:30 session
 - ▶ Otherwise: find group members in Brightspace forum
- ▶ Programming and reflection assignments
 - ▶ Published on Brightspace
 - ▶ presentation and feedback during tutorial session
 - ▶ Java, plus some language extensions and tools
 - ▶ OOP, preprocessors frameworks, FOP, AOP

Group project

- ▶ A part of KW2
- ▶ Topic of choice within course scope, for example:
 - ▶ Implementation of a case
 - ▶ Conducting a small research project
- ▶ Main parts
 - ▶ Topic pitch + green-lighting
 - ▶ 4 weeks of implementation work
 - ▶ Final presentation and discussions

Examination

- ▶ Assignment part
 - ▶ Need to have completed the home assignments “satisfactorily”
 - ▶ one no-submit is OK
 - ▶ Need to have completed group project
- ▶ Written exam
- ▶ Group project
- ▶ Grade
 - ▶ Final exam 70%
 - ▶ Group project 30%

Questions and comments in Zoom

- ▶ Interaction is desired
 - ▶ Please ask questions if something is unclear
 - ▶ Ask in chat – we will keep an eye on it
 - ▶ We might ask questions to you as well
 - ▶ Ask publicly, so that everybody can benefit from the question
 - ▶ ideally: during lesson
 - ▶ between lessons: discussion forum on brightspace