Software Reengineering P2: Setting Direction

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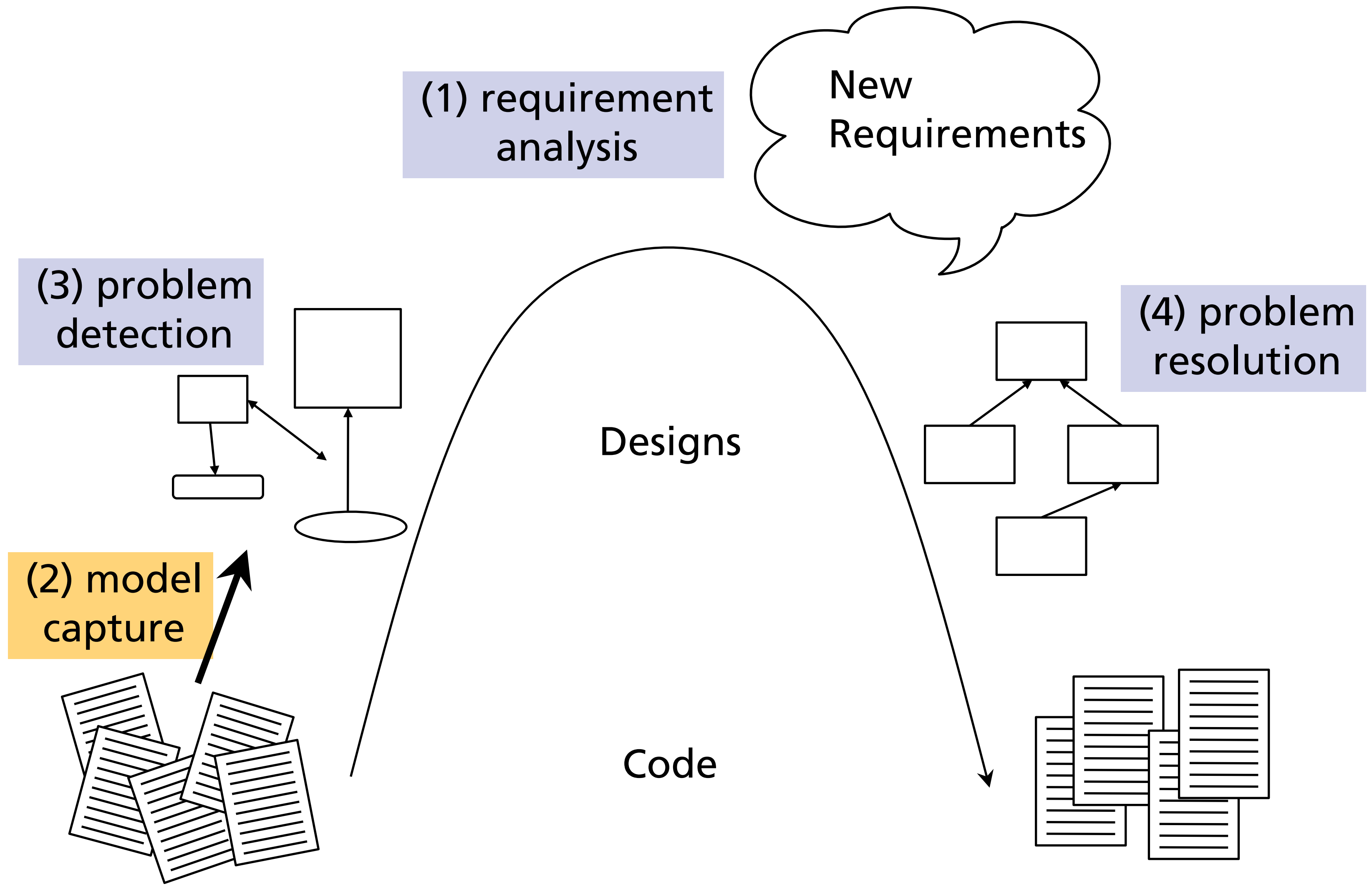
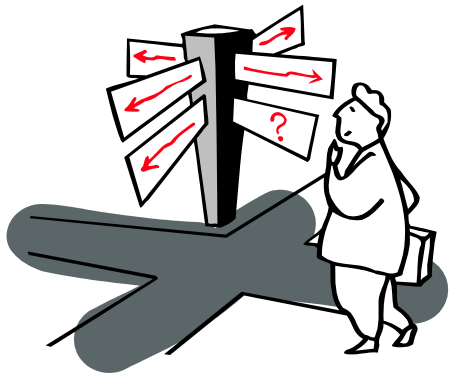
Reengineering Life-Cycle



