

CISC 322

Software Architecture



Lecture 03:

Non Functional Requirements

Emad Shihab

Adapted from: Ahmed E. Hassan

Software Requirements

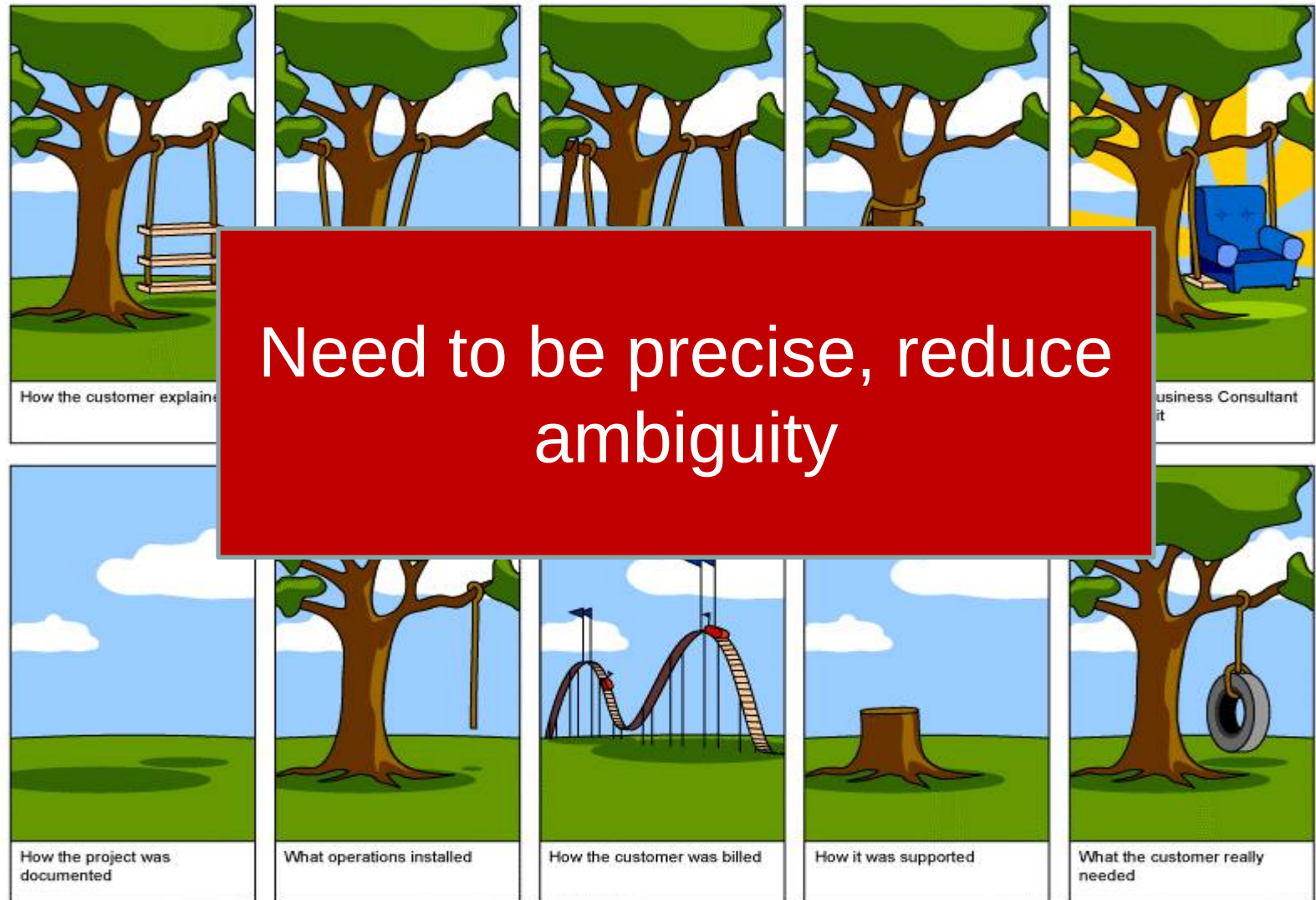
- *“Requirements are...a specification of **what should be implemented**. They are descriptions of how the system should behave, or of a system property or attribute. They may be a constraint on the development process of the system.”*
(Sommerville and Sawyer 1997, Karl E. Wiegiers 1999)
- Not **how** the product will be constructed

