

Informatik

MASTER SEMINAR

Program Analysis and Transformation



IFS

INSTITUTE FOR
SOFTWARE

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HSR

HOCHSCHULE FÜR TECHNIK
RAPPERSWIL

FHO Fachhochschule Ostschweiz

Goals

- **Learn scientific/research style of working**
 - Understand advanced software research topic
 - Put topic into context by incorporating additional sources
 - Evaluate applicability of research into tools and applications
 - Write your own report on a scientific topic
 - Explain such a topic to others in a paper and a presentation
 - Discuss with others about similar topics to increase understanding

Tasks expected

- **Read provided research papers**
- **Plan your work**
- **Research additional sources on topic and neighboring research results**
 - locate work groups on area
- **Write a scientific article of 10+ pages**
 - explain the topic of the paper selected
 - put it into the context of other work
 - evaluate it with respect to applicability for (refactoring) tools
- **Present the results in a 20-25 min talk**
- **Discuss with peers (15 min for each presentation)**

Workload expected

- **3 credits = 90 hours over semester**
- **kick-off 1 hour**
- **individual feedback with supervisor 3-6 hours**
 - Individual Milestones:
 - outline & structure of article
 - draft of article
 - final article + presentation draft
 - presentation day (all together)
- **presentation 45 min (talk + discussion)**
- **listening & discussion 6 x 45 min -> 4.5 hours**
- **reading, research, experiments, writing, presentation preparation: ca. 80 hours**
 - If not much experience, some extra reading time might be

Requirements on your report

- **Independent writing of a report of about 10-20 pages**
- **Complete set of references to all consulted literature**
- **Correct citations**

- **Font size: 12pt (or a little less if 2 columns)**
 - prefer Latex article A4 (2 column) layout
- **Language: English**
- **Correct spelling and grammar**
 - too many errors on a single page: fail!

Requirements on presentation

- **Your talk:**
 - Talk about 15-20, discussion 25 minutes
 - Focus on the audience
 - Slides:
 - less than 12 lines of text
 - useful examples (first)!
 - English
 - Finish in time
 - Ask for questions
 - Elaborate on previous questions

Evaluation

- **no credits (exclusion from seminar)**
 - if 2nd feedback after rework is below standard set
 - in case of plagiarism
- **20 % working style**
 - planning, research, progress
- **30% research paper**
 - language, content, structure
- **30% presentation**
 - structure, language, presentation, answers to questions
- **20% participation in discussion**
 - relating topic to own research work

Milestones & Schedule

- **20.02.2017 (today)**
 - kick-off, topic selection and assignment
- **individual feedback dates (latest)**
 - 20. March: outline review
 - 30. April: article draft review
 - 02. June: article finished and uploaded to wiki and presentation draft review
- **Final presentation day**
 - 12. June 2017: presentation day

Thinks to look out for

- **Look for secondary sources beyond the given articles**
- **Cite all sources correctly**
- **If citing literally from other sources use quotes and provide source reference**
 - plagiarism is a no no!
 - we will check!
- **Explain topic with your own words**
 - first you need to understand
- **Do not hesitate to ask your supervisor when you need help**
- **Try to apply with an experiment (time permitting)**

What is Program Slicing?

- Based on Work by Mark Weiser
- “Where does a variable’s value come from?”
 - What statements provide to its value at a given point in the pgm.
- slice for value of z on line 18
 - 5,7,10,13,14
- slice for value of x on line 15
 - 5,7
- slice for value of total on line 18
 - 5,6,7,9,10,15

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int x { };
6     int y { };
7     cin >> x >> y;
8     double sum { };
9     double total { };
10    if (x <= 1) {
11        sum = y;
12    } else {
13        int z{};
14        cin >> z;
15        total = x * y;
16    }
17    cout << total << " " << sum << '\n';
18 }
```

Pre-Selection

TBD: Supervisor association

- **Introduction and Overview Program Slicing (incl. CFG/DFG)**
 - SamuelKurath - FM
- **Interprocedural Slicing (Horwitz, incl. PDG/SDG)**
 - PeterMichael - MS
- **Slicing Object-oriented Programs**
 - TobiasStauber - PS
- **Dynamic Slicing: ORBS/PORBS**
 - FelixMorgner - PS
- **Hindley-Milner Type Inference (vs. Swift Type Inference)**
 - DanielMarty - FM