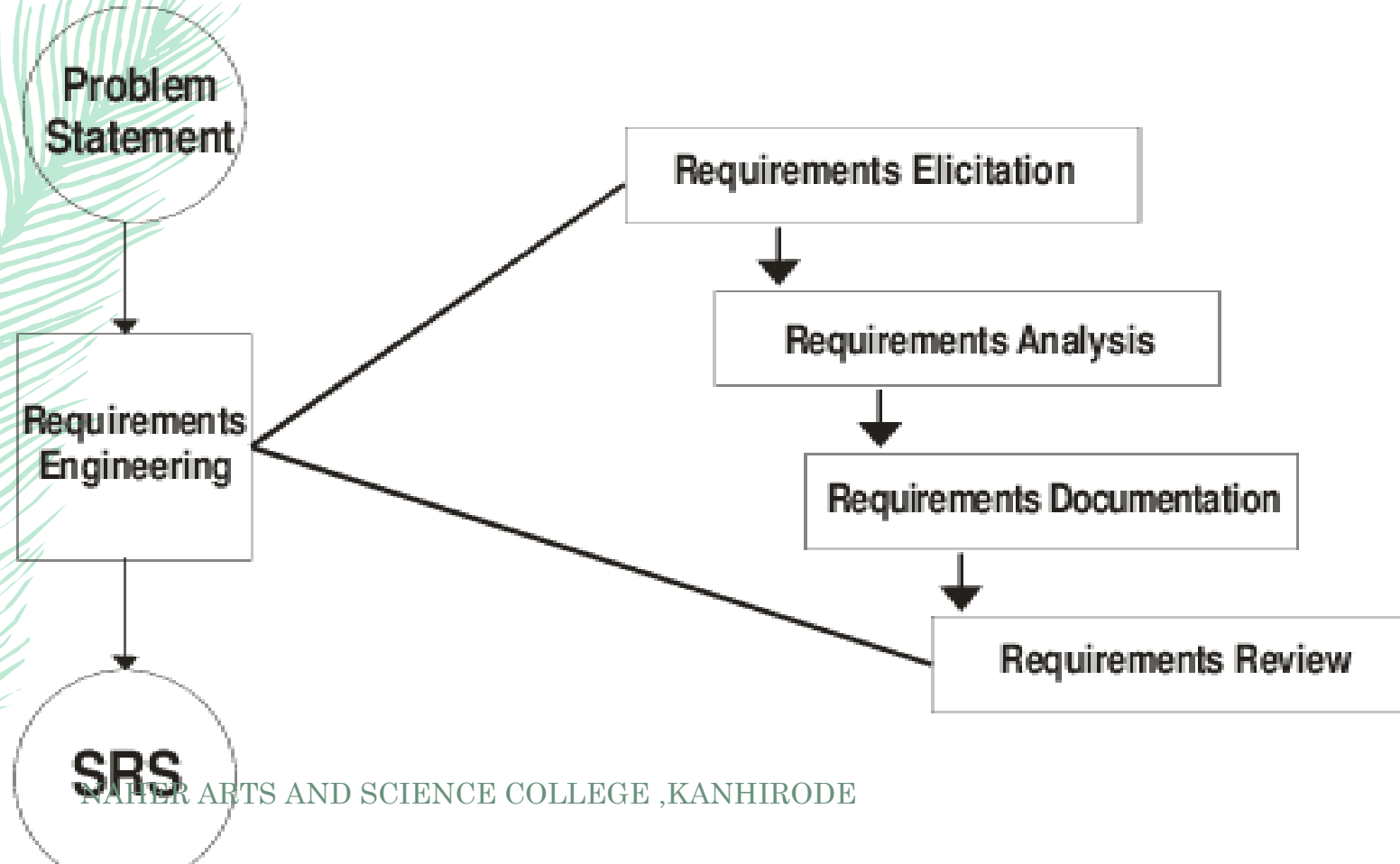# Requirements Engineering

– The process to gather the **software requirements** from client, analyze and document them is known as **requirement engineering**.