Outline



Setting direction

First contact

First project plan

The book

Object-Oriented Reengineering Patterns
Demeyer, Ducasse & Nierstrasz

Serge Demeyer, Stéphane Ducasse, Oscar Nierstrasz
Object-Oriented Reengineering
Patterns

Present simple, lightweight techniques on how to cope with large-scale, complex legacy systems in need of reengineering

Uses patterns, descriptions of generic problem-situations, possible solutions and trade-offs

Download a free copy from: http://scg.unibe.ch/download/oorp/

A few of these patterns…

Most valuable first

Chat with the maintainers

Read all the code in one hour

Skim the documentation

Interview during demo

Do a mock installation

Speculate about the design

Study the exceptional entities

Refactor to understand

Write tests to enable evolution

…

Useful during...

Setting direction

- What are the goals of the project?
- Find Go/No-Go decision

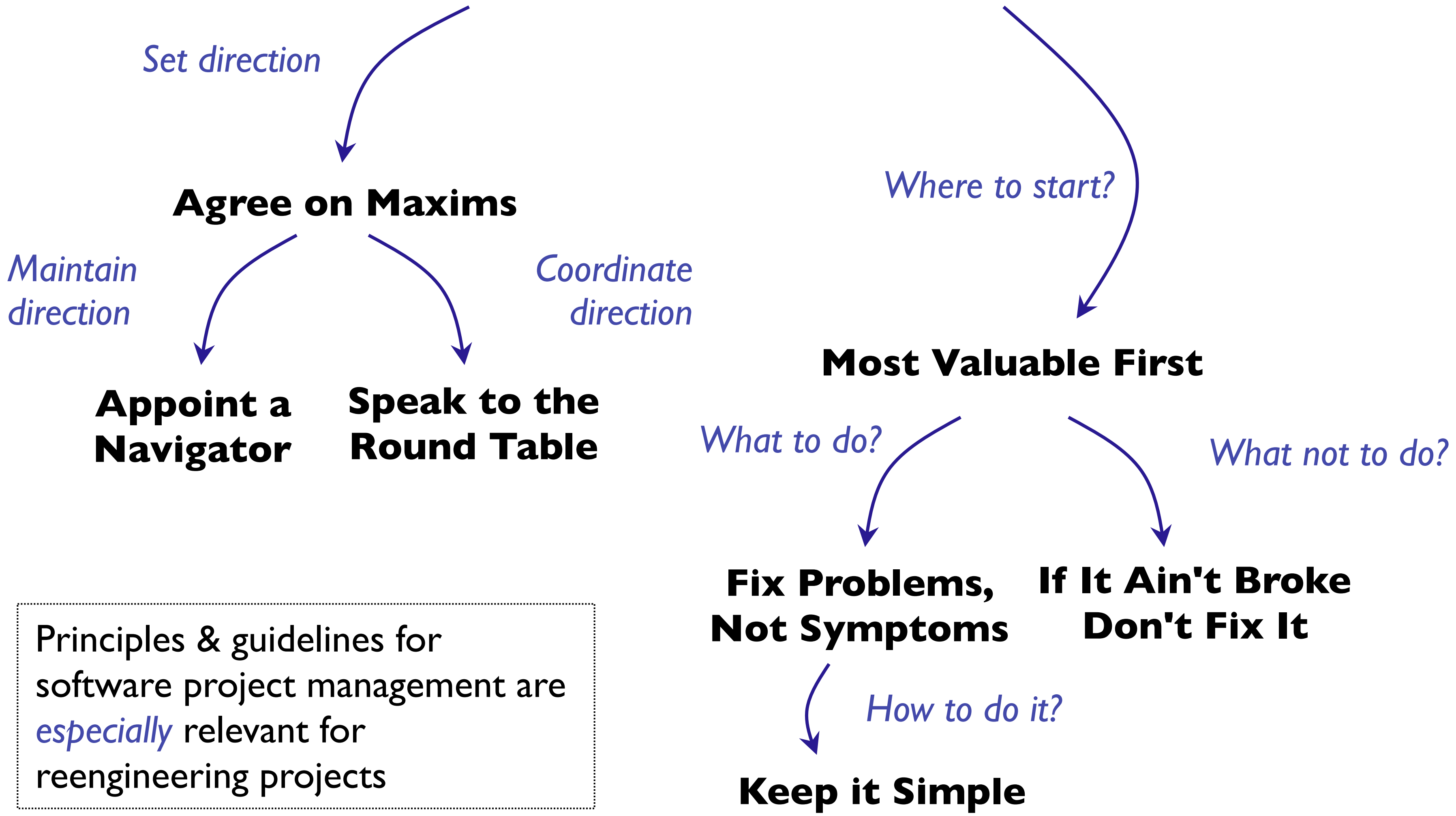
First contact

- You are facing a system that is completely new to you and within hours/days you should determine:
  - Whether the software is still viable
  - A plan of work
  - A cost-estimation

