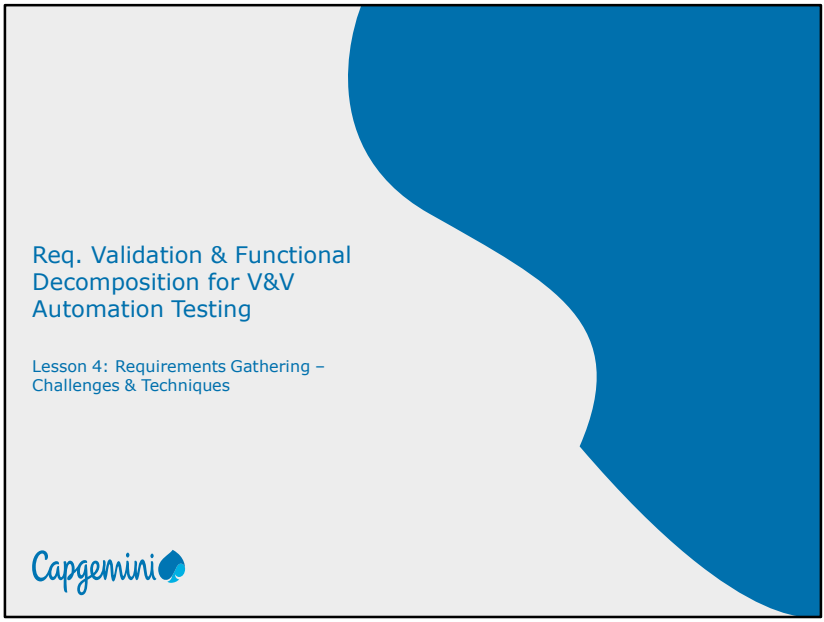

Req. Validation & Functional Decomposition for V&V Automation Testing
Lesson 4: Requirements Gathering – Challenges & Techniques
Capgemini

Lesson Objectives

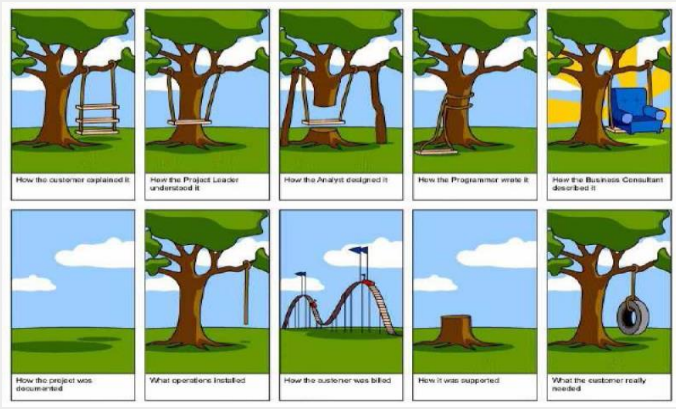
To understand the following topics:

- Requirements Gathering – A Typical Illustration
- Requirement Gathering Patterns
- Challenges in Requirements
- Challenges – Clarity of requirements
- Challenges – Communication
- Ambiguity From a Requirements Perspective - Pitfalls of the English language

Lesson Objectives

- Ambiguity and Pitfalls
- Ambiguity Checklist
- Ambiguity Review
- Requirement Gathering - Skills Required
- Tips to Requirement Gathering
- Identification and Verification of Requirements
- Summary
- Review Questions

Requirements Gathering – A Typical Illustration



Requirement Gathering Patterns

Traditional approach

- Requirements are specified in detail and passes thru multiple reviews and sign-offs

Extreme approach

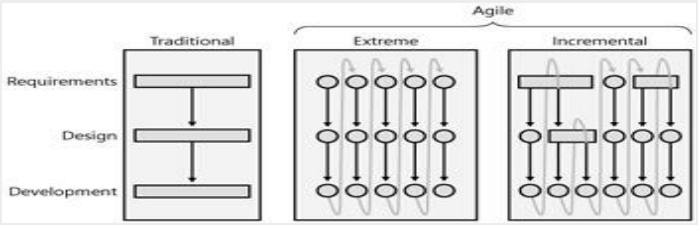
- Strives to make product/application ASAP and generally requirements needs to be elaborated

Incremental approach

- Some of the requirements

Requirement Gathering Patterns

Requirement Patterns



Challenges in Requirements

User Involvement

- "It is month end, quarter end ,year end. I have to do all my reports so can't spend time on requirements"