Software Requirements

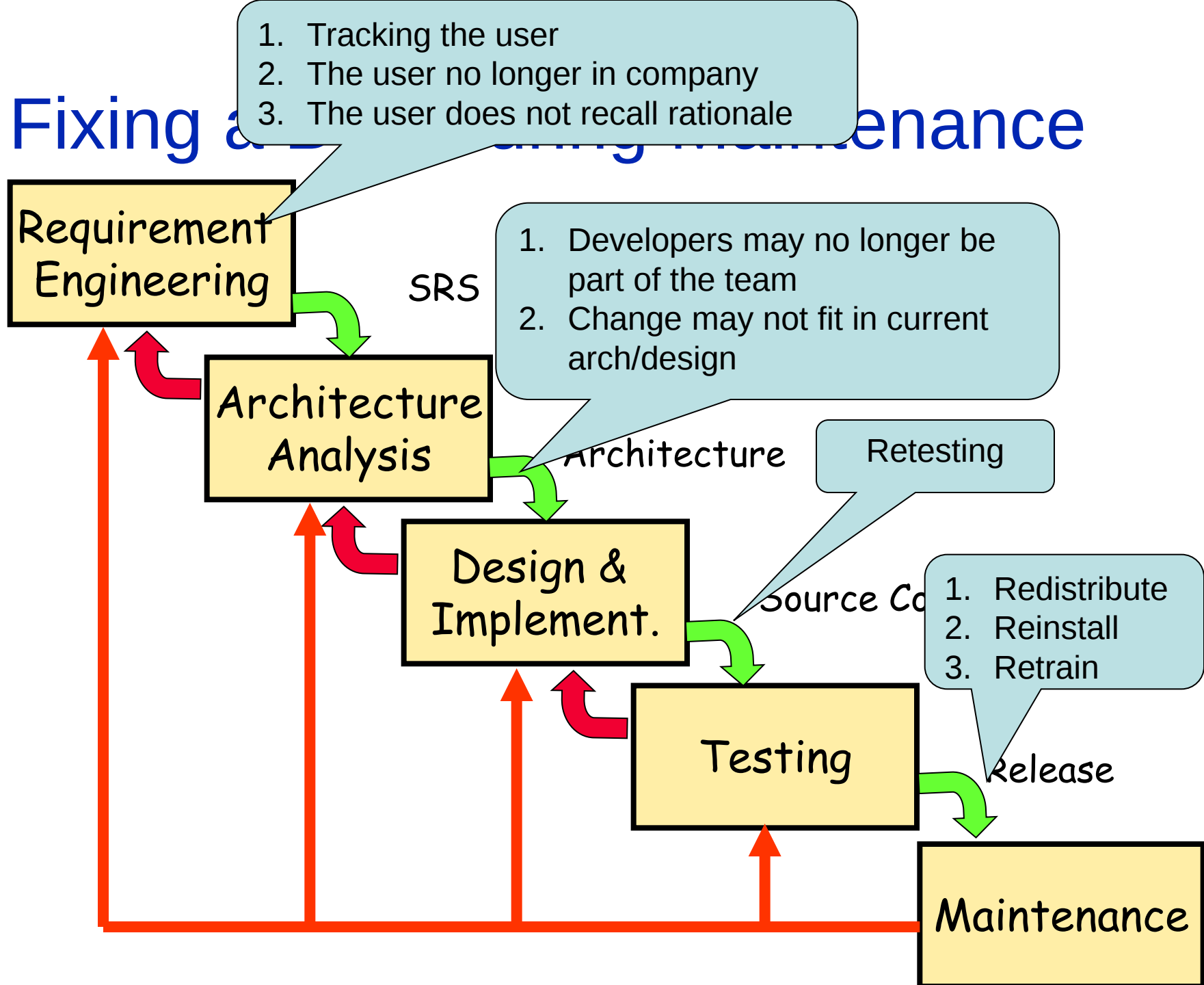
- Involve the elicitation, analysis, specification and validation of the different stakeholders
- An analyst/requirement engineer:
 - Elicits these demands/needs (raw requirements)
 - Analyzes them for consistency, feasibility, and completeness
 - Formulates them as requirements and write down a specification
 - Validates that the gathered requirements reflect the needs/demands of stakeholders