... and the other phases of re-engineering

Setting Direction

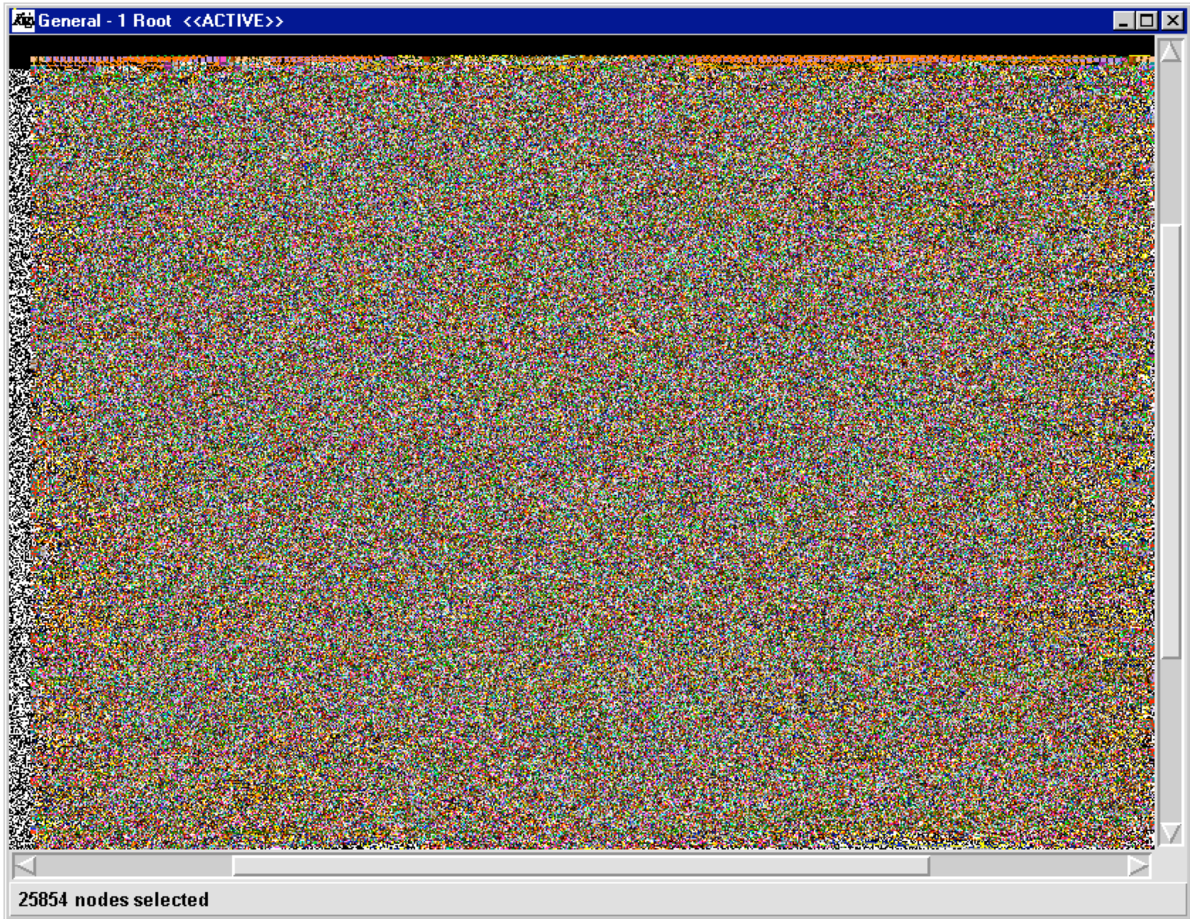
Setting direction patterns



Principles & guidelines for software project management are *especially* relevant for reengineering projects

Pattern: Most Valuable First

Problem: Which problems should you address first?



Most valuable first (2)

Solution: Work on aspects that are most valuable to your customer

- Maximize commitment
- Deliver results early
