(X) Requirement Engineering:

1) Requirement Elicitation: Gathering of requirements.

2) Requirement Analysis: Requirements are analyzed to
   - find inconsistency, contradictions.
   - Omissions.

3) Requirement Documentation: End product of first 2 steps leads to.
   - preparation of SRS. (software requirements specifications)
   - → Becomes foundations for design of s/w.

4) Requirement Review (or) Req. verification (or) validation.
   - To improve the quality.
   - SRS is shown to Customer.
   - → Check for consistency and completeness.

(X) Desirable characteristics of A SRS:

1. Consistent
2. correct
3. Complete
4. Understandable
5. Basis for design & Implementation
6. Act as a contract.
7. Modifiable
8. Verifiable
9. Traceable.
10. Unambiguous. (non confusion)

(8) Types of Requirements:

(1) Functional and Non Functional Requirements.
(2) User and System Requirements.
(3) Interface Specification.

- **Functional Requirements:**
  - → It specifies product features, or services or functionalities.
  - → Describe what the system has to do.
  - → What are the expectations from the s/w by the customer.
  - → What the s/w should not do.

  eg) features of a gaming s/w.

- **Non-Functional Requirements:**
  - → Mostly Quality Requirements. (Specify quality).
  - → Highlights how-well the s/w performs its function.

  eg) For user: High performance, reliability, usability.

  For developers: Maintainability, Testability, Portability.

- **User Requirements:** → are abstract statements of the system requirements.
  - → Written for users who are not experts of sw field.
  - → Highlights the overview of system without design description.
  - → Specifies → functional + non-functional requirements.
    - Constraints
    - Quality
    - External behaviour (how the sw will interact with the user).

- What to avoid?
  - ↳ Complex language
  - ↳ Design details
  - ↳ Technical terms and values.

- System Requirements:
  - ↳ Derived from user requirements or expanded form of user requirements.
  - ↳ used as input to designers so that they can prepare Software Design Document (SDD).
  - → are the more detailed description of the functionality to be provided.

- Interface Specification:
  - ↳ Application Programming Interfaces (API) are specified in SRS.
  - ↳ What kind of interfaces customers desires.

(*) Feasibility Studies:
- → Determines if the project is workable or not.
- → Work Product: Feasibility Report.
- → use: → It helps the management / project team / customer to decide if the sw should be built.

What factors are considered ?

1. Current practices vs Proposed system.
2. Amount of resources needed.
3. Major risks that can occur.
4. Cost and schedule.
5. Technical skill required.

Benifits of Feasibility Study:

1. 10% failure vs 80% failure.

2. More accurate estimates can be prepared.

(9/10) # Requirements Engineering :

→ The broad spectrum of tasks and techniques that lead to an understanding of requirements is called requirements engineering.

→ Requirements engineering builds a bridge to design and construction.

But where does the bridge originate ?

- One could argue that it begins at the feet of the project stakeholders (e.g., managers customers, and end-users), where business need is defined, user scenarios are described, functions and features are delineated, and project constraints are identified.

- Requirements engineering encompasses seven distinct tasks :

1) Inception : → understand the problem.
→ Define the nature & scope of the problem.

2) Elicitation : → Software team try to understand from the stakeholders or clients what are their requirements.
→ problems arise :
(1) Problems of scope → ill-defined of requirements by the clients.
(2) Problems of understanding → Clients does not have domain knowledge or no clear idea.

(3) volatility :- Clients or stakeholders requirements changes over the time.

3) Elaboration :- → Trying to develop Refined Requirement Model based on the information collected from the Inception & Elicitation steps.

→ It is trying to identify the various aspects of system fn, system behaviour and information

→ Trying to create, refine the user scenarios that is they are trying to describe how the end-user is going to interact with the system.

(4) Negotiation :- → Elimination of unrealistic requirements.

→ Alter or modify the requirements.

→ Create win-win solution for the satisfaction of all the stakeholders.

→ Negotiation task is done when there occurs conflict of requirements among stakeholders.

(5) Specification :- → specify all the requirements in the form of written document, graphical model, mathematical model, prototype.

→ Flexibility → Specification vary with different projects.

(6) Validation :- → check for inconsistency, ambiguity, error, conflicting requirements etc. to meet customer expectations.

(7) Requirements Management :- → It is trying to monitor, track, control the requirements and the changes to the requirements at any time as the project proceed.