Unit-2
Software Requirement Process

Chamundeswari Arumugam
Professor
SSN College of Engineering, Chennai

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Outline

- Requirement Engineering Process
- Feasibility Studies
- Requirements Elicitation and Analysis
- Requirements Validation
- Requirement Management

Requirement Engineering Process

Four high-level activities

- Feasibility study - Assessing the system usefulness to the business
- Elicitation and Analysis - Discovering requirements
- Specification - Converting the requirements into standard form
- Validation - Checking that the requirements actually define the system that the customer wants.

Spiral RE process

- Activities are organized around a spiral with the output being a system requirement document.
- Time and effort devoted to each activity in each iteration depends on the stage of the overall process
- Early stage in spiral, more effort required to understand FR, NFR, UR and SR.
- Later stage in spiral, more effort devoted to elicition and SR.

Fig : Spiral view of RE process

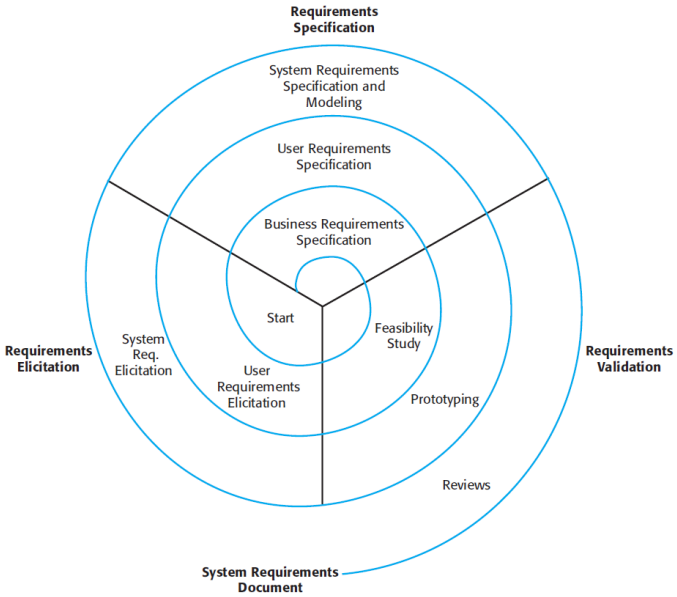
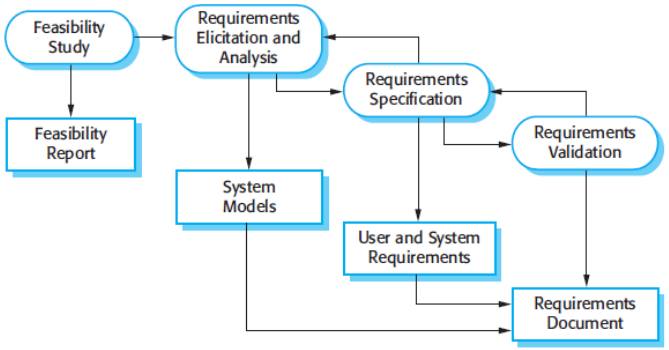


Fig : RE process



Feasibility Studies

- Can we build software to meet the defined scope? Is the project feasible ?
- The main aim of the feasibility study activity is to determine whether it would be financially and technically feasible to develop the product.
- This study involves the analysis of the problem and collection of all relevant information relating to the product.
- Different data items collected - input to the system, the processing, output data, constraints on the behaviour of the system.
- A feasibility report enables the organization to decide whether the project can be taken up by the organization or not.

This study should answer the following questions: sample provided

- Can current software and hardware technologies can be used for development ?
- Is the proposed system will be cost-effective from a business point of view ?
- Can we develop within existing budgetary constraints ?

Types of feasibility

- Technical feasibility : can the system be implemented within schedule and budget using current technology?
- Operational feasibility : does the system contribute to the overall objectives of the organization?
- Economic feasibility : can the system be integrated with other systems that are used?

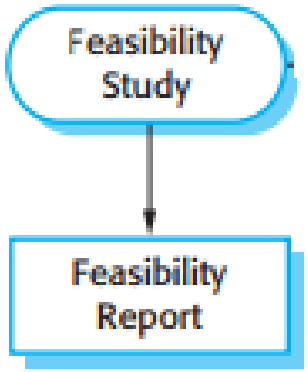


Fig : Feasibility Study

Requirement Elicitation and analysis

What is Elicitation ?