Many Stakeholders

Different Visions, Conflicting Goals



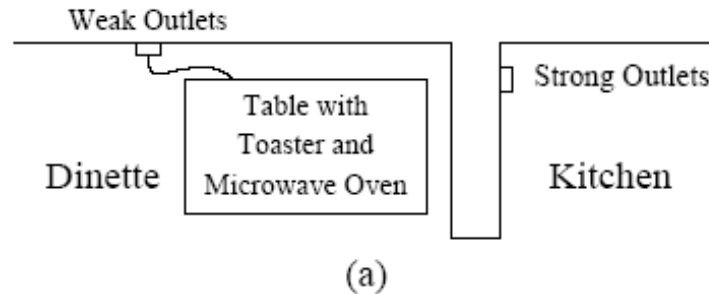
Fixing a model's performance maintenance



Questions that Arise During Requirement Gathering

- Is this a need or a requirement?
- Is this a nice-to-have vs. must-have?
- Is this the goal of the system or a contractual requirement?
- Do we have to program in Java? Why?

A Good Understanding of the Problem is Essential



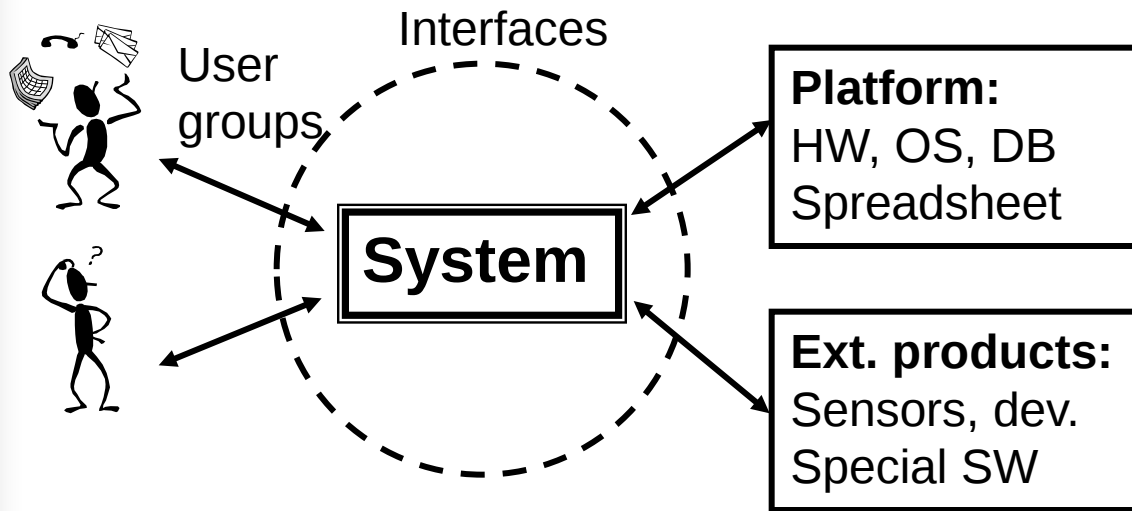
A Good Understanding of Problem is Essential

- Elevators in skyscraper
- Toothpaste boxes
- Out of coverage simulator
- Ice cream store in Lake Como (Handicap service)

Software Specification

- Specification acts as a bridge between the real-world environment (demands of stakeholders) and the software system

Contents of Requirement Specification



Data requirements:

System state: Database, comm. states
Input/output formats

Functional requirements, each interface:

Record, compute, transform, transmit
Theory: $F(\text{input, state}) \rightarrow (\text{output, state})$
Function list, pseudo-code, activity diagram
Screen prototype, support tasks xx to yy

Quality reqs:

Performance
Usability
Maintainability
...