Steps of requirement engineering

Problem Statement

Requirements Engineering

SRS

Requirements Elicitation

Requirements Analysis

Requirements Documentation

Requirements Review

- 1.Requirements Elicitation : Gathering of requirements.Requirements are

    identified with the help of customer and existing

    system processes,if available.

- 2.Requirement analysis   : Requirements are analysed inorder to identify

    inconsistencies,defects,omission etc.

- 3.Requirements Documentation :This is the end product of requirement

    elicitation and analysis. The document is known as

    SRS(Software Requirement Specification)

- 4. Requirement Review   : It is carried out to improve the quality of the SRS.It is

    also called as requirement verification

Types of requirements

- Functional and non-functional

- User and system requirements

- Interface Specification

- Known requirements   :Something a stake holder believes to be implemented.

- Unknown Requirements   :Forgotten by the stakeholder because they are not

   needed right now or needed only by another stakeholder.

- Undreamt requirements   :Stake holder may not be able to think of new

   requirements due to limited domain knowledge.

1.Functional Requirements

Requirements, which are related to functional aspect of software .   They define functions and functionality within and from the software system.

2.Non Functional

- Security

- Logging

- Storage

- Usability

- Performance

- Cost

- Flexibility

User & System Requirements

- User requirements are written for the users and include functional and non functional requirements.

- System requirements are derived from user requirements .

- They are expanded form of user requirements.

Interface Specification

- Procedural Interface   :APIs(Application Programme Interface)

- Data structures   :Used to transfer data from 1 module to another.

Feasibility Studies

– A **feasibility study** determines whether the **project** is likely to succeed in the first place. It is typically conducted before any steps are taken to move forward with a **project**, including planning.

– An **analysis** and evaluation of a proposed project to determine if it (1) is technically **feasible**, (2) is **feasible** within the estimated cost, and (3) will be profitable.

– Various **types of feasibility** that are commonly considered include **technical** feasibility, **operational** **feasibility**, and **economic** **feasibility**.

- Technical Feasibility

- This assessment focuses on the technical resources available to the organization.

- Involves the evaluation of the hardware, software, and other technical requirements of the proposed system.

- Operational Feasibility

- how a project plan satisfies the requirements identified in the requirements analysis phase of system development.

- Economic Feasibility

- This assessment typically involves a cost/ benefits analysis of the project.

1. Requirement Elicitation

- It is the practice of collecting the requirements of a system from users.Also referred to as requirements gathering.

- There are number of requirement elicitation methods

- 1.Interviews(Meeting):
  - *Arrange a meeting with the customer.*
  - *It may be open ended or structured.*
    - *In open ended there is no pre-set agenda.*
    - *In structured, proper questionnare is designed for the interview.*

– There are several groups to be considered for conducting interviews.

Entry level personnel   :May not have sufficient domain knowledge.

Useful for fresh ideas and different views.

Mid-level   :Better domain knowledge and experience of the project.

Project leader should always be interviewed.

Managers   :Higher level management officers like Vice Presidents, General

Managers,Managing directors should also be interviewed.

Users of the software:

2. Brainstorming Session

- It is a group technique.

- Highly trained facilitator may be required.

- Every idea will be documented.

- White boards, overhead transparencies or a computer projection system can be used to make it visible to every participant.

- After the session ,a detailed report will be prepared and facilitator will review the report.

3. FAST (Facilitated Application Technique.)

– Team oriented approach :Joint team of customers and developers.

– The basic guidelines for FAST are

  – *Arrange a meeting.*

  – *Prepare an informal agenda.*

  – *Appoint a facilitator to control the meeting.*

  – *Facilitator may be a developer,a customer,or an outside expert.*

  – *Prepare a definition mechanism board.*

4.Quality Function Deployment (QFD)

– The model aims in translating customer needs and expectations into technical requirements by listening to the voice of customer.

– Three types of requirements are identified.

i) Normal Requirements :

– *The objectives and goals of the proposed software are discussed with the customer.*

(ii) Expected Requirements

– *These requirements are implicit to the software product and may be so obvious that customer doesn't explicitly state them.*

(iii) *Exciting Requirements :*

Some features go beyond customers expectations and prove to be very satisfying when present.

