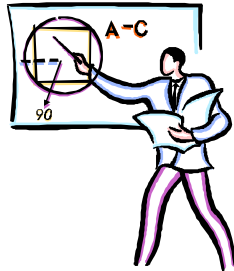# VIII. Requirements Analysis

Functional and Non-Functional Requirements
Stakeholders
## From Whom Do We Gather Requirements?
How Do We Specify Them?

What Are Requirements?

"...Requirements definition is a careful assessment of the needs that a system is to fulfill...must say *why* a system is needed, based on current and foreseen conditions, which may be internal operations or an external market...must say *what* system features will serve and satisfy this context...must also say *how* the system is to be constructed..."

[Ross77]

■ Requirements constitute a specification for the new system. They serve as a "contract" between customers and developers.

Requirements describe the system with respect to its environment, NOT its inner workings!
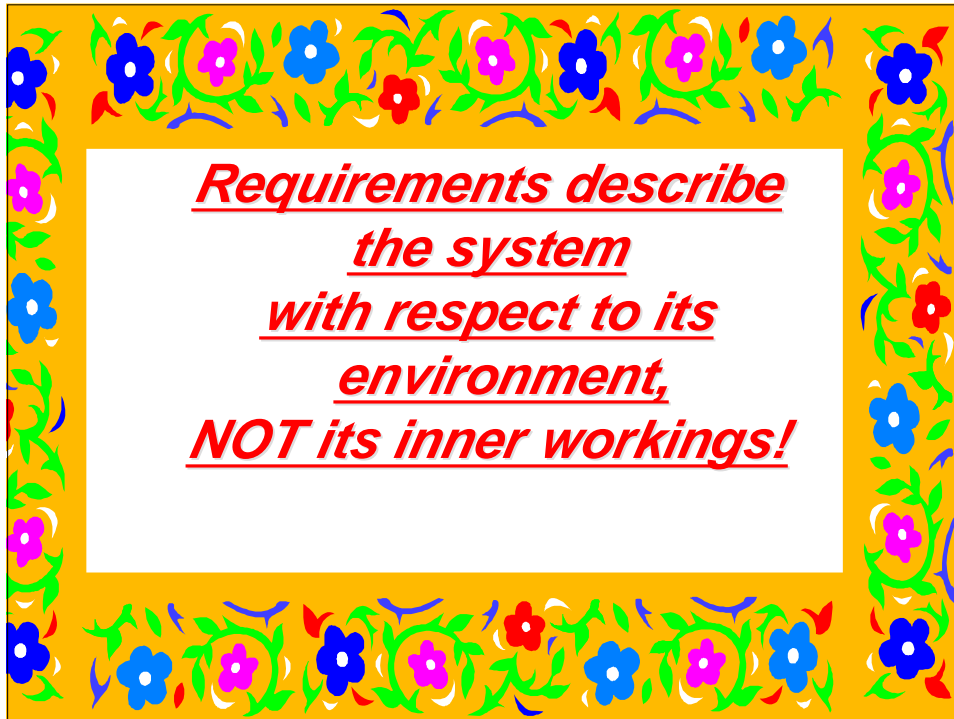
Functional Requirements

- Describe the *processing* (i.e., *functions* to be supported) by the new system.
- Describe the *inputs* into the system.
- Also describe the *outputs* of the system.
- Finally, they describe the *data that must be managed* by the system.

Non-Functional Requirements

■ Describe how well the system supports the functional requirements (hence the name *non-functional*, or *quality* requirements).

■ This description may include:
  ✓ Performance criteria;
  ✓ Reliability requirements;
  ✓ Security considerations;
  ✓ Usability requirements,
  ✓ …more...

Are Requirements Always Done in Software Engineering Practice?

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Whom Do We Gather Requirements From?

From the ***stakeholders*** (***actors***):

- ✓ Users - who are concerned about the features and the functionality of the new system;
- ✓ Designers;
- ✓ Systems analysts;
- ✓ Training and user support staff;
- ✓ Business analysts;
- ✓ Technical authors;
- ✓ The project manager;
- ✓ …more…

Stakeholders are Different for Different Types of Projects

- ■ ***Customer-driven*** projects develop customized, one-of solutions.
- ■ ***Market-driven*** ones develop (generic) software that is sold in the market.
- ■ (Coming soon) ***User-driven*** projects develop software that is downloaded and used -- for a fee, on demand.
- ■ The concept of software is evolving from that of a ***custom-built artifact***, to that of a ***commodity*** that you buy, and soon to that of a ***service/resource*** that you use on demand.
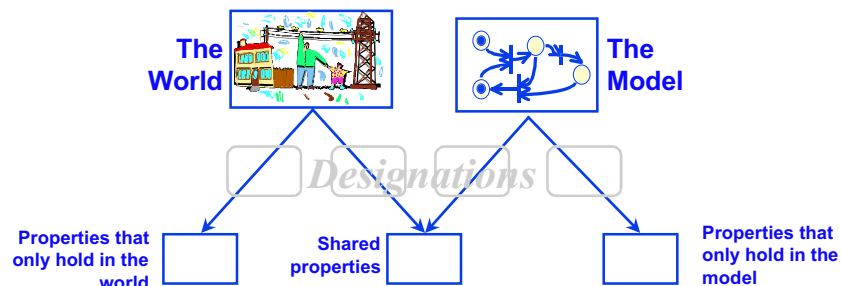
What Do We Gather?

- *Scenarios* (*use cases*) from which we can infer functional and non-functional requirements.
- Scenarios describe desirable sequences of events that should be supported by the new system.
- They also describe undesirable ones that should be prevented.

How Do We Specify Requirements?

- Through (visual) modeling

The World   **The Model**

Designations

Properties that only hold in the world   **Shared properties**   **Properties that only hold in the model**

But Remember:
A Model is Usually just an Approximation!

Additional Readings

- [Kotonya98] Kotonya, G. et all. *Requirements Engineering: Processes and Techniques*, John Wiley & Sons, 1998.
- [Macaulay96] Macaulay, L., *Requirements Engineering*, Springer-Verlag, 1996.

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