- Elicitation is an activityin RE process to find out the services, constraints, performance of the proposed system.
- It has iterative 4 process and ends with SRS.

What is 4 process of Elicitation ?

- Requirement discovery, requirement classification & organization, requirement priorization & negotiation, requirement specification

Difficulties in Elicitation

- Unrealistic demand, Requirement Engineering(RE) experience item Discovery commonalities and conflict requirement, Political factors, New requirements from new stakeholders

Stakeholders in Elicitation

- System Stakeholders, Development Engineer, Maintenance Engineer, Business Manager, Domain experts, Trade union representatives

Fig : Elicitation and Analysis in RE process

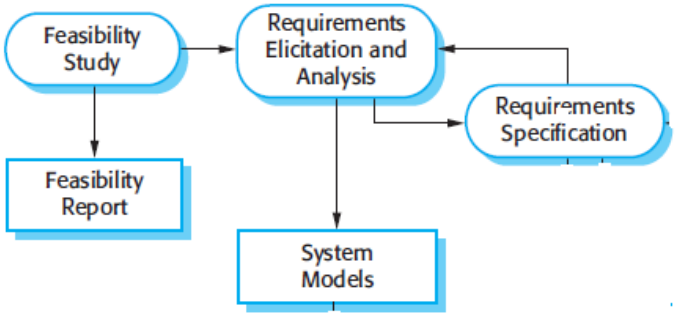
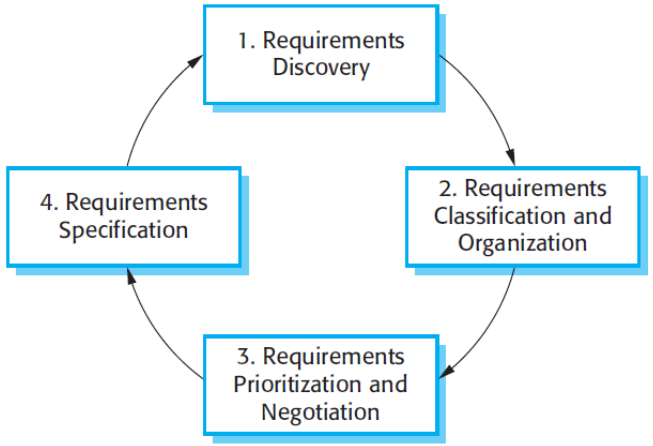


Fig :The Requirements Elicitation and Analysis Process



Requirement Elicitation and analysis (contd..)

Requirement discovery

- **Basic guidelines**
  1. Meeting with stakeholders
  2. Draft an agenda for idea collection
  3. A facilitor oppointed to control the meeting
  4. A mechanism (eg. chat room, virtual, forum, wall stickers, work sheets) to store the requirement is defined
- **Req discovery Goals**
  1. Identify the problem
  2. Propose elements of the solution
  3. Negotiate different approach
  4. Specify a preliminary set of solution

Requirement discovery

- **Facilitator goals**
  1. Invite stakeholders by fixing the schedule
  2. Collect the product request from stakeholders
  3. Collect the propose elements using mechanism
  4. Check for ambiguity, omissions, and errors in requirements

Req classification & organization

- **Basic functions**
  1. Translate the requirements into technical requirements for the proposed software
  2. Identifies three requirements : Norma, expected, exciting

Req classification & organization

- **Types of requirements**
  1. Normal requirement - req that satisfies the customer eg. graphic display
  2. Expected requirement - req that creates dissatisfaction eg. reliability
  3. Exciting requirement - req that go beyond the customer expectations
- **Methods used**
  1. Open interview, closed interview
  2. Observation, Survey, historial data
- **Mechanism used**
  1. Diagrams, Matrices, Evaluation method

Requirement Elicitation and analysis (contd..)

Requirement Classification & Organization

- **Usage scenario**
  1. Translate the techical requirements into technical SE activities
  2. Scenarios are created using use cases.
  3. Use case diagram is developed.