Customer Expectations

- Unreasonable, Infeasible, Conflicting in many occasions

Scope and Vision not clearly defined

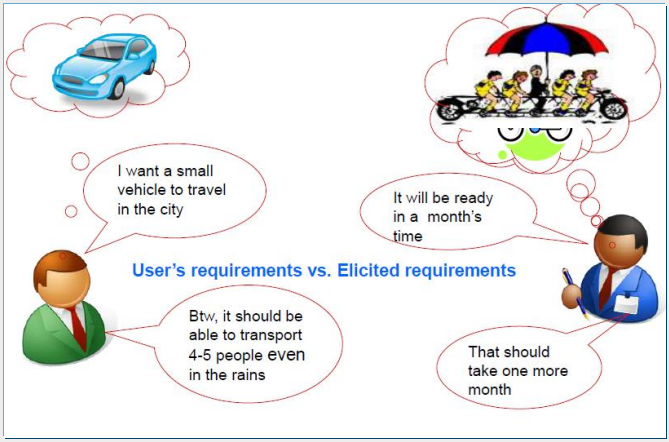
- All requirements are critical, no priority is defined

Improper Change Management

- New requirements get added in the middle of the project
- Users/customers are busy and not available to specify requirements
- Signed-off requirements keep changing

Functionality built, rarely or never used

Challenges – Clarity of requirements



Challenges – Communication

Language barriers
- Have interpreter
  - E.g. Japanese projects
- Use more visual communication tools

Difference in terminologies
- Understand the customer's terms
  - "He wants an elevator, we make only lifts"
- Use Pictures and Diagrams

Ambiguity From a Requirements Perspective - Pitfalls of the English language

There are 5,790 languages in the world today
More than one half of English speaking people did not grow up speaking it
English has more words than any other language
Estimates range from 490,500 words to nearly 2,000,000 words

Ambiguity and Pitfalls

Sloppiness

- From an airline safety booklet (found in the seat pocket)
  - "If you are sitting in an exit row and you cannot read this card or cannot see well enough to follow these instructions, please tell a crew member."

Linguistic Ambiguity

- One half of two and two = ??

Ambiguity Checklist

Dangling Else

Ambiguity of reference

Scope of action

Omissions

- Causes without effects
- Missing effects
- Effects without causes
- complete omissions
- Missing causes

Ambiguous statements

- Verbs, adverbs, adjectives
- Variables, unnecessary
- Aliases

Random organization

- Mixed causes and effects
- Random case sequence

Ambiguity Checklist

Ambiguous Logical Operators
- OR, AND
- Implicit connectors
- Compound operators

Negation
- Scope of negation
- Unnecessary negation
- Double negation

Built-in assumptions
- Functional/environmental knowledge

Unclear sequence

Implicit case

i.e. versus e.g.

Temporal ambiguity

Boundary ambiguity

Ambiguity Checklist

Dangling Else

Must be, will be, is one of, should be, could be, can be, shall

EXAMPLE:

"The loan type must be first or second."

Else?

An error condition?

Ambiguity of Reference

EXAMPLE 1:

"Add Purchase-Amount to Account-Balance. This number must be positive."

EXAMPLE 2:

"Transaction 1 displays the customer's name and address. Transaction 2 displays the customer's account numbers. Transaction 3 displays the customer's account balances. Such transactions require the security code."

Ambiguity Checklist

Omissions

- **Causes without effects:**
  "Codes 1 through 4 produce the message. It is also possible for the code to be a 5."
- **Effects without causes:**
  "This message sometimes appears."
  "It is sometimes necessary for the operator to re-initialize the field."
- **Complete omissions**
  A Blank page.
  Page unintentionally left blank.

- **Missing causes:**
  EX.1 - "If you drive through a red light you will get a ticket."
  Missing - you must be caught doing it.

  EX.2 - "If the number is 1, 3, 5, 7, 11, 13, 19,23, or 29 it is a prime number."
  Missing - 2, 17.
- **Missing effects:**
  EX.1 - "If the account is overdrawn reject the check."
  Missing - notify the customer.

Ambiguity Checklist

Ambiguous Logical Operators

OR:
If A or B then C.
What people write:
"A and B each produce C."
"A and B produce C."

AND:
If A and B then C.
What people write:
"A and B produce C."
"A and B together are required to produce C."

Implicit Connectors:
Harry's "Going to the Party" Rules
Rule 1: If either Sally or Sarah go, Harry will go.
Rule 2: If Sally does not go with John, Harry will go.
Rule 3: If Sarah does not go with Bob, Harry will go.
What happens if Sarah goes and Bob goes?
Rule 1: Says Harry will go.
Rule 3: Implies Harry will not go.

Confusing Compound Connectors:
Confusing compound operators:
"If A or B and C produce D."
If [A or B] and C produce D?
OR
If A or [B and C] produce D?