- Build confidence

Most valuable first (3)

EXTREME PROGRAMMING
I CAN'T GIVE YOU ALL OF THESE FEATURES IN THE FIRST VERSION.
scottadams@aol.com
www.dilbert.com
AND EACH FEATURE NEEDS TO HAVE WHAT WE CALL A "USER STORY."
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OKAY, HERE'S A STORY: YOU GIVE ME ALL OF MY FEATURES OR I'LL RUIN YOUR LIFE.

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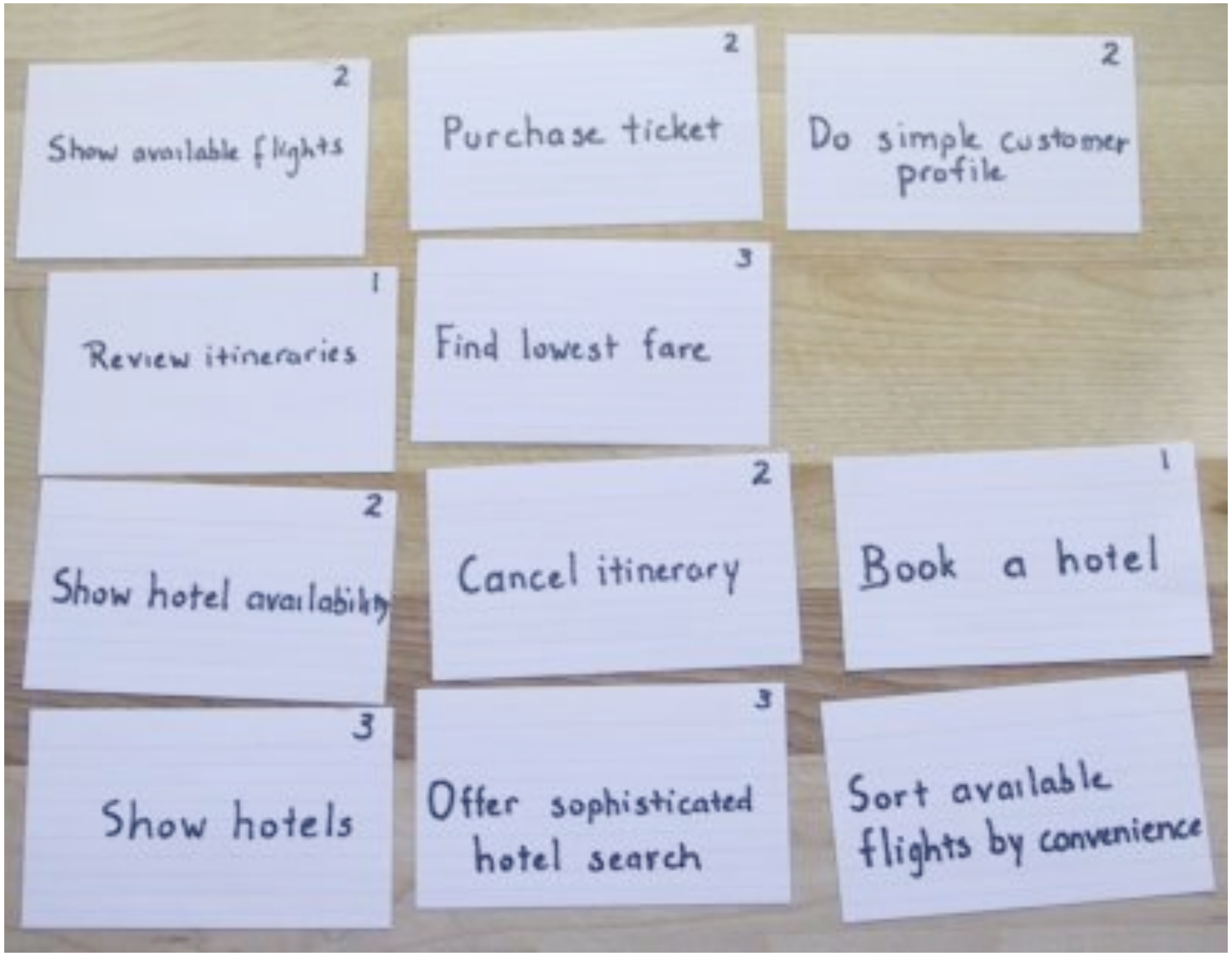
Most valuable first (4)

