### MechEng Software Engineering 3

Lecture 3 : Wednesday 20th January

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2009/10

**Requirements Capture** 

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### Supplementary Reading

Interview with Bill Gates (1986)

www.dcs.gla.ac.uk/~simon/teaching/MechEngSE3

NB: no lecture on Wednesday 27th January

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• Sommerville: "System requirements should set out *what* the system should do rather than *how* this is done."

What are Requirements?

- functional requirement: "describes a system service or function"

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 non-functional requirement: "describes a constraint placed on the system or on the development process"

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### **Describing Requirements**

- User Requirements: "describe the requirements so that they are understandable by users without detailed technical knowledge"
- System Requirements: "expanded version of the user requirements that are used by software engineers as the starting point for systems design"
  - Sommerville 6.1 and 6.2

User Requirements	User	· Red	quire	ement	S
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• The software must provide a means of representing and accessing external files created by other tools.

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### System Requirements

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- The user should be provided with facilities to define the type of external files.
- Each external file type may have an associated tool that may be applied to files of that type.
- Each external file type may be represented by a specific icon on the user's display.
- Facilities should be provided for the icon representing an external file type to be defined by the user.
- When a user selects an icon representing an external file, the effect of that selection is to apply the tool to the file.







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### **Requirements Engineering Phases**

- Feasibility study initial assessment of business case for project
- Elicitation and Analysis discovering the requirements and organising them
- Specification representation of requirements in precise, unambiguous language basis of contract

#### Requirements Engineering Phases

- Validation process of determining if the requirements are acceptable
  - crude version = requirements are valid if they state what the client wants
  - but, what the client initially says they want may not be what they will eventually say they want (once they are better informed & have thought about the problem more deeply)

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<ul> <li>meet stake         <ul> <li>Note: state those where the second the second term is the second term is the second term is the standard second term</li></ul></li></ul>	holder needs keholders are o affected by system luence the ments relevant	<ul> <li>verifiable</li> <li>comprehensible</li> <li>traceable</li> <li>adaptable</li> <li>realisable</li> <li>consistent</li> <li>complete</li> <li>essential</li> </ul>		<ul> <li>in this course requirement</li> <li>Use Cases if - system b</li> <li>actors (b)</li> <li>transactions to but we also</li> <li>context</li> <li>constraint</li> <li>that affect</li> </ul>	se we will be using UML Use Cases for ts specification identify: boundaries numan & system "objects") ions (operations) t to discover these during requirements need to determine nts (non-functional requirements) the use cases	r the system capture
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#### Key Points in Requirements Capture 1

- you must understand the activity or activities in which your problem is embedded
- identify stakeholders (*all* interested parties)
- watch out for
  - hidden assumptions
  - implicit rules or practices
  - unstated goals and constraints (political risk)

### Key Points in Requirements Capture 2

- start open and move towards greater focus
- be careful over premature commitment to design ideas
  - however, "envisionment" can be helpful to elicit requirements from stakeholders
- write clearly and precisely (keep it simple!)

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<ul> <li>Unacceptable achievable), un</li> <li>The system shift quantities of d.</li> <li>The system shift of 350 wpm.</li> </ul>	= untestable (vague), unreal nnecessary ('gold-plating'), all have a user friendly GUI all support visual search ove ata. all enable users to achieve a	istic (not  or large typing rate	<ul> <li>Observa</li> <li>The Inte</li> <li>Question</li> <li>Scenario</li> <li>Prototyp</li> </ul>	ation erview nnaires o Walkthroughs pes	

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### Observation

- if you don't know the domain, observation ("shadowing") can be useful
  - Unstructured to obtain general background
  - **Structured** to answer specific question(s)
  - identify actors (& stakeholders)
  - investigate workflow/activity structure
  - uncover constraints and assumptions
- observation can be via remote monitoring (e.g., audio and/or video recording)

- but very time consuming to analyse

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# The Interview 1

- precision