Modul: Fortgeschrittene Programmierkonzepte (FPK)

01-Einführung

Dozent: Prof. Dr. Marcel Tilly

Bachelor Informatik, Fakultät für Informatik

Organisatorisches

- Material:
  - https://hsro-inf-fpk.github.io (fork von https://hsro-inf-prg3.github.io)
  - Github Organization: https://github.com/hsro-inf-fpk
  - Slides, Skript, Übungen ...in Englisch!
  - Learning Campus: Einschreiben unter **Fortgeschrittene Programmierkonzepte (INF-B3), WiSe19/20** (Selbsteinschreibung ohne Schlüssel!)
- Vorlesung: Mittwochs, 08:00 - 09:30 in **R0.03**
- Übungen:
  - Tutor: ???
  - Mittwochs, 2./3./4. Stunde, **S1.31**
  - Gruppenwahl über Learning Campus
- Mattermost(einschreiben)

WICHTIG: Materialien auf Englisch, Vorlesung aber auf Deutsch.

Leistungsnachweis

Klausur!

- schriftliche Prüfung (SP, 90 Minuten) am Ende des Semesters
- erlaubt ist ein Buch mit ISBN Nummer
- Anmeldung über OSC
- Was kommt dran?
  - Alles was in der Vorlesung dran war!

Lernziele

Aus dem Modulhandbuch

Die Studierenden … - … **vertiefen** ihre Kenntnisse in der objektorientierten Programmierung am Beispiel einer geeigneten Programmiersprache (hier: Java!) - … können die Möglichkeiten und Gefahren der objektorientierten Programmierung **beurteilen**. - … **sind befähigt**, alle wichtigen Programmierkonzepte für das Programmieren im Großen im Sinne der Komponentenorientierung anzuwenden. - … **erarbeiten sich die Grundlagen** der funktionalen Programmierung und deren Anwendungsgebiete.

Review

Programmieren 1

- Imperative Programmierung in C
- Constants, Variables, Expressions, Functions, I/O
- Datenstrukturen (fields, arrays, lists)
- Pointer

–

Programmieren 2 (OOP)

- Objekt-orierntierte Programmierung (OOP) in Java
- Klassen und Objekte
- Interfaces und Vererbung
- Fehlerbehandlung via Exceptions

Agenda für FPK

See https://hsro-inf-fpk.github.io/

Agenda für heute

0. *Inform:* Your trusted advisors: Google – SO – Java Docs – Google Translate
1. *Memorize:* The git version control system (https://git-scm.com/)
2. *Automate:* The Gradle build tool (https://gradle.org/)
3. *Organize:* The IntelliJ IDEA (https://www.jetbrains.com/idea/)
4. *(Optional) Collaborate* Practice cross-repository pull requests and learn about *continuous integration* (https://travis-ci.org/)

SO = stackoverflow

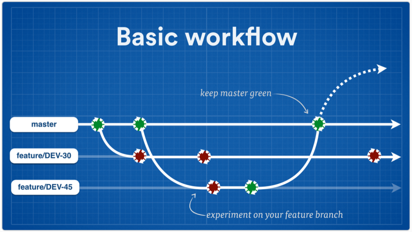
Version Control

Git

- Git is a distributed version-control system for tracking changes in source code during software development.
- It is designed for coordinating work among programmers, but it can be used to track changes in any set of files
- Git is the *de-facto* state of the art version control system.
- Some of you might remember CVS (concurrent versions system) or subversion.
- Generally speaking, you should always use a version control system (VCS) when working on code, so you can keep track of changes.
- Print and laminate: https://services.github.com/on-demand/downloads/github-git-cheat-sheet.pdf
- For the more visual: http://ndpsoftware.com/git-cheatsheet.html
- If you run into a mess (and you will): http://justinhileman.info/article/git-pretty/git-pretty.png

Git and feature branches

https://www.atlassian.com/continuous-delivery/continuous-delivery-workflows-with-feature-branching-and-gitflow



- Git Guide: https://rogerdudler.github.io/git-guide/
- Git != GitHub

Automate

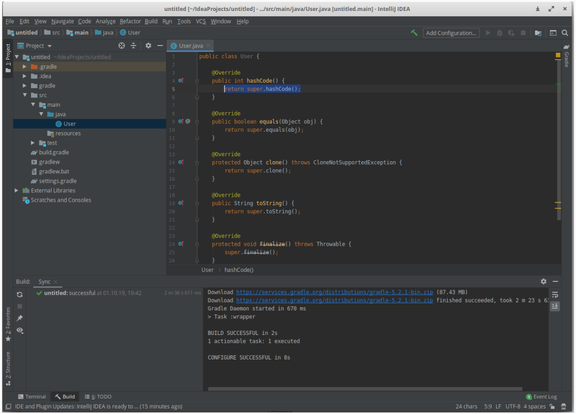
The Gradle Build Tool (GBT)

Gradle is an open-source build-automation system that builds upon the concepts of Apache Ant and Apache Maven and introduces a Groovy-based domain-specific language instead of the XML form used by Apache Maven for declaring the project configuration.

Gradle Build Tool https://gradle.org - `gradle init --type java-application` to bootstrap a project - `./gradlew build` to use the Gradle wrapper to be independent of locally installed Gradle - `apply plugin: 'eclipse'` and `./gradlew eclipse` to generate Eclipse project files - `apply plugin: 'idea'` and `./gradlew idea` to generate IntelliJ files (note: these are file-based project descriptions, not the new directory based `.idea/*`)

IntelliJ

https://www.jetbrains.com/idea/



untitled [~/IdeaProjects/untitled] - .../src/main/java/User.java [untitled.main] - IntelliJ IDEA

```java
public class User {

    @Override
    public int hashCode() {
        return super.hashCode();
    }

    @Override
    public boolean equals(Object obj) {
        return super.equals(obj);
    }

    @Override
    protected Object clone() throws CloneNotSupportedException {
        return super.clone();
    }

    @Override
    public String toString() {
        return super.toString();
    }

    @Override
    protected void ~~finalize~~() throws Throwable {
        super.~~finalize~~();
    }
```

untitled: successful at 01.10.19, 19:42 2 m 36 s 611 ms

```
Download https://services.gradle.org/distributions/gradle-5.2.1-bin.zip (87.43 MB)
Download https://services.gradle.org/distributions/gradle-5.2.1-bin.zip finished succeeded, took 2 m 23 s 6
Gradle Daemon started in 670 ms
> Task :wrapper

BUILD SUCCESSFUL in 2s
1 actionable task: 1 executed

CONFIGURE SUCCESSFUL in 8s
```

IDE and Plugin Updates: IntelliJ IDEA is ready to ... (15 minutes ago)

Collaborate

Travis CI

Travis CI is a hosted continuous integration service used to build and test software projects hosted at GitHub. Travis CI provides various paid plan for private projects, and a free plan for open source.

- Collaboration means splitting the work
- Teamwork means working together
- Use feature branches and automated tests (JUnit)
- Use automated build and test runner

Summary

- We will look into advanced programming concepts in Java (starting next week!)
- We will use professional software engineering tools
  - Git
  - IntelliJ Idea
  - Gradle
  - Travis CI
- Let's try to have fun!