Chapter 5

- **Understanding Requirements**

Requirements Engineering

- The broad spectrum of task and techniques that lead to an understanding of requirements is called requirement engineering

- Requirement engineering provides the appropriate mechanism for understanding what the customer wants, analyzing need, assessing feasibility, negotiating a reasonable solution, specifying the solution unambiguously, validating the specification and managing the requirements during transformation into operational system.

- It encompasses seven distinct tasks : Inception, Elicitation, elaboration , negotiation , specifications, validations and management.

- Some of these task occurs parallel and all are important for project

Requirements Engineering-I

- Inception—ask a set of questions that establish …
  - basic understanding of the problem
  - the people who want a solution
  - the nature of the solution that is desired, and
  - the effectiveness of preliminary communication and collaboration between the customer and the developer
- Elicitation—elicit (obtain) requirements from all stakeholders
  - Elicitation is not simple it faces following problems
    - Problem of scope
    - Problem of understanding
    - Problem of volatility (requirement change)
- Elaboration—create an analysis model that identifies data, function and behavioral requirements
- Negotiation—agree on a deliverable system that is realistic for developers and customers

Requirements Engineering-II

- Specification—can be any one (or more) of the following:
    - A written document
    - A set of models
    - A formal mathematical models
    - A collection of user scenarios (use-cases)
    - A prototype
- Validation—a review mechanism that looks for
    - errors in content or interpretation
    - areas where clarification may be required
    - missing information
    - inconsistencies (a major problem when large products or systems are engineered)
    - conflicting or unrealistic (unachievable) requirements.
- Requirements management : A set of activities that helps the project team – identify , control, and track requirements and changes to requirements at any time as project proceeds

Inception

- Identify stakeholders
  - "who else do you think I should talk to?"
- Recognize multiple points of view
- Work toward collaboration –commonality & conflicts are resolved by senior technologist or business manager
- The first questions
  - Who is behind the request for this work?
  - Who will use the solution?
  - What will be the economic benefit of a successful solution
  - Is there another source for the solution that you need?

Eliciting Requirements

- meetings are conducted and attended by both software engineers and customers
- rules for preparation and participation are established
- an agenda is suggested
- a "facilitator" (can be a customer, a developer, or an outsider) controls the meeting
- a "definition mechanism" (can be work sheets, flip charts, or wall stickers or an electronic bulletin board, chat room or virtual forum) is used
- the goal is
  - to identify the problem
  - propose elements of the solution
  - negotiate different approaches, and
  - specify a preliminary set of solution requirements