How do you tell what is valuable?

- Identify your customer
- Understand the customer's business model
- Determine measurable goals
- Consult change logs for high activity
- Play the Planning Game
- Fix Problems, not Symptoms

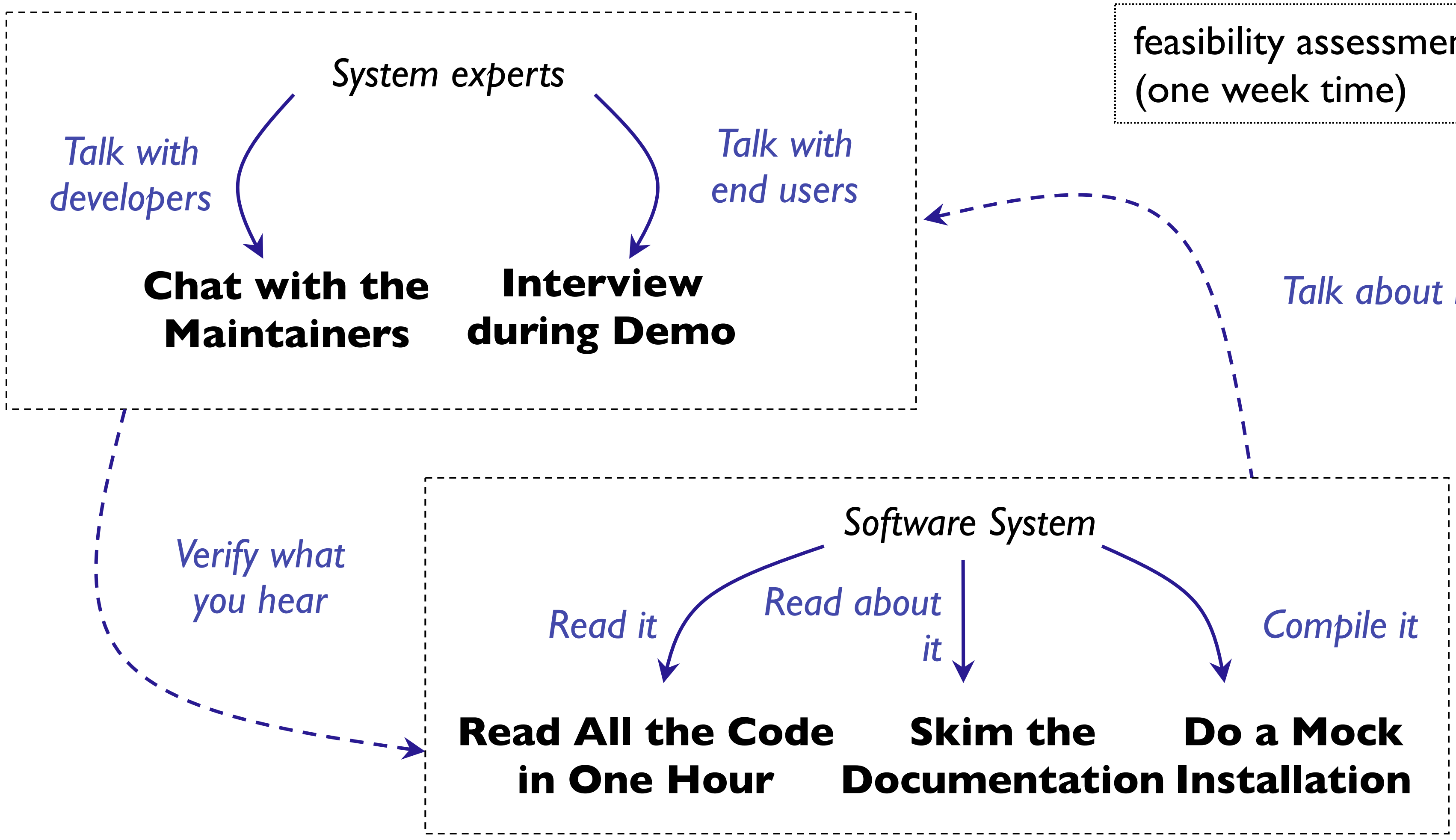
Most valuable first (5)

