Successful Software Outsourcing and Offshoring

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Requirements engineering

- Must involve all stakeholders (not all of them necessarily obvious)
  e.g. system users, unions, customers, subcontractors, ...
- Requirements determine two products:
  - The software
  - The test plan
- Document must be "correct, unambiguous, complete, consistent, ranked for importance and/or stability, verifiable, modifiable, traceable" (IEEE)
- One of the principal difficulties is completeness
Requirements engineering

- Purpose: to capture the user needs for a “machine” to be built

- Jackson’s view: define success as 
  
  \[ \text{machine specification} \land \text{domain properties} \Rightarrow \text{requirement} \]

- **Domain properties**: outside constraints (e.g. can only modify account as a result of withdrawal or deposit)

- **Requirement**: desired system behavior (e.g. withdrawal of \(n\) francs decreases balance by \(n\))

- **Machine specification**: desired properties of the machine (e.g. request for withdrawal will, if accepted, lead to update of the balance)
Components of requirements

- Domain properties
- Functional requirements
- Non-functional requirements (reliability, security, accuracy of results, time and space performance, portability...)
- Requirements on process and evolution
IEEE Standard 830-1993

Recommended practice for Software Requirements Specifications

Recommended document structure:

1. Introduction
   1.1 Purpose
   1.2 Scope
   1.3 Definitions, acronyms, and abbreviations
   1.4 References
   1.5 Overview
2. Overall description
   2.1 Product perspective
   2.2 Product functions
   2.3 User characteristics
   2.4 Constraints
   2.5 Assumptions and dependencies
3. Specific requirements
Appendixes
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Contract:
A legally binding document agreed upon by the customer and supplier. This includes the technical and organizational requirements, cost, and schedule for a product. A contract may also contain informal but useful information such as the commitments or expectations of the parties involved.

Customer:
The person, or persons, who pay for the product and usually (but not necessarily) decide the requirements. In the context of this recommended practice the customer and the supplier may be members of the same organization.

Supplier:
The person, or persons, who produce a product for a customer. In the context of this recommended practice, the customer and the supplier may be members of the same organization.

User:
The person, or persons, who operate or interact directly with the product. The user(s) and the customer(s) are often not the same person(s).
How to ensure good requirements?

Managerial aspects:
- Involve all stakeholders
- Establish procedures for controlled change
- Establish mechanisms for traceability
- Treat requirements document as one of the major assets of the project; focus on clarity, precision, completeness

Technical aspects: how to be precise?
- Formal methods?
- Design by Contract