The perfect talk
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Goals of the Seminar

• Find your way into scientific challenges
• Structure and present scientific material
• Train your social and communication skills

Preparation

• Check the material
• Identify central topics and claims
• Outline the talk
• Make a detailed sketch
Ask Yourself

- Do the claims hold?
- Are the examples illustrative?
- Can I do better in presenting?
- What are the central claims, anyway?
- And how are they supported?

The Perfect Talk

Organizing Your Talk

- Motivation
- Solution (including failures)
- Results
- Conclusion
Motivation

• Present the general topic
  *A village in the woods*

• Show a concrete problem.
  *Wicked dragon attacks the peasants*

• Show that the state of the art is not enough
  *Peasants' forks can not pierce dragon armor*

Solution + Results

• Show new approach and its advantages
  *Hero comes with vorpal blade and fights dragon...*

• Show how approach solves concrete problem
  *Vorpal blade goes snicker-snick; dragon is slayed*

• Does the approach generalize?
  *Would this work for other dragons, too? Why?*
Outline

• Tell a story
• Make slides invisible
• Use examples, lots of examples
• Connect to the audience
• Hope for questions and feedback

What’s wrong with this slide?

Outlines

• Don’t use talk outlines at the beginning
• Don’t use talk outlines in between
• Actually, don’t use talk outlines at all
• Better: Use a graphic after 5 minutes
• Think of this graphic as a memorizable image

Model Mining
1. Collect input data
   - Bug Database
   - Version Database
   - Code

2. Map post-release failures to defects in entities
   - Entity
   - Entity
   - Entity

3. Predict failure probability for new entities
   - Entity ➔ Predictor ➔ Failure probability

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Daikon

- Run
- filter invariants
- report results
- Postcondition
  - b[] = orig(b[])
  - return == sum(b)

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Slide contents

- Use examples first, abstraction afterwards
- Concentrate on the bare necessities (e.g. at most 5 bullets per slide)
- Do not present full sentences on a slide, because these are far too long and hard to read; also, they may tempt you in reading them loud.
- Use milestones to summarize results
Building Models

Slide layout

- Focus on clarity
- Avoid all that distracts from the message
- Slides should support your (spoken) word.
- Always prefer graphics over text
- Avoid bullet lists (like this one)
Maths

\[
f_{h,\varepsilon}(x, y) = \varepsilon E_{x,y} \int_0^{t_{\varepsilon}} L_{x,y,\varepsilon}(u) \varphi(x) \, du
\]

\[
= h \int L_{x,x} \varphi(x) \rho_x \, (dz)
\]

\[
+ \left[ \frac{1}{t_{\varepsilon}} \left( E_y \int_0^{t_{\varepsilon}} L_{y,y}(s) \varphi(x) \, ds - t_{\varepsilon} \int L_{x,x} \varphi(x) \rho_x \, (dz) \right) \right. \\
- \left. \frac{1}{t_{\varepsilon}} \left( E_y \int_0^{t_{\varepsilon}} L_{y,y}(s) \varphi(x) \, ds - E_{x,y} \int_0^{t_{\varepsilon}} L_{x,y,\varepsilon}(s) \varphi(x) \, ds \right) \right]
\]

\[
= h \tilde{L}_x \varphi(x) + h h_0(x, y)
\]

\[
\mathbf{Formal\ Background}
\]

**Concrete state** \( v \in V \) with \( v = (x_1, x_2, \ldots, x_n) \)

\( x_i \) – Return value of an inspector

**Trace** \( t = [(v_1, m_1, v'_1), (v_2, m_2, v'_2), \ldots] \)

with \( v_i \in V \) and \( m_i \) – name of a mutator

**State abstraction** \( \text{abs} : V \rightarrow S \)

**Model** with transitions \( s \xrightarrow{m} s' \) and states \( s, s' \in S \)

**Transition condition** \( s \xrightarrow{m} s' \) with \( s, s' \in S \) iff

\( \exists (v, m, v') \in t \cdot \text{abs}(v) = s \land \text{abs}(v') = s' \)

**Maths**

- Avoid maths.
- Formulae are for papers, not slides
- Few people can read + understand complex formulae in 30 seconds
- Demonstrate that the formal foundation can be presented on demand
- Examples are more important than maths
Graphics

- Use simple, clear graphics
- Convey exactly **one** message per graphics
- Usage of color helps

Model Sizes

The human factor

- Every presenter is nervous (and so am I)
  - Legs start shaking
  - Need for air
  - Brain goes into stand-by mode
- ... but nobody will notice, let alone worry
The human factor

• Before the talk:
  • Sit down
  • Go through your slides
  • Remember the first sentences
  • *All presenters are nervous!*

The talk

• Do not *read your slides* (from paper or slides)
• Speak slowly, loudly and clearly
• Speak *personally* (Use “I”, not “one”)
• Change your *tone* – and use *breaks*

Your impression

- Body language: 7%
- Voice: 38%
- Content: 55%
Connecting to the audience

- Talk directly to the audience
- Ask rhetorical questions ("What should the poor peasants do?")
- Search eye contact to audience (not to slides, not to professor)

Conclusion

- Refer to the beginning
  ...and they lived in peace henceforth
- Summarize
  ...and the key point is:
- Open issues
  ...but there are more dragons that loom in the dark
- Consequences
  If you ever see a dragon, ...

Finding Violations

• Searching Failure Causes
  - Detecting Anomalies
    • Finding bugs
      - Which failures were the biggest
      - Building with anti-debugging
  - Program Comprehension
    • "Normal behavior is correct behavior"
    • Assessing Changes
      - Detecting potential errors
  - Building Models
    - Deferring point to potential errors
  - Finding Violations
Searching Failure Causes

• Which mutators cause the failure?

Simplifying with delta debugging

void testVector(){
    v.add(1);
    v.remove(1);
    assert(v.isEmpty());
}

Dealing with Questions

• Repeat question (helpful for audience - gives time for preparing an answer)

• In doubt: “I don't know, but I'll look into it”

• Or: “Let’s just take this offline”

• Be respectful to the audience – no punching in the lecture room

Any Questions

• Questions after a talk may be embarrassing...

• ...but the worst embarrassment is to have no questions at all

• Questions help to direct and shape own work
Summary

• Tell a story
• Make slides invisible
• Use examples, lots of examples
• Connect to the audience
• Hope for questions and feedback