Eliciting Requirements

FAST : Facilitated Application Specification Technique
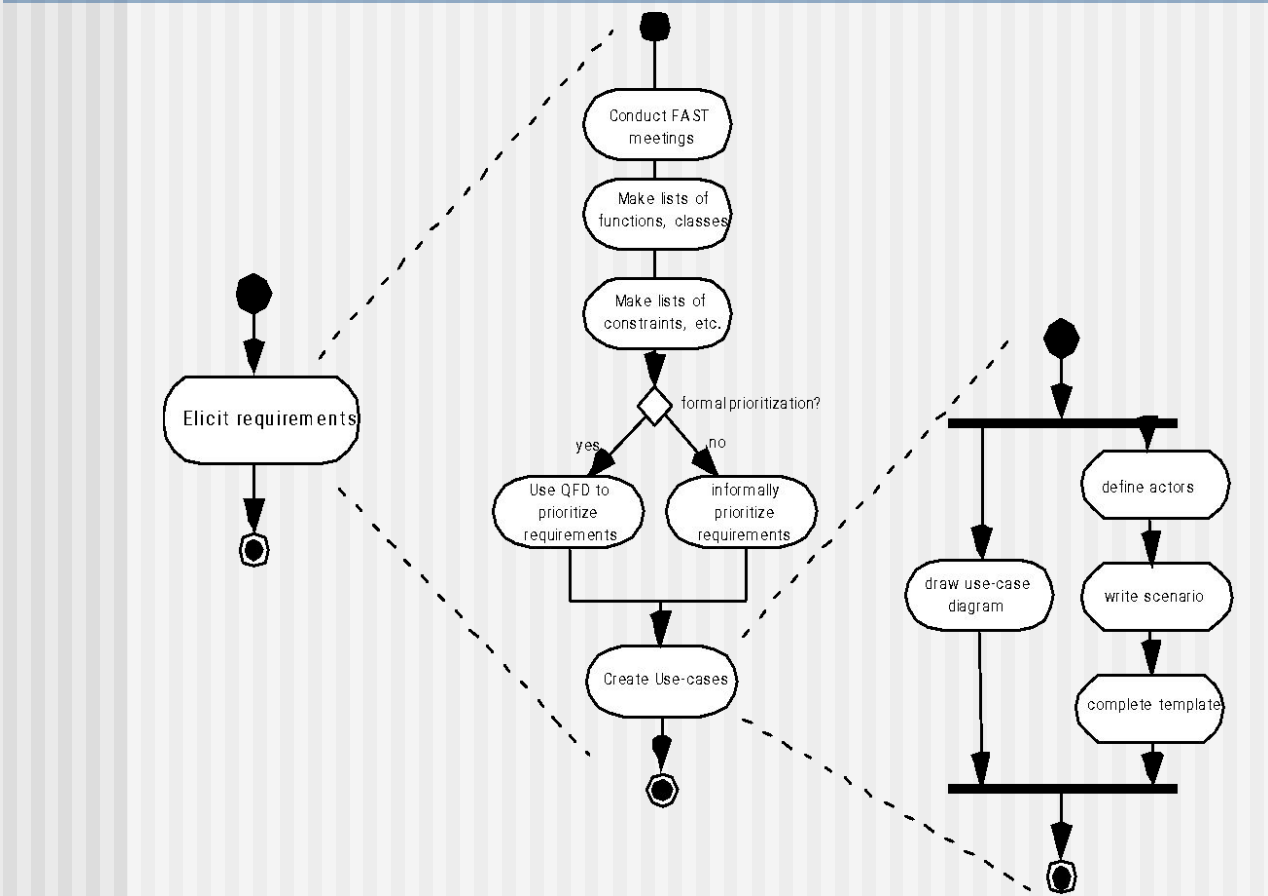
Quality Function Deployment

- **Function deployment** determines the "value" (as perceived by the customer) of each function required for the system

- **Information deployment** identifies data objects and events

- **Task deployment** examines the behavior of the system

- **Value analysis** determines the relative priority of requirements

QFD identifies ….

- Normal Requirements : graphical display , specific system function, performance…

- Expected Requirements : easy to use, reliable, correct easy to install ….

- Exciting requirements : multi touch screen, visual , voice interface….

Elicitation Work Products

- a statement of need and feasibility.
- a bounded statement of scope for the system or product.
- a list of customers, users, and other stakeholders who participated in requirements elicitation
- a description of the system's technical environment.
- a list of requirements (preferably organized by function) and the domain constraints that apply to each.
- a set of usage scenarios that provide insight into the use of the system or product under different operating conditions.
- any prototypes developed to better define requirements.

Building the Analysis Model

Negotiating Requirements

- Identify the key stakeholders
    - These are the people who will be involved in the negotiation
- Determine each of the stakeholders "win conditions"
    - Win conditions are not always obvious
- Negotiate
    - Work toward a set of requirements that lead to "win-win"

Validating Requirements - I

- Is each requirement consistent with the overall objective for the system/product?
- Have all requirements been specified at the proper level of abstraction? That is, do some requirements provide a level of technical detail that is inappropriate at this stage?
- Is the requirement really necessary or does it represent an add-on feature that may not be essential to the objective of the system?
- Is each requirement bounded and unambiguous?
- Do any requirements conflict with other requirements?

Validating Requirements - II

- Is each requirement achievable in the technical environment ,that is in house system or product?

- Is each requirement testable, once implemented?

- Does the requirements model properly reflect the information, function and behavior of the system to be built.

- Has the requirements model been "partitioned" in a way that exposes progressively more detailed information about the system.

Exercises

- What is QFD ? QFD identifies which types of requirements.

- Explain requirement Engineering seven distinct tasks

- Explain in detail Elicitation and elicitation work product

- Explain in brief Negotiating Requirements