

Applied Static Analysis

Software Technology Group

Technische Universität Darmstadt

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Summer Term 2019

Lecture

Every week at 11:40am in S101|A03.

- We are going to discuss algorithms (static analyses) that can be used to detect code smells and security vulnerabilities by analyzing the (binary) code of applications.
- The concepts generally apply to a very wide range of languages and programming language paradigms.
- The examples and analyses are primarily concerned with Java (Bytecode).
- The language that we use for implementing analyses is [Scala](#).

The lecture slides can be found at: <https://github.com/stg-tud/apsa>.

The lecture slides are basically markdown files that are presented using [Deskset](#). The final PDF is rendered using [Marked 2](#) after preprocessing them using the following [sed](#) program:

```
/usr/bin/sed -E -e 's/^\[\.+\|:.\+\]//' -e 's/^\^[[:space:]]/' -e 's/#[[:space:]]\[fit  
 \]/#/'
```

The program basically removes all non-standard markdown commands which are only used/required by Deskset.

Hence, if you have suggestions for improvement or if you find typos or more significant issues don't hesitate to create [issues](#). Pull requests are also very welcome.

Exam

- We will have a closed-book exam after the semester.
 - The exam will be 60 minutes.
 - (There will be no bonus.)
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Exercise

Every week we will have ~60minutes of lecture and ~30minutes exercises.

Some exercises will just be theory and some will require you to comprehend and write concrete static analyses. The analyses will be developed using the [OPAL](#) framework.

The exercises will help you to prepare for the exam.

Planned Content

- Basic terminology (e.g., soundness, precision, context-sensitivity, ...)
 - Code representations (e.g., three-address code)
 - Parallelization of static analyses
 - Call-graph construction
 - Inter-procedural data-flow analyses (IFDS, IDE, ...)
 - Purity and immutability analysis
 - Escape analysis/Points-to analysis
 - Code slicing
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Prerequisites

- A keen interest in analyzing code.
- Basic knowledge in compiler construction is helpful.
- A very good understanding of object-oriented programming and in-particular of Java.
- Willing to learn and use Scala.