5. The Use Case Approach

– Use-cases are descriptions of the functionality of a system.

– Describe the functionality and users(actors) of the system.

– Show the relationship between the actors that use the system.

– Components of use case diagram

– Actor

– Use case

– System boundary

– Relationship

– ACTOR

– An actor is some one or something that must interact with the system.

– It can be a human ,machine.
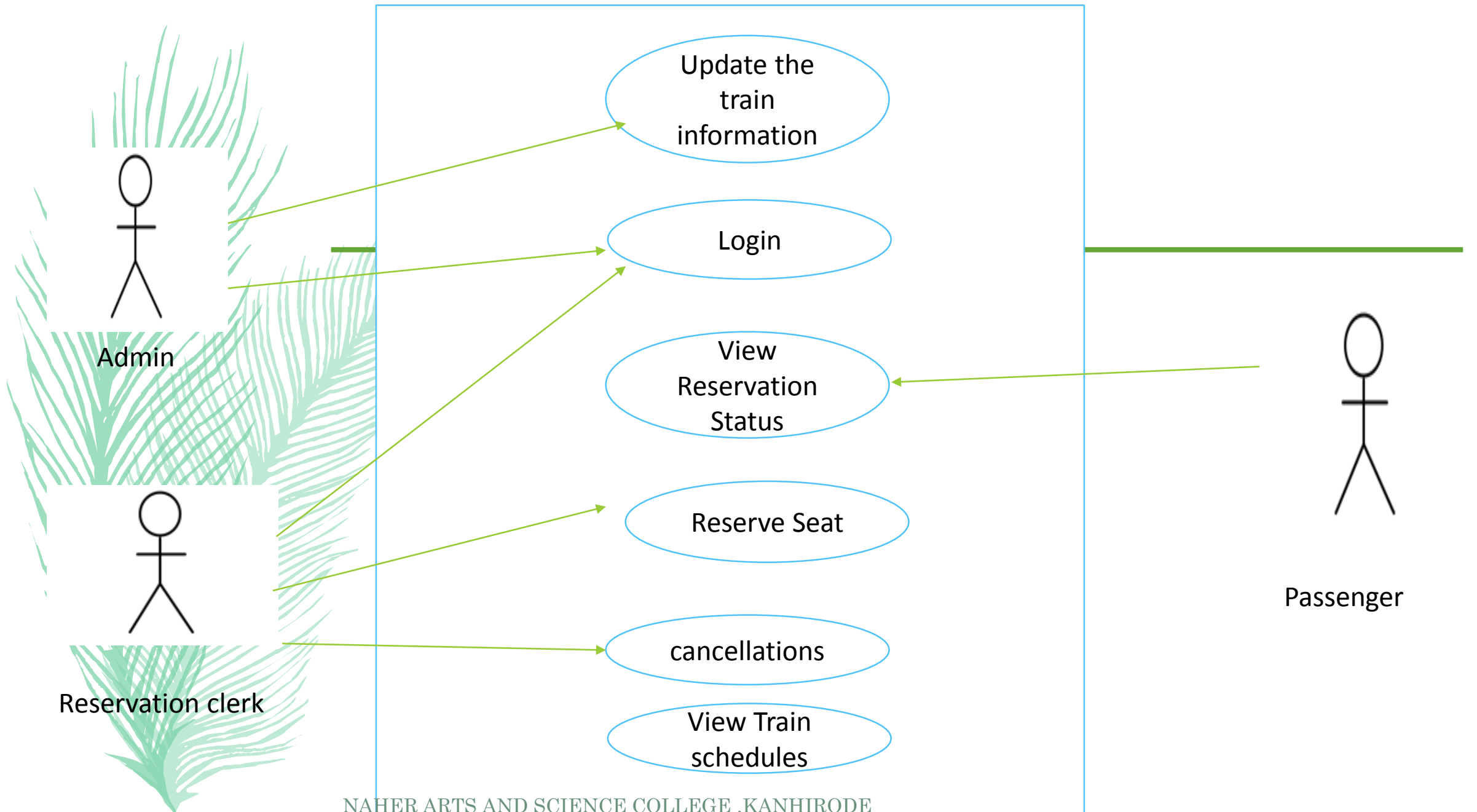
– Actors are not part of the system.
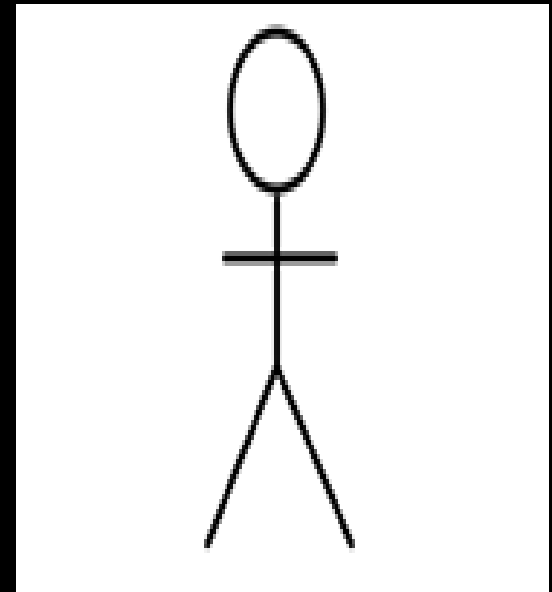
Use case