Planning Game



First Contact

First contact patterns



feasibility assessment
(one week time)

Pattern: Chat with the Maintainers

Problem: How to get insights into the legacy system?

Difficult because:

- Documentation records decisions about the solution, not the historical context
- Often people-related (political) issues are at the bottom of the legacy problem
- People working with the system may mislead you to cover up their own mistakes

Chat with the maintainers (2)

Solution:

- Treat the maintainers as “brothers in arms”
- Make sure they are on your side.

Possible questions include

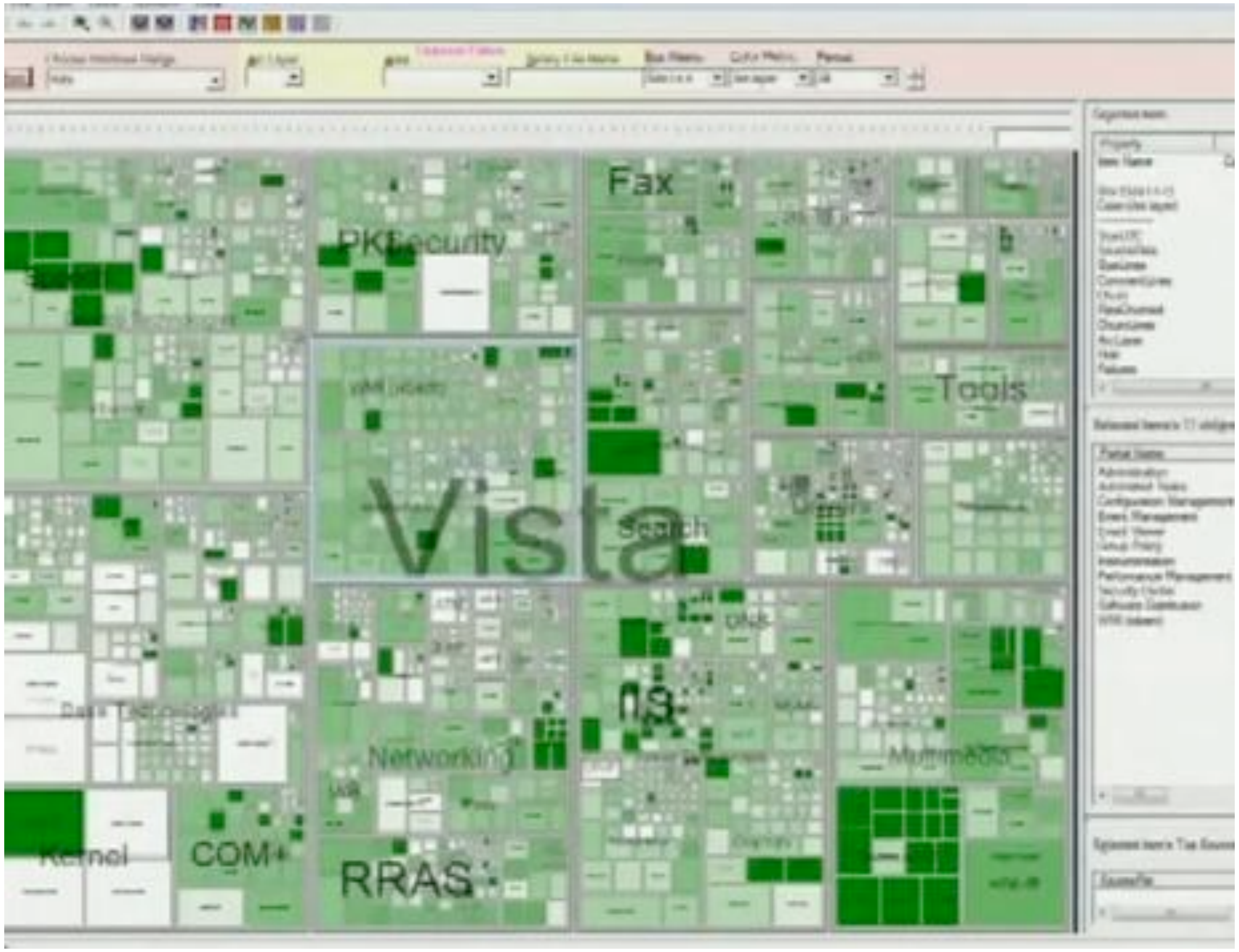
- What was the easiest/hardest bug you had to fix over the last month?
- How long did it take you?
- Why was it easy/difficult to fix?
- How are priorities given?
- Is there a version control system in place?
- ...

