Requirements engineering

• Involves
  • eliciting
  • understanding
  • analyzing
  • specifying

• Focus on
  • *what* qualities are needed, NOT on
  • *how* to achieve them
What is needed

- Understand interface between the application and the external world
- Understand the application domain
- Identify the main stakeholders and understand expectations
  - different stakeholders have different viewpoints
  - software engineer must integrate and reconcile them
The requirements specification document (1)

- Provides a specification for the interface between the application and the external world
  - defines the qualities to be met
- Has its own qualities
  - understandable, precise, complete, consistent, unambiguous, easily modifiable
The requirements specification document (2)

- **Must be analyzed and confirmed by the stakeholders**
  - may even include version 0 of user manual
- **May be accompanied by the system test plan document**
The requirements specification document (3)

• As any large document, it must be modular
  • "vertical" modularity
    • the usual decomposition, which may be hierarchical
  • "horizontal" modularity
    • different viewpoints
• Defines both functional and non functional requirements
A case study

railway automation

• Who are the stakeholders?
  • management of the train company
  • train drivers and their unions
  • passengers (customers)
  • contractors

• Each has different goals
Case study: how to classify requirements

• Safety requirements
  • the probability of accidents should be less than $10^{-9}$ per year

• Utility requirements
  • level of usefulness of the system as perceived by the various stakeholders
Case study
the produced document

• Introduction: the “mission” of the system
• Architecture: the main structure of the system
• Specific requirements associated with each subsystem
  • discussion of how the subsystems’ requirements guarantee that the overall goals are indeed achieved