- Use cases are sequence of actions that the user takes on a system to get particular target.

- Use case is a dialogue between an actor and the system.

- Eg:

Add a course
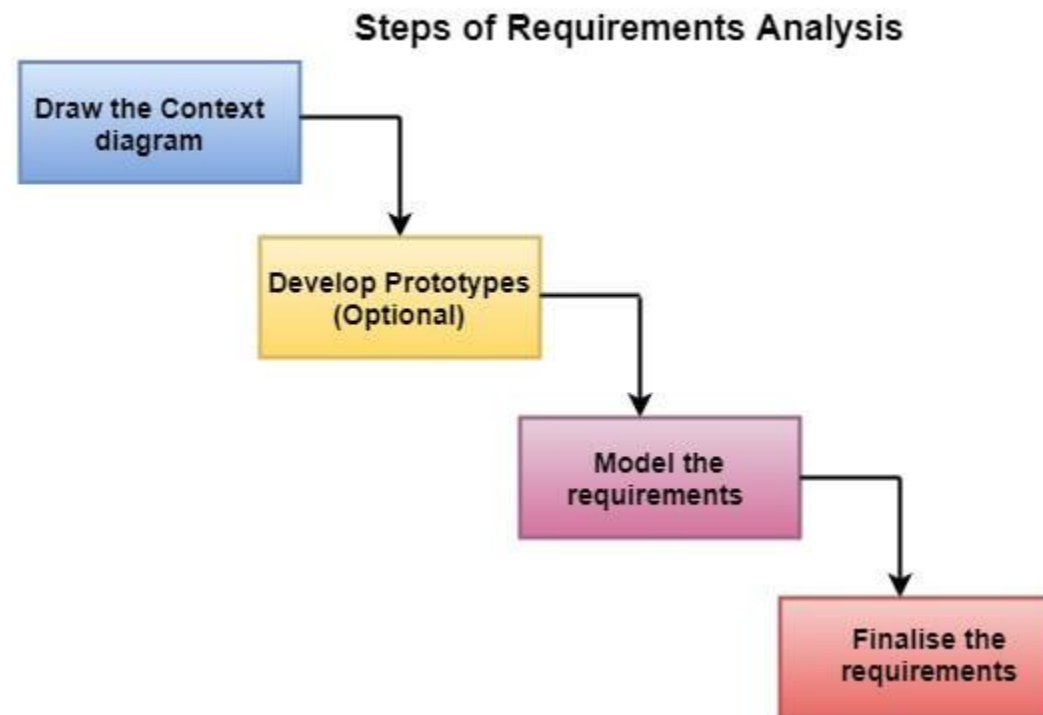
System Boundary

– It is shown as rectangle.

