# REQUIREMENT ENGINEERING

Lecture #17

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# TYPES OF REQUIREMENTS: DOMAIN REQUIREMENTS

- Constraints on the system from the domain of operation
- The system's operational domain imposes requirements on the system.
- Domain requirements can be new functional requirements, constraints on existing requirements, or define specific computations.
- If domain requirements are not satisfied, the system may be unworkable.
- Domain requirements problems
  - Understandability:
    - Requirements are expressed in the language of the application domain; This is often not understood by software engineers developing the system.
  - Implicitness:
    - Domain specialists understand the area so well that they do not think of making the domain requirements explicit.

# EXAMPLE OF DOMAIN REQUIREMENT

- The system safety shall be assured according to standard IEC 60601-1:Medical Electrical Equipment – Part 1:General Requirements for Basic Safety and Essential Performance
- Train protection system Example
- This is a domain requirement for a train protection system:
  - The deceleration of the train shall be computed as:
  - Dtrain = Dcontrol + Dgradient
  - where Dgradient is 9.81ms2 * compensated gradient/alpha and where the values of 9.81ms2 /alpha are known for different types of train.
- It is difficult for a non-specialist to understand the implications of this and how it interacts with other requirements

# RE TASKS

- Inception: Basic Understanding
- Elicitation: Clear Understanding
- Elaboration: Refinement
- Negotiation: Settlement of Conflicts
- Specification: SRS
- Validation: FTR Team Validates
- Management: Managing changing requirements



# INCEPTION

- During inception, the requirements engineer asks a set of questions to establish…
  - A basic understanding of the problem
  - The people who want a solution
  - The nature of the solution that is desired
  - The effectiveness of preliminary communication and collaboration between the customer and the developer
- Through these questions, the requirements engineer needs to…
  - Identify the stakeholders
  - Recognize multiple viewpoints
  - Work toward collaboration(give and take policy)
  - Initiate the communication

# ELICITATION

- Elicitation means to find the requirements from anybody.
- The requirements are difficult because the **following problems occur in elicitation**.
  - **Problem of scope:** The customer give the unnecessary technical detail rather than clarity of the overall system objective.
  - **Problem of understanding:** Poor understanding between the customer and the developer regarding various aspect of the project like capability, limitation of the computing environment.
  - **Problem of volatility:** In this problem, the requirements change from time to time and it is difficult while developing the project.

# ELICITATION (STEPS)

- **Collaborative Requirements Gathering**
  - Gathering the requirements by conducting the meetings between developer and customer.
  - Fix the rules for preparation and participation.
  - The main motive is to identify the problem, give the solutions for the elements, negotiate the different approaches and specify the primary set of solution requirements in an environment which is valuable for achieving goal.



# ELICITATION (STEPS)

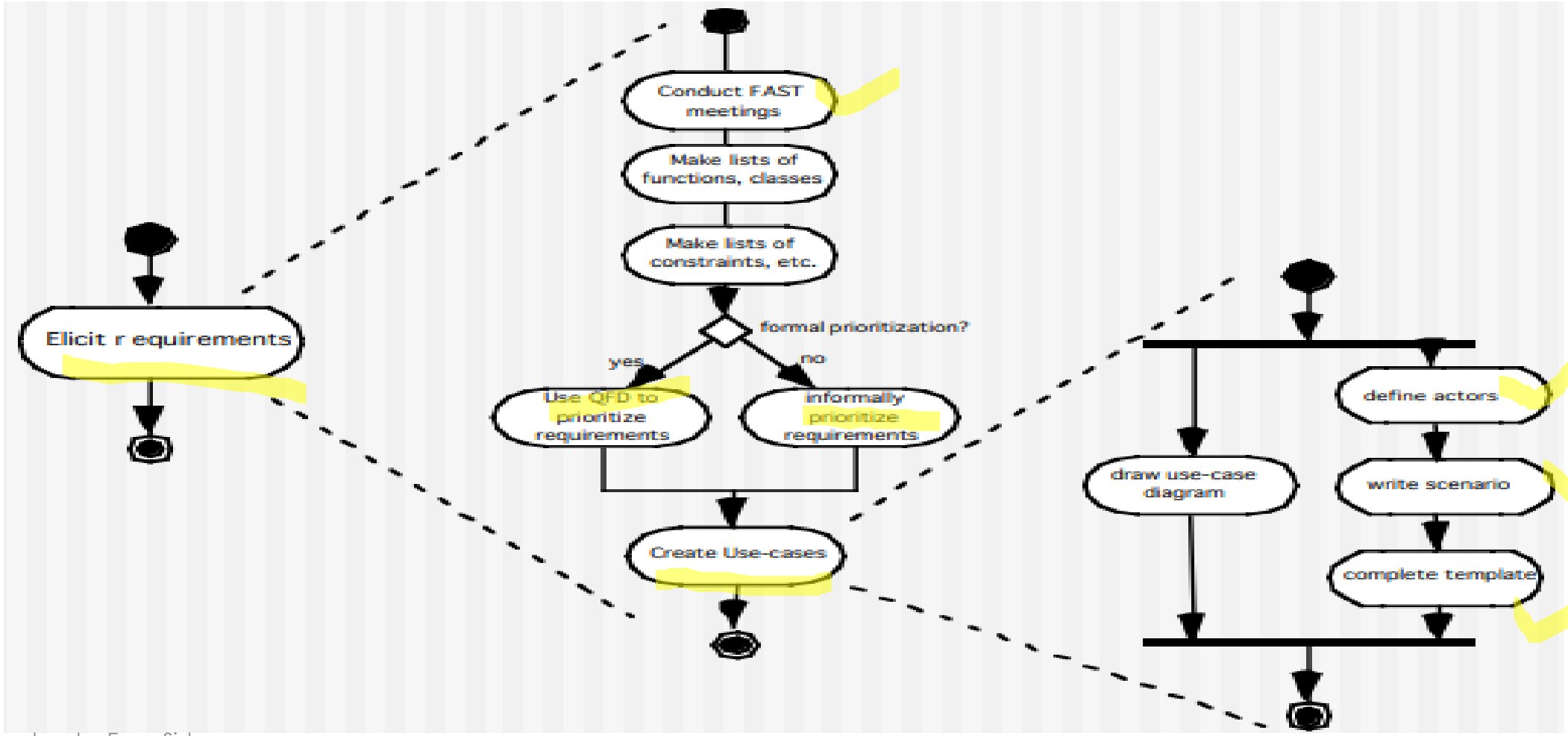
- **Quality Function Deployment (QFD)**
  - In this technique, translate the customer need into the technical requirement for the software.
  - QFD system designs a software according to the demands of the customer.
  - **QFD consist of three types of requirement:**
    - **Normal requirements**
    - **Expected requirement**
    - **Exciting  requirements**

# ELICITATION (STEPS)

- **Usage scenarios**
  - Till the software team does not understand how the features and function are used by the end users it is difficult to move technical activities.
  - To achieve above problem the software team produces a set of structure that identify the usage for the software.
  - This structure is called as 'Use Cases'.



# ELICITATION (STEPS)



# ELICITATION WORK PRODUCT

- The work products will vary depending on the system, but should include one or more of the following items
  - 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 (organized by function) and the domain constraints that apply to each
  - A set of preliminary usage scenarios (in the form of use cases) that provide insight into the use of the system or product under different operating conditions
  - Any prototypes developed to better define requirements

# REQUIREMENT ELICITATION TECHNIQUES

- Interviews
- User Scenarios
- Ethnography
- Surveys