Requirements Engineering (RE) Process

Chapter 4.4-4.7

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Topics

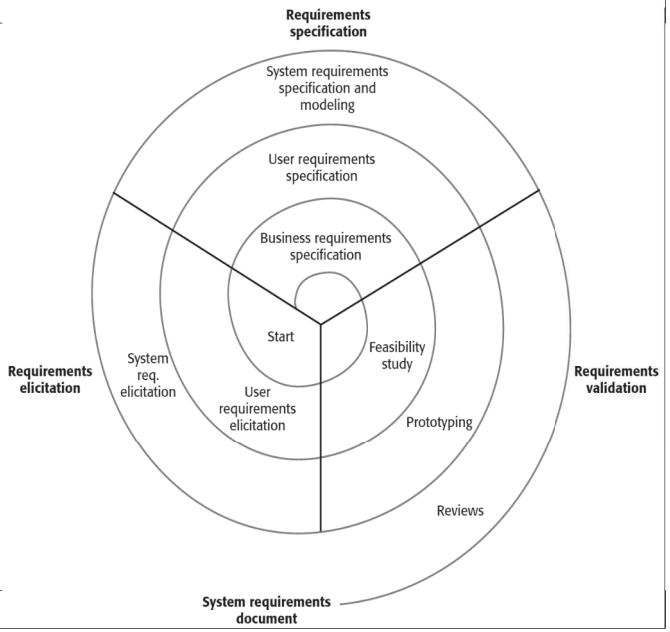
1) What is the requirements engineering processes?
2) How do we elicit and analyze requirements?
3) How do we validate requirements?
4) How do we manage changes to requirements?

Requirements Engineering (RE) Process

- RE processes vary widely depending on:
  -
  - people and organization
- Generic activities common to all RE processes:
  - Requirements elicitation
  - Requirements analysis
  - Requirements validation
  - Requirements management

Spiral view of RE process

In practice,
RE is an iterative activity in which...



Requirements elicitation and analysis

Requirements elicitation and analysis

- Software developers work with.. to find out about:
  - application domain;
  - services that the system should provide;
  - required system performance;
  - hardware constraints;
- Requirements Discovery:
  - Gathering information about the system and...

Problems of requirements elicitation

- Stakeholders...
- Stakeholders express requirements in their own terms.
- The requirements change during the analysis process.

Problems of requirements elicitation

- Different stakeholders may have...
- Organizational and political factors may influence the system requirements.
- How can you get the information from the customer?

RD: Interviewing

- Stakeholder interviews common in RE process.
- Types of interview
  - based on predetermined list of questions
  - explore various issues with stakeholders.
  - Both are often used together.
- Effective interviewing
  - listen & learn customer's needs.
  - Get discussions going using some questions, or working together on a prototype system.

RD: Interviews in practice

- Interviews are good for..
- Interviews are not good for understanding domain requirements:
  - Developer's don't understand specific domain terminology;
  - Some domain knowledge is so familiar that people find it hard to articulate or...
- You have to be tenacious about working to truly understand system.

RD: Scenarios

- Scenarios are real-life examples of how a system can be used.
  - These are XP user stories.
- They should include
  - A description of the...
  - A description of the...
  - A description of...
  - Information about other concurrent activities;
  - A description of the state when the scenario finishes.

Scenario: collecting medical history

Patient seen by receptionist who created record in system and collected patient's personal information (name, address, age). A nurse is logged in and is collecting medical history.

Nurse searches for the patient by family name. If more than one patient returned, use given name and date of birth.

Nurse chooses the menu option to add medical history.

Nurse follows a series of prompts from the system to enter
- other consultations on mental health problems (free text),
- existing medical conditions (selects conditions from menu),
- medication currently taken (selected from menu),
- allergies (free text), and home life (form).

Scenario: collecting medical history

Patient's record not exist: nurse creates a new record.

Patient conditions or medication not in menu: nurse chooses 'other' and enter free text describing the condition/medication.

Patient cannot/will not provide information on medical history: nurse records patient's refusal and prints exclusion form.