Ambiguity Checklist

Ambiguous Statements

- **Ambiguous verbs:**
  Calculate, update, produce, modify:
  "If it is month end calculate the interest earned."
- **Ambiguous variables:**
  "If the interest amount is greater than $100, send the customer the notice."
  Interest accrued?
  Interest earned?
  Interest paid?
  Interest anticipated?
- **Ambiguous adjectives:**
  "It is against the law to ride down the street on an *ugly* horse." *Law in Wilbur, Washington*
- **Ambiguous adverbs:**
- **"The delete transaction must be processed** *quickly*."
- **"Field A is usually positive."**

Ambiguity Review

Ambiguity Review Tips

- Be sensitive to the language issue by using simple, straightforward words
- Ambiguity reviews should eliminate instances of careless writing
- Ambiguity reviews by non-domain experts help eliminate assumed functional knowledge. Jargon should be avoided or at least defined in the glossary
- Acronyms must be defined in the data dictionary
- Do not write like you are being paid by the word

Benefits of Ambiguity Reviews

- Timely feedback early in development life cycle
- Feedback leads to defect avoidance
- SA writing skills are improved

Requirement Gathering - Skills Required

Inter-Personal Skills
- Effective communication
- Probing, Right questioning !
  - Awareness
  - Listening
  - Compassion

Engaging with the Customer
- Expectations
- Executive and User level
- Organize Users and IT groups
- Changes to Scope or terms of contract
- Organization dynamics Skills for
- Requirement Gathering

Consulting Ability
- Domain expertise
  - Business terms, Regulatory
  - and statutory knowledge
- Technology expertise
- Ability to anticipate requirements
- Pro-activeness, Problem Solving
- Project Management

Risk Management
- Business, technology, operation

Creativity, Innovation, Team work!!

Tips to Requirement Gathering

It is a team work!

- Form the requirements elicitation team
- Business & technical knowledge, experience
- Gather knowledge on similar projects

Training

- Domain, Soft skills

Tips to Requirement Gathering

Know your Customer

- Customer's profile and history
- Market positioning, competitive edge/ differentiators
- Business areas and core business domain
- Business processes
- Business risks
- Confidentiality and sensitivity of business information
- Regulatory and statutory knowledge
- Customers' org structure, reporting structure of the key contacts-up
- Organizational culture
- Regional culture and language
- Client Holidays
- Our prior experience with the same customer

Tips to Requirement Gathering

Identify stake holders and set the expectations

- Identify single point contacts
- Availability of business users
- Ground work or preparation required from customer
- Decision makers

Identify participants

- For interviews
- Joint Application Development/Design [JAD] sessions
- Brainstorming
- Representatives from various groups
  - IT, Business, Users

Tips to Requirement Gathering

General principles for requirements

- Specify the problem – not the solution
- Specify the system – not the project
- Separate the formal and in-formal parts
- Avoid repetition
- Use the same lingo

Identification and Verification of Requirements

Verify the gathered requirements with the customer

- Can be done periodically through review meetings and status reports
- Reverse walk through to eliminate bad or wrong requirements

Summarize and present the requirements as understood by you to the user/stakeholder

- Clarify any unclear requirements or conflicts
- Clarify any unclear requirements or conflicts

The requirements are presented "as you told" to the user

Once the identification and verification of requirements is done. Approved SRS will be given to testing team. It is used for designing test cases.
Once SRS is received it is necessary to study those requirements and itemize those requirements in simple requirements.

Summary

In this lesson, you have learnt:

- Requirements Gathering
- Requirement Gathering Patterns
- Challenges in Requirements
- Ambiguity From a Requirements Perspective - Pitfalls of the English language
- Ambiguity and Pitfalls
- Ambiguity Checklist
- Ambiguity Review
- Requirement Gathering - Skills Required
- Tips to Requirement Gathering
- Identification and Verification of Requirements

Answers:

Question1: True

Question2: False

Question3: Incremental approach

Question4: Inter-Personal Skills

Question5: Traditional approach

Review Question

Question 1: Extreme approach strives to make product/application ASAP and generally requirements needs to be elaborated.

- True/ False

Question 2: Different terms used while stating requirements improves the understanding of requirement in the team.

- True/ False

Question 3: _____ approach emphasize on detailing the requirements in an incremental manner.

Question 4: Probing and right questioning falls under _____ requirement gathering skills.

Review Question

Question 5: In which of the following requirement gathering patterns requirements are specified in detail and passes thru multiple reviews and sign-offs?

- Option 1: Traditional approach
- Option 2: Extreme approach
- Option 3: Incremental approach
- Option 4: None of the above