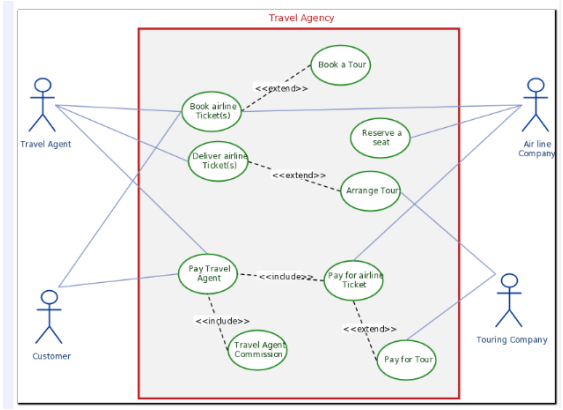
Requirement Priorization & Negotiation

- Balancing the business benefit of requirement against its cost and product
- concentrates on user and system requirements
- focus on effort
- trade-off among conflicting goals
- allocate resources

Req specification - SRS

- Use SRS IEEE template to document the requirements.
- Use natural language to write specification
- NF and NFR should be stated.
- User requirements and system requirements should be clear, unambiguous, easy to understand, complete, consistent.
- User requirements can be supported by diagrams and tables.
- System requirements can include graphical system model or mathematical system model.
- Not to include architecture diagrams or design diagram
- A specific architecture diagram for complex large system should be included.

Fig :Use case diagram



Use case diagram

- Case study - Booking the tour through touring company.
- Use case diagram represents the proposed software (Ref:Fig).

Requirement Validation

What is req validation?

- Checks the defined system requirements.
- It discover errors in the request to prevent rework cost after system development.
- Provides solid foundation for design.
- Inconsistencies, omissions, and ambiguity are examined.

Sample Checklist

- Is each requirement bounded and unambiguous ?
- Is each requirement testable once implemented?
- Do any requirement conflict with other requirement ?

Types of Checks

- Validity check - Whether diverse stakeholders requirements are satisfied?
- Consistency checks - No contradictory constraints in the requirements document.
- Completeness checks - FR and NFR should be stated in SRS.
- Realism checks - Can the requirements be implemented within the budget and schedule.
- Verificability - Is the requirements are testable ?

Validation techniques

- Requirement reviews - check for errors and inconsistencies.
- Prototyping - an executable model is experimented to validate the requirements.
- Test case generation - reveals the requirement problem by testing the requirements.

Requirement Management

What is req management?

- Process of understanding and controlling changes to system requirement and to track the requirement to maintain.

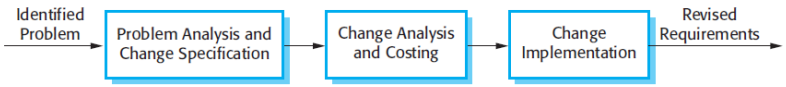
What is req traceability?

- Keep track of the relationship between requirements, their sources, and the system design, so as analyze the proposed changes and their impact in other parts of the system.

Types of changing requirement

- **Enduring requirement** : Requirement that are associated with the core, slow to change activities of an organization.
- **Volatile requirement** : Requirements are likely to change due to supporting activities of the organization.

Fig : Requirement Change Management



Why requirements change?

- Change is possible for large system.
- Requiement are bound to be incomplete.
- Requirement must evolve for changes.

Why requirements change is inevitable ?

- Business and technical environment change
- Adding new requirement for user support to meet the proposed sytem goals.
- Discover requirements to support diverse user community.

Requirement management process:

- **Requirement management planning** : Decide on requirement identification, change management process, traceability policies, tool supoort (requirement storage).
- **Requirement change management** : Manages the new requirement and is responsible to create a revised requirement document. It involves 3 stages as given in Fig.

Summary

- Activities of RE process
- Feasibility report
- Elicitation and analysis process.
- Draw use case diagram.
- Validation techniques
- Requirement management process

Assessment

- Prepare a feasibility report for the proposed online exam system
- Draw the use case diagram for teh proposed university result analysis system.
- Discover the requirement for the proposed on-line shopping application.
- Identify teh normal, expected, and exciting requirements for the proposed on-line shopping application.

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