About the Course

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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?"

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Your Lecturer

Andreas Zeller

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Your Tutor

Andrzej Wasylkowski

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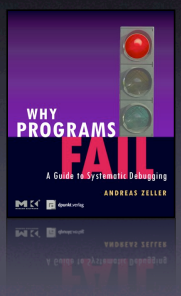
Course Material

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



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Course Format

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

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Four Projects

Simplifying Input	Comparing Coverage	Locating Causes
3 weeks	3 weeks	4 weeks

(plus 1 more)
written in Python for Python

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Simplifying Input

```
<SELECT NAME="op_sys" MULTIPLE SIZE=7>
<OPTION VALUE="All">All<OPTION VALUE="Windows 3.1">Windows 3.1<OPTION
VALUE="Windows 95">Windows 95<OPTION VALUE="Windows 98">Windows
98<OPTION VALUE="Windows ME">Windows ME<OPTION VALUE="Windows
2000">Windows 2000<OPTION VALUE="Windows NT">Windows NT<OPTION
VALUE="Mac System 7">Mac System 7<OPTION VALUE="Mac System 7.5">Mac
System 7.5<OPTION VALUE="Mac System 7.6.1">Mac System 7.6.1<OPTION
VALUE="Mac System 8.0">Mac System 8.0<OPTION VALUE="Mac System
8.5">Mac System 8.5<OPTION VALUE="Mac System 8.6">Mac System
8.6<OPTION VALUE="Mac System 9.x">Mac System 9.x<OPTION VALUE="MacOS
X">MacOS X<OPTION VALUE="Linux">Linux<OPTION VALUE="BSDI">BSDI<OPTION
VALUE="FreeBSD">FreeBSD<OPTION VALUE="NetBSD">NetBSD<OPTION
VALUE="OpenBSD">OpenBSD<OPTION VALUE="AIX">AIX<OPTION
VALUE="BeOS">BeOS<OPTION VALUE="HP-UX">HP-UX<OPTION
VALUE="IRIX">IRIX<OPTION VALUE="Other">Other<OPTION
VALUE="OpenVMS">OpenVMS<OPTION VALUE="OSF1">OSF1<OPTION VALUE="OSF/
1">OSF/1<OPTION VALUE="Solaris">Solaris<OPTION
VALUE="SunOS">SunOS<OPTION VALUE="other">other</SELECT>

</td>
<td align=left valign=top>
<SELECT NAME="priority" MULTIPLE SIZE=7>
<OPTION VALUE="--">---<OPTION VALUE="P1">P1<OPTION VALUE="P2">P2<OPTION
VALUE="P3">P3<OPTION VALUE="P4">P4<OPTION VALUE="P5">P5</SELECT>
```

What's relevant in here?

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Comparing Coverage

```
$ sample 9 8 7
Output: 7 8 9
```

```
$ sample 11 14
Output: 0 11
```

How do these runs differ?

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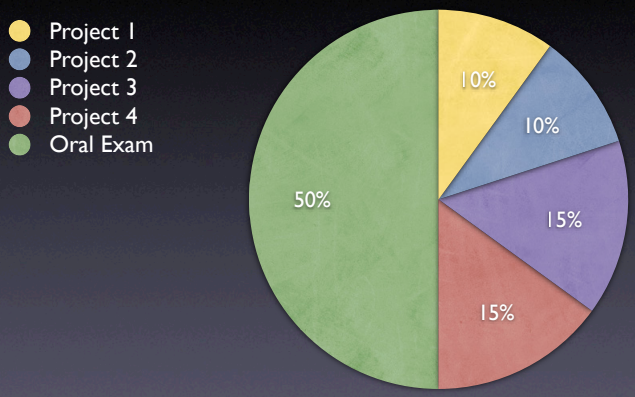
Locating Causes

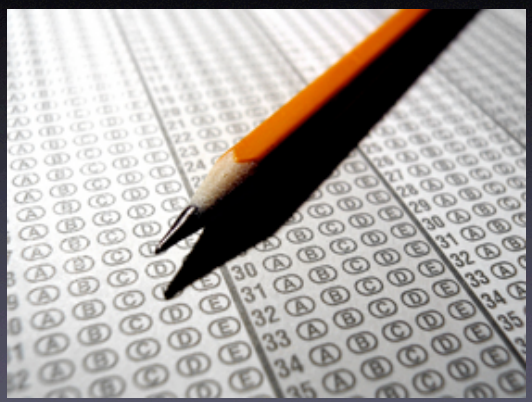
```
if (GET_CODE (XEXP (x, 0)) == PLUS {
    x = apply_distributive_law
      (gen_binary (PLUS, mode,
                   gen_binary (MULT, mode,
                               XEXP (XEXP (x, 0), 0),
                               XEXP (XEXP (x, 0), 1),
                               XEXP (x, 1))));

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

What causes the failure?

Grading



Assessment



Exam

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