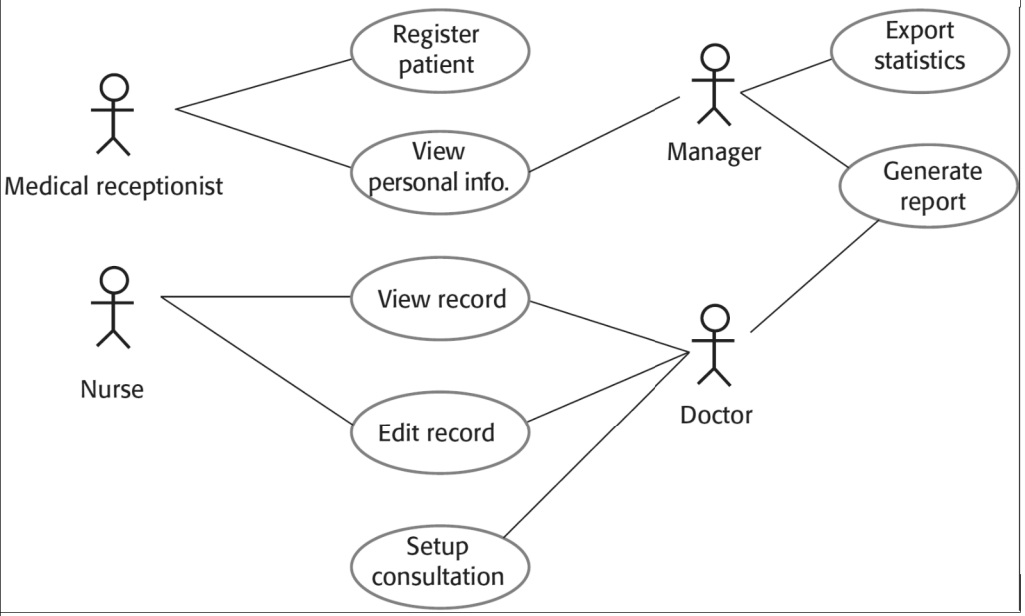
Others can read but not edit record while being entered.

User is logged on.
Patient record (with medical history) entered in the database,
System log shows nurse, start and end time of the session.

RD: Use cases

- Use-cases are a scenario based technique to..
  -
  - Text/table gives details of interaction.
- The set of use cases should describe all possible interactions with the system.
- Does not show sequence of actions.
  - Use sequence diagrams (later) to show the order of steps.

Use cases for the MHC-PMS



Ethnography

- People are generally not very good at...
- Ethnography:
  - Analyst immerses him/herself in work environment where system will be used.
  - Analyst observes current workflow; people don't explain it to him/her.
- Good/Bad:
  - Good for documenting what people really do.
  - Bad at..

Requirements validation

Requirements validation

- Demonstrating that the requirements...
- Cost of requirements errors are high so validation is very important
  - Fixing a requirements error after delivery may cost 100 times the cost of fixing an implementation error.

Requirements checking

-
  - Does the system provide the functions which best support the customer's needs?
-
  - Are there any requirements conflicts?
-
  - Are all functions required by the customer included?
-
  - Can the requirements be implemented given available budget and technology
-
  - Can the requirements be checked?

Requirements validation techniques

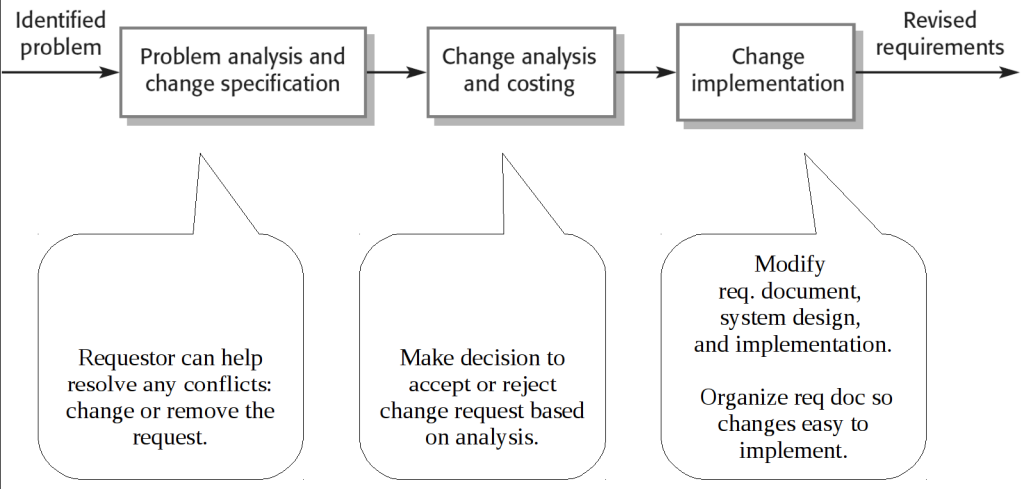
- Requirements reviews
  -
  - Involve both developers and customer while requirements are being formulated.
- Prototyping
  - Using an executable model of the system to check requirements.
- Test-case generation
  - Developing tests for requirements to...

Requirements management

Requirements management

- Requirements management:
  - during the requirements engineering process and system development.
  - Set of activities to assess impact and cost of changes.
- Reasons for changing requirements:
  - Business and technical environment of the system always changes after installation.
  - Adding new hardware and systems.
  - New legislation and regulations apply to the system.

Requirements change management



Supporting change management

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  - Each requirement is uniquely identified so that it can be cross-referenced with other requirements.
-
  - Policies to track which design features implement which requirements.

Summary

- Requirements engineering – a spiral or iterative process:
  - Requirements elicitation and analysis:
    iterative process.
    - Requirements Discovery:
      Using interviews, scenarios, use-cases, ethnography
  - Requirements validation – check requirements for:
    - validity, consistency, completeness, realism and verifiability.
  - Requirements management – process of managing and controlling changing system requirements.