– It helps to identify what is external versus internal and what the responsibilities of the system are.

– The external environment is represented oonly by actor.

– RELATIONSHIP   :Represented by

Admin

Reservation clerk

Update the train information

Login

View Reservation Status

Reserve Seat

cancellations

View Train schedules

Passenger

2.REQUIREMENTS ANALYSIS

- Essential activity after elicitation.

- Various steps of requirement analysis are

Steps of Requirements Analysis

Draw the Context diagram

Develop Prototypes (Optional)

Model the requirements

Finalise the requirements

(i).Draw the context diagram

– Defines the boundaries and interfaces of the proposed system with the external world.

– It identifies the entities outside the proposed system that interact with the system.

– The context diagram of student result management system is given below:

–
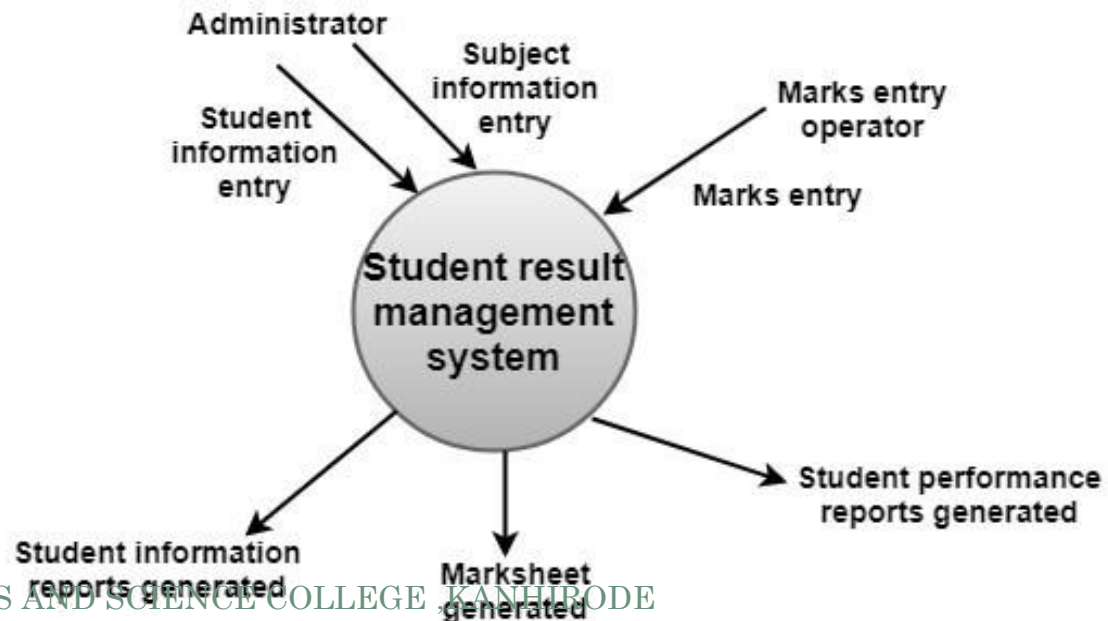
(ii). Development of a Prototype (optional):

- Construct a prototype.

- Use customer feedback to modify the prototype until the customer is satisfied continuously.

- The prototype should be built quickly and at a relatively low cost.

- Would not be acceptable in the final system. This is an optional activity.

(iii). Model the Requirements

- Consists of various graphical representations of the functions, data entities, external entities, and the relationships between them.

- To find incorrect, inconsistent and missing requirements .

- Such models include the Data Flow diagram, Entity-Relationship diagram, Data Dictionaries, State-transition diagrams, etc.

(iv) Finalise the requirements

– After modeling the requirements, we will have a better understanding of the system behavior.

– The flow of data amongst various modules has been analyzed.

– Elicitation and analyze activities have provided better insight into the system.

– Now we finalize the analyzed requirements, and the next step is to document these requirements in a prescribed format.