Other deliverables:

Documentation
Install, convert,
train ...

Managerial reqs:

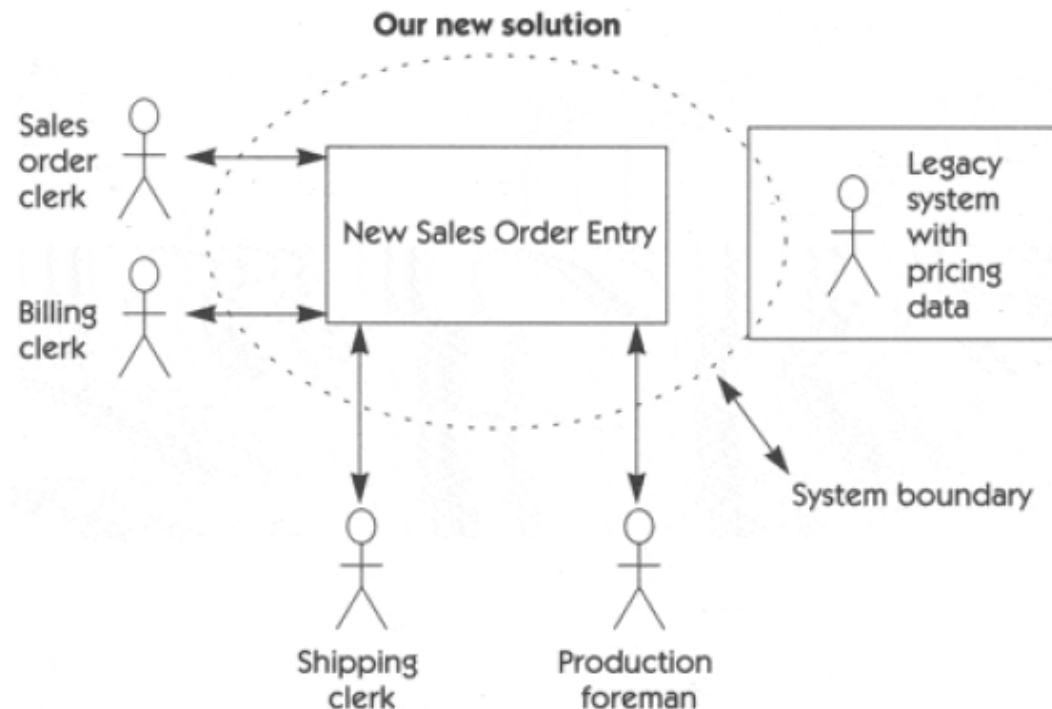
Delivery time
Legal
Development
process ...

Helping the reader:

Business goals
Definitions
Diagrams ...

System Perspective Diagram

- **System perspective** is a block diagram that describes the boundaries of the system, its users, and other interfaces



Example Constraints

Source	Constraint	Rationale
Operational	An exact copy of sales order data must remain on the legacy database for up to one year.	The risk of data loss is too great; we will need to run in parallel for up to one year.
Systems and OS	The applications footprint on the server must be less than 20 megabytes.	We have limited server memory available.
Equipment budget	The system must be developed on existing server and host; new client hardware for users may be provided.	Cost control and maintenance of existing systems.
Personnel budget	Fixed staffing resource; no outsourcing.	Fixed operating costs as per the current budget.
Technology mandate	New OO methodology to be used.	We believe that this technology will increase productivity and increase reliability of the software.

Example SRS

- Read and fill in groups
- Discussion

Fig 9.1 Quality criteria for a specification

Classic: A good requirement spec is:

Correct

Each requirement reflects a need.

Complete

All necessary requirements included.

Unambiguous

All parties agree on meaning.

Consistent

All parts match, e.g. E/R and event list.

Ranked for importance and stability

Priority and expected changes per requirement.

Modifiable

Easy to change, maintaining consistency.

Verifiable

Possible to see whether requirement is met.

Traceable

To goals/purposes, to design/code.

Necessary AND Feasible

Additional:

Traceable from goals to requirements.

Understandable by customer and developer.

Next Class

- Friday, Sep 16
- Will cover:
 - Non-functional requirements