Chat with the maintainers (3)

- Trade-offs
  - Pros
    - Obtain information effectively
    - Get acquainted with your colleagues
  - Cons
    - You only get anecdotal evidence, no hard facts
  - Difficulties
    - People protect their jobs
    - Teams may be unstable

Pattern: Read all the code in one hour

Problem: Yes, but… the system is so big! Where to start?



Read all the code in one hour (2)

Solution: Read the code in one hour

Focus on:

- Functional tests and unit tests
- Abstract classes and methods and classes high in the hierarchy
- Surprisingly large structures
- Comments
- Check classes with high fan-out
- Study the build process

In Java programs focus on

```
public abstract class Example {
...
}
```

```
public interface IExample {
...
}
```

```
/**
 * Block comment
 */
public class Example {
  public void foo() {
    int x = 1;
    for (int x=1; i<100; i++) {
      // do something comment
    }
  }
}
```

```
public class Test {
  ...
  @Test
  public void testExample() {
    ...
  }
}
```

Pattern: Skim the documentation

Problem: What about documentation?

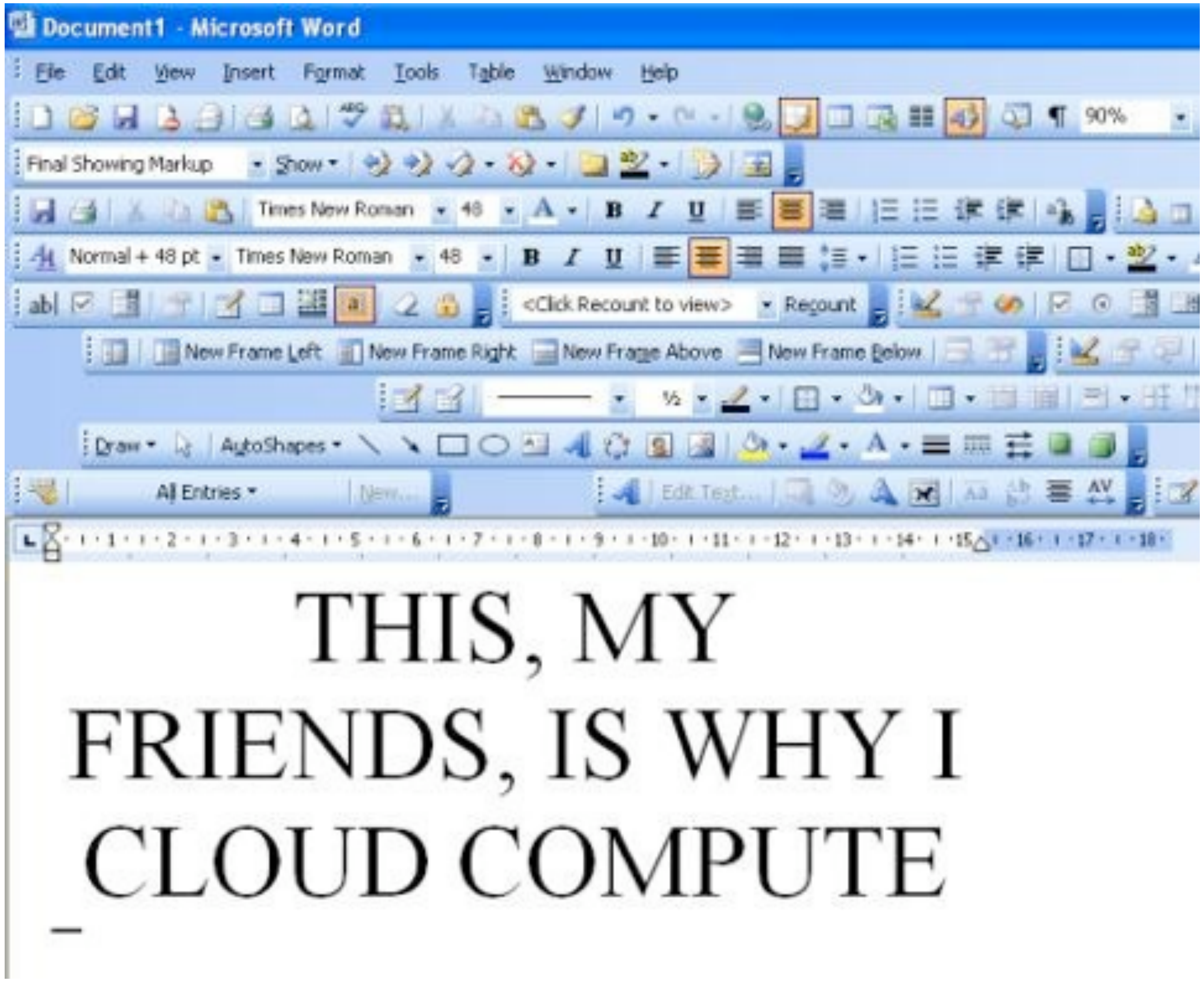
Skim the documentation (2)

Solution: Skim the available documentation

- Do a general assessment of the documentation (will it be of use or not?)
  - Is there a table of contents, searchable, …?
  - Are there figures? Formal specs?
- Make a list of the useful parts of the documentation
- Check whether it is up to date
  - Look at version numbers!

Pattern: Interview during demo

Problem: What are the main features?



THIS, MY FRIENDS, IS WHY I CLOUD COMPUTE

Interview during demo (2)

Solution: Do an interview during a demo

Let an end-user show you around in the functionality of the system

It will give you some usage scenarios

