About the Course
Andreas Zeller

Course Topics
- Tracking and Reproducing Problems
- The Scientific Method
- Making Programs Fail
- Isolating Failure Causes (automatically)
- Locating and Fixing Defects

“Why does my Program Fail?”

Your Lecturer
Andreas Zeller
Your Tutor

Andrzej Wasylkowski

Course Material

- Book “Why programs fail”
  http://www.whyprogramsfail.com/
- Lecture slides, dates, links…
  http://www.st.cs.uni-sb.de/edu/adebug/2008/

Course Format

- 15 lectures
- Four projects ("write your own debugger")
- Oral exams at end of semester
Four Projects

Simplifying Input 3 weeks
Comparing Coverage 3 weeks
Locating Causes 4 weeks
(plus 1 more)
written in Python for Python

Simplifying Input

What's relevant in here?

Comparing Coverage

$ sample 9 8 7 $ sample 11 14
Output: 7 8 9 Output: 0 11

How do these runs differ?
Locating Causes

```c
if (GET_CODE (XEXP (x, 0)) == PLUS {
    x = apply_distributive_law
    gen_binary (PLUS, mode,
        gen_binary (MULT, mode,
            XEXP (XEXP (x, 0), 0),
            XEXP (x, 1)),
        gen_binary (MULT, mode,
            XEXP (XEXP (x, 0), 1),
            XEXP (x, 1))));

    if (GET_CODE (x) != MULT)
        return x;
}
```

What causes the failure?

Grading

- Project 1: 50%
- Project 2: 15%
- Project 3: 15%
- Project 4: 15%
- Oral Exam: 10%

Assessment
About the Course

Tracking Problems

Making Programs Fail

Simplifying Problems

The Scientific Method

Deducing Errors

Observing Facts

Reproducing Problems

Tracking Origins

Asserting Expectations

System Assertions

Causes and Effects

Isolating Failure Causes

Isolating Cause-Effect Chains

Locating Failure Causes

Fixing the Defect

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