# Requirement Specification

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Functional

Non Functional Requirement

1. **Performance:** Specifies how efficiently the system should respond to user actions and handle workloads.
2. **Reliability:** Defines the system's ability to operate consistently without failures, ensuring availability and fault tolerance.
3. **Security:** Outlines measures to protect the system and its data, covering aspects like authentication, authorization, and encryption.
4. **Usability:** Describes the user interface and overall user experience, ensuring accessibility and adherence to design guidelines.
5. **Scalability:** Addresses the system's capability to handle increased workload, data, or users without compromising performance.
6. **Maintainability:** Refers to how easily the system can be modified, updated, or repaired over time, including code organization and documentation.
7. **Compatibility:** Ensures the system functions correctly on specified browsers, platforms, and integrates well with other systems.
8. **Regulatory Compliance:** Specifies adherence to laws, regulations, and industry standards governing the system's operation.
9. **Interoperability:** Addresses the system's ability to work seamlessly with other specified systems, ensuring effective data exchange.
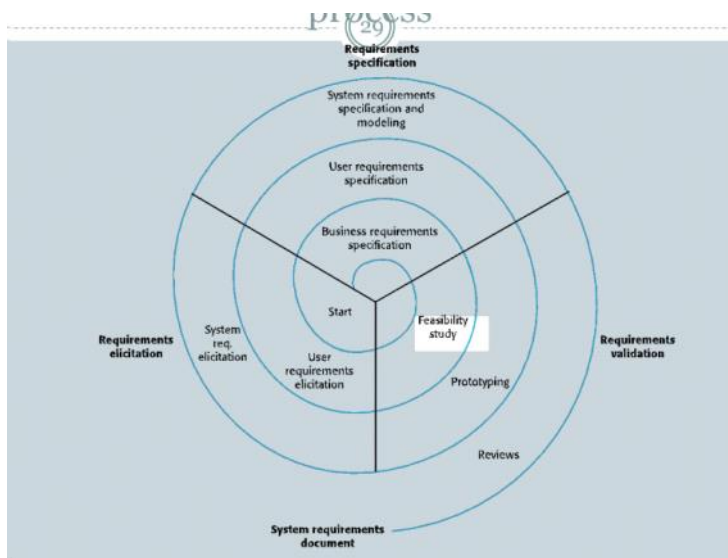
Requirement Elicitation Process

Elicitation techniques for the SMART Agriculture system

1. *Interviews:* The most common technique for requirement elicitation is to interview stakeholders, such as farmers, agronomists, and farm managers. Interviews can be conducted in person, over the phone, or through video conferencing. The objective of these interviews is to understand the current practices, challenges, and needs of the stakeholders.
2. *Focus groups:* Focus groups are another technique for requirement elicitation, especially when a group of stakeholders have similar needs or challenges. Focus groups provide an opportunity for stakeholders to share their perspectives and ideas on the SMART Agriculture system.
3. *Questionnaires:* Questionnaires are a cost-effective technique for requirement elicitation, especially when dealing with a large number of stakeholders. Questionnaires can be designed to collect both qualitative and quantitative data, and can be administered online or in paper form.
4. *Observation:* Observing stakeholders in their farming practices can provide valuable insights into the requirements for the SMART Agriculture system. This technique can be used to understand the challenges and constraints faced by farmers, as well as the opportunities for optimization.
5. *Prototyping:* Prototyping involves creating a basic version of the SMART Agriculture system and testing it with stakeholders. This technique allows stakeholders to provide feedback on the functionality, usability, and performance of the system, and can be used to refine the requirements.

Requirement validation

Requirements checking
(69)

- Validity. Does the system provide the functions which best support the customer's needs?
- Consistency. Are there any requirements conflicts?
- Completeness. Are all functions required by the customer included?
- Realism. Can the requirements be implemented given available budget and technology
- Verifiability. Can the requirements be checked?

Requirements validation techniques
(70)

- Requirements reviews
  - Systematic manual analysis of the requirements.
- Prototyping
  - Using an executable model of the system to check requirements.
- Test-case generation
  - Developing tests for requirements to check testability.

Review checks
(72)

- Verifiability
  - Is the requirement realistically testable?
- Comprehensibility
  - Is the requirement properly understood?
- Traceability
  - Is the origin of the requirement clearly stated?
- Adaptability
  - Can the requirement be changed without a large impact on other requirements?

Management Process

- Requirements management decisions:
  - *Requirements identification* Each requirement must be uniquely identified so that it can be cross-referenced with other requirements.
  - *A change management process* This is the set of activities that assess the impact and cost of changes. I discuss this process in more detail in the following section.
  - *Traceability policies* These policies define the relationships between each requirement and between the requirements and the system design that should be recorded.
  - *Tool support* Tools that may be used range from specialist requirements management systems to spreadsheets and simple database systems.

Requirements change management
(80)