- Could be useful for dynamic analysis!

The main features of the system

- And whether they are appreciated or not

Consider different demos with different persons

- Managers, sales-person, help desk, maintainer, etc.

Pattern: Do a mock installation

Problem: Can you (re)build the system?

Do a mock installation (2)

Solution: Do a mock installation of the available system in a clean environment

Check whether you have all the necessary artifacts available by installing the system, compiling the code and running the tests.

Gives insight into:

- Dependencies
- Version numbers of libraries
- Problems

Attention: easy to get carried away and loose time

First project plan

- Project scope (1/2 page)
  - Description, context, goals, verification criteria
- Opportunities
  - Identify factors to achieve project goals
    - Skilled maintainers, readable source-code, documentation, etc.
- Risks
  - Identify risks that may cause problems
    - Absent test-suites, missing libraries, etc.
  - Record likelihood & impact for each risk
- Go/no-go decision, activities (fish-eye view)

Summary

Setting direction patterns to

- Set the goals
- Find the Go/No-Go decision
- Increase commitment of clients and developers

First contact patterns to

- Obtain an overview of the system
  - Design, implementation, documentation
- Grasp the main issues
- Assess the feasibility of the project

Homework

Read the chapters about

- Initial understanding patterns (Chapter 4)
- Detailed model capture patterns (Chapter 5)
- Read short papers about Class and Package design principles

Form teams of two students

- Mail team composition (name, student number) to us not later than 23.09.2011

Install

- DA4Java
- Findbugs, PMD, Metrics
- X-Ray, inCode