

**GILD**  
and requirements management



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*University of Victoria*

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**Outline**

- What is requirements and the process of their "engineering"
  - Goals and requirements, and our project
- What vs. How or Requirements vs. Design
- Requirements and project management
  - Activity phases
  - Practical considerations

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**Requirements and their "engineering" in Software Engineering**

**A requirement is a feature of the system or a description of something the system is capable of doing in order to fulfill the system's purpose.**

**Related to:**

- Motivations, interests, goals, needs, wishes
- Different stakeholders in the project

**Requirements "engineering": a complex phenomenon, little understood and often underestimated**

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### Our project - thought provokin

Research endeavor	Software development project
<ul style="list-style-type: none"> <li>•Different stakeholders</li> <li>•Goals</li> <li>•Research questions</li> </ul>	<ul style="list-style-type: none"> <li>•Different stakeholders</li> <li>•Software requirements</li> </ul>

**Our Project Management**

- Defining our goals
- Deriving software requirements to map these goals (rationale for work)
- Continually checking for progress re: goals and requirements

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### Our project - Thought provoking

Research	Software Engineering	Curriculum Development
Research Question	Problems to solve	
Gather data Analyze and interpret data	Gather requirements Analyze and manage requirements	
Answer research question	Developed software component	

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## Importance of getting it right

Failures to understand and manage requirements is the biggest single cause of cost and schedule over-runs

### A study run by Standish Group:

- surveyed 350 companies about their over 8000 software projects
- results: 31% - canceled before they were completed;
- only 9% were delivered on time and cost.

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## Importance of getting it right

### Causes:

- incomplete requirements (13.1%)
- lack of user involvement (12.4%)
- lack of resources (10.6%)
- unrealistic expectations (9.9%)
- lack of executive support (9.3%)
- changing requirements and specifications (8.7%)
- lack of planning (8.1%)
- system no longer needed (7.5%)

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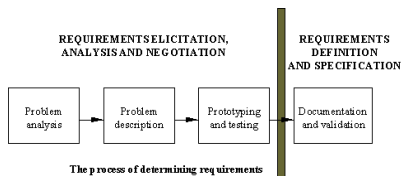
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## Requirements process and its activities



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## Requirements management

### Activity phase:

- Elicitation/definition
- Analysis and modeling
- Negotiation
- Documentation/specification

### What you are actually doing

- Identify stakeholders
- Analyze the requirements gathered for ambiguities, completeness, inconsistencies, etc.
- Resolve conflicts (find trade-offs)
- Maintain a repository of requirements/issues/traceability links among all these

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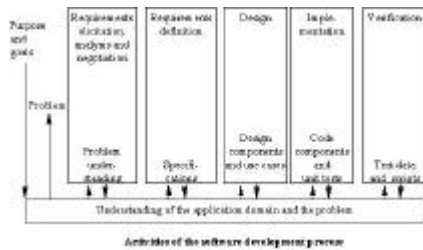
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## The What vs. How and the development life-cycle



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## Establishing Requirements

**Aim:** to make them as clear, specific and unambiguous as possible

### There are many different kinds of requirements

- Functional requirements
  - E.g. for a website: that the time to download any complete page is less than 5 seconds
- Non-functional
  - E.g. that the system runs on many platforms such as PC, Mac, Unix
- Data requirements
  - E.g. type, persistence, accuracy of data processed by the system
- Environmental requirements or context of use
  - E.g. ATMs operating in busy or public areas
- User requirements
  - E.g. system serves novices as well as experts users
- Usability requirements
  - E.g. efficiency, safety

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## “Requirements identification” techniques

- Questionnaires
- Interviews
- Focus groups and workshops
- Naturalistic observation
- Studying documentation

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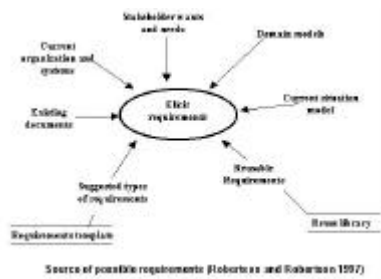
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## Sources of requirements



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## Questionnaires

### Closed-ended questionnaire

- Leaves no room for individual comments from the respondent
- Pre-set responses for each question

### Open-ended questionnaire

- Respondent replies to questions in their own words

Combine closed-ended and open-ended questions

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## Interviews

- Interviews tend to be one on one and only elicit one person's perspective
- Interviews can be
  - structured,
  - unstructured or
  - semi-structured

depending on how rigorously the interviewer sticks to a prepared set of questions

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## Focus Groups and Workshops

- Sessions with a group of stakeholders to discuss issues and requirements
- These sessions can be very structured with set topics for discussion, or can be unstructured
- Require a facilitator who can keep the discussion on track and provide focus and redirection when appropriate

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## Naturalistic Observation

- Observation involves spending some time with the stakeholders as they go about their day-to-day tasks
- A member of the design team shadows a stakeholder, making notes, asking questions, and observing what is being done in the natural context of the activity

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## Studying Documentation

- Manuals are a good source of data about the steps involved in an activity (e.g. Procedures and rules)
- Studying documentation is good for understanding legislation and getting some background information on the work
- It is an *idealized account* of the work practices

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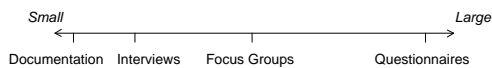
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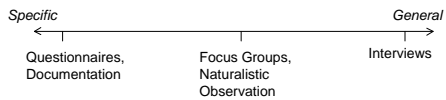
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## Choosing among data gathering techniques

### USER GROUP SIZE / AVAILABILITY



### TYPE OF DATA NEEDED



Drawn by Polly Allen in Seng310, Spring 2003

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## Choosing among data gathering techniques

- Focus on identifying the stakeholders' needs
- Involve all the stakeholder groups
- Use a combination of data gathering techniques
- Support the data-gathering sessions with suitable props, such as task descriptions and prototypes if available
- Run a pilot session if possible to ensure that your data-gathering session is likely to go as planned

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## Requirements management – practical considerations

Requirements management == expectations management

### Safety (sanity) checks:

- define a minimal set of requirements feasible within project parameters
- define “meaningful” subsequent project artifacts e.g. design, tests, implementation
- keep track of progress/changes/coverage of requirements

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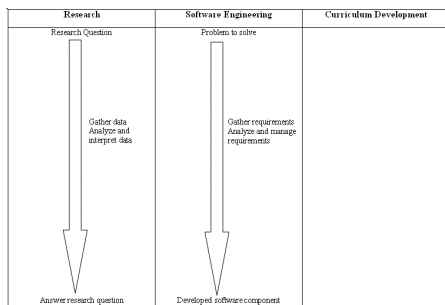
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