Lecture # 4

Software Requirements

Recap of Last Three Lectures

- Kinds of requirements
  - Functional
  - Non-functional
  - Domain
  - Inverse
  - Design and implementation constraints

Topics Covered In This Lecture

- There also exists another view of requirements apart from different kinds of requirements we have studied so far.
  - Another view of requirements
- There are some problems which occur in requirements, that are necessary to be identified and properly attended.
  - Problems in requirements

Another View of Requirements

- In general requirements can be viewed as
  - User/customer requirements

    OR
  - System contract requirements

User/Customer Requirements

User/Customer Requirements - 1

- Functional and non-functional requirements should be stated in natural language with the help of forms or simple diagrams describing the expected services of a system by the User under certain constraints

User/Customer Requirements - 2

- These are understandable by users, who have no, or little, technical knowledge

- System design characteristics should be avoided as much as possible

User/Customer Requirements - 3

- It is a good practice to separate user requirements from more detailed system requirements in a requirements document

User/Customer Requirements - 4

- Including too much information in user requirements, constraints the system designers from coming up with creative solutions

User/Customer Requirements - 5

- The rationale associated with requirements is very important. It helps in managing changes to requirements

System Contract Requirements

System Contract Requirements - 1

- Sets out the system services and constraints in detail
- May serve as the basis of contract for implementation of the system
- Should be complete and consistent

System Contract Requirements - 2

- They are used by the designers and developers as the starting point for system design

- They should be understood by technical staff of the customer organization and the development team

System Contract Requirements - 3

- In principle, these requirements should also state ‘what’ the system does, rather than ‘how’ it is implemented
- However, with the level of details needed to specify the system completely, it is not possible to exclude all design information

System Contract Requirements - 4

- An initial architecture of the system may be defined to help structure the requirements specification
- In most cases, systems interoperate with other systems
- Use of specific design may be included as an external requirement

System Contract Requirements - 5

- Natural language is often used to describe system requirements
- Some specification languages may be used with natural language, which add structure to specifications and reduce ambiguity

System Contract Requirements - 6

- Unified Modeling Language (UML) is a specification language, which has become the de-facto standard for modeling requirements

Requirements Problems

Requirements Problems - 1

- The requirements don't reflect the real needs of the customer for the system
- Requirements are inconsistent and/or incomplete
- It is expensive to make changes to requirements after they have been agreed upon

Requirements Problems - 2

- There are misunderstandings between customers, those developing the system requirements, and software engineers developing or maintaining the system

Problems with Natural Languages - 1

Requirement specification in natural language pose some problems which include

- Lack of clarity
- Requirements confusion
- Requirements amalgamation

Problems with Natural Languages - 2

- Natural language understanding relies on the specification readers and writers using the same words for same concept

- A natural language requirements specification is over-flexible.

  "You can say the same thing in completely different ways"

Problems with Natural Languages - 3

- It is not possible to modularize natural language requirements. It may be difficult to find all related requirements
  - To discover the impact of a change, every requirement have to be examined

Impact of Wrong Requirements

- When requirements are wrong, systems are late, unreliable and don’t meet customers needs
- This results in enormous loss of time, revenue, market share, and trust of customers

Summary

- Discussed requirements from the user/customer's perspective and also explored issues related to system contract requirements
- Discussed requirements problems