3.REQUIREMENTS DOCUMENTATION

– Requirements document is also called Software Requirement Specification(SRS).

_____

– A **software requirements specification** (**SRS**) is a **document** that describes what the **software** will do and how it will be expected to perform.

– Characteristics of a good SRS

  – CORRECT :

  – UNAMBIGOUS :*Every statement stated therein has only one interpretation.*

  – COMPLETE

  – CONSISTENT

  – VERIFIABLE

  – MODIFIABLE

  – TRACEABLE

REQUIREMENT VALIDATION

– SRS document

Validation Process

List of problems

– Organizational Standards

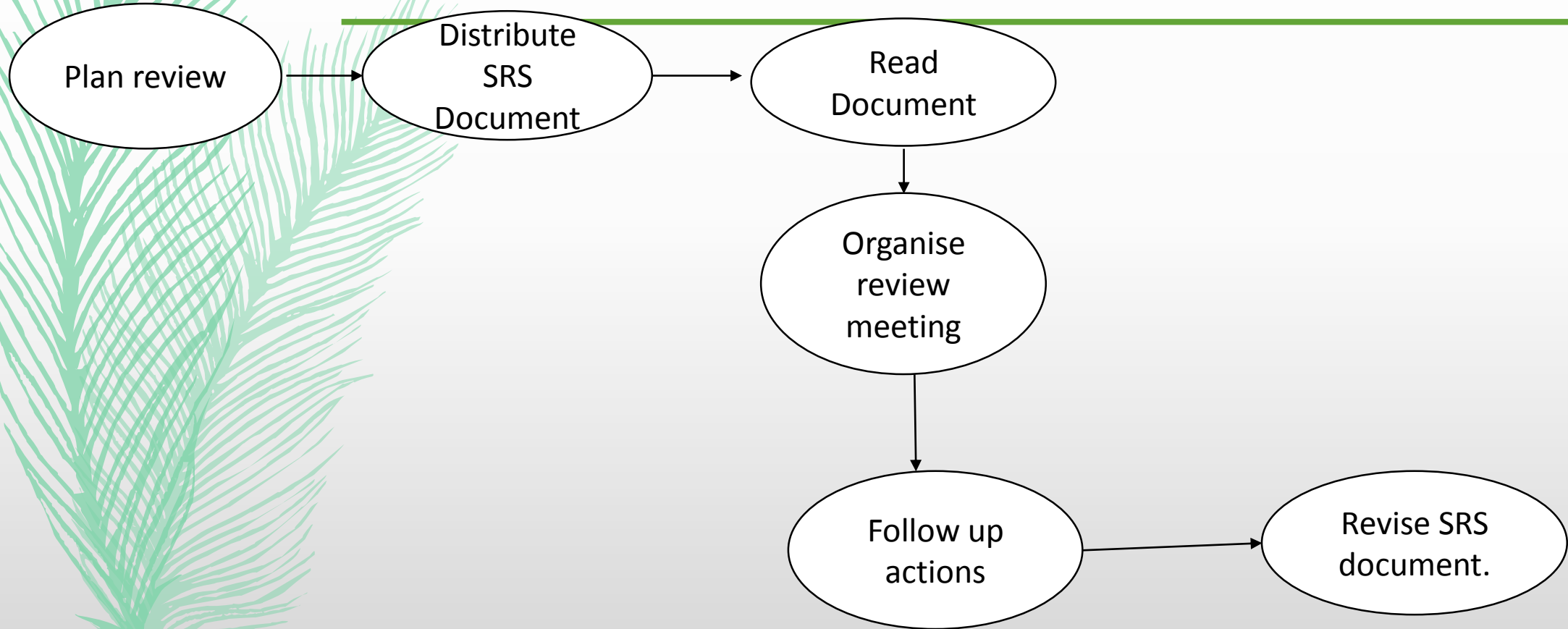Approved Actions

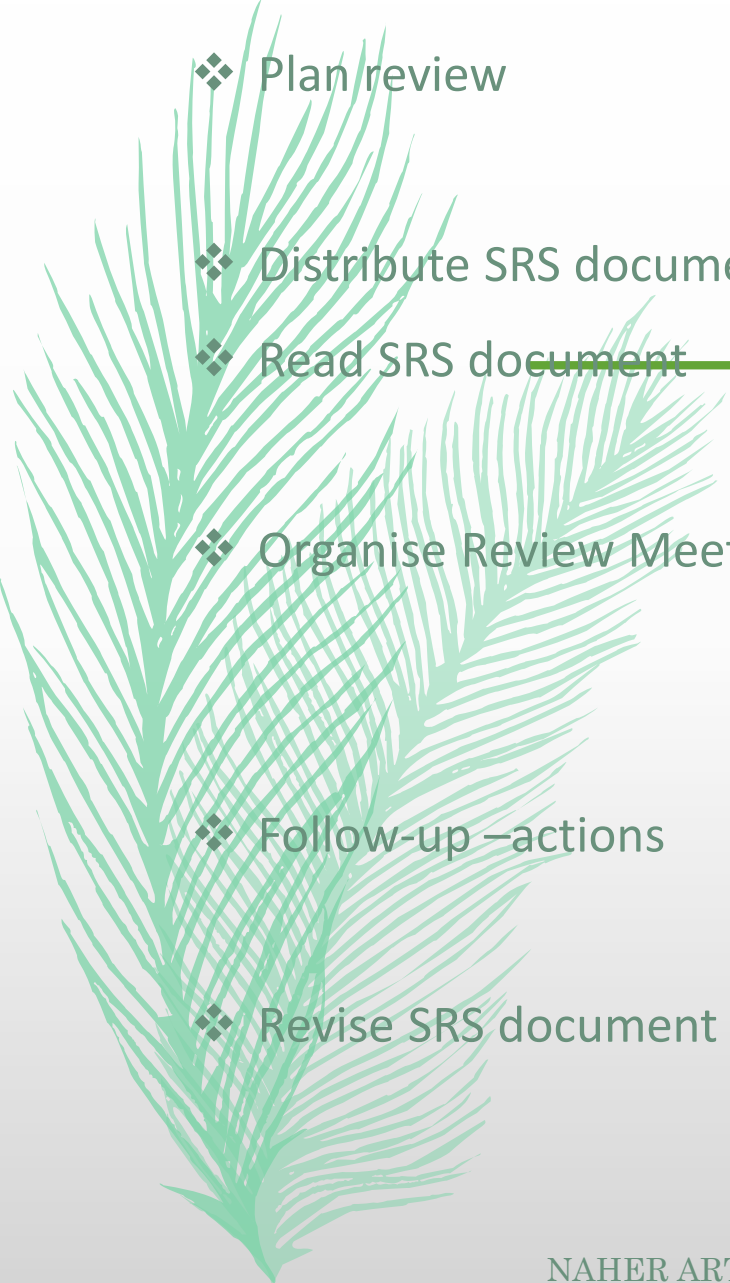– (Validation process with input and output)

- SRS Document   : It should be a final draft, should be organized as per
-   IEEE   standards.

- Organizational Standards   :Every organization should have some quality
-   standards for SRS document and other activities.

- Problem List   : List of discovered Problems in the requirements
-   document.

- Approved Actions   : List of approved actions in response to the
-   requirements.

4.REQUIREMENTS REVIEW

Plan review → Distribute SRS Document → Read Document → Organise review meeting → Follow up actions → Revise SRS document.

❖ Plan review   : The review team is selected and time and place for review meeting is

fixed.

❖ Distribute SRS document : The SRS document is distributed to all the members.

❖ Read SRS document   : Each member should read the document carefully to find conflicts

omissions,inconsistencies and other problems.

❖ Organise Review Meeting :Each member presents his/her views and identified problems.The

problems are discussed and a set of actions to address the problem

is approved.

❖ Follow-up –actions   : The chairperson of the team checks that the approved actions have

been carried out

❖ Revise SRS document   :The SRS document is revised to reflect the approved actions.

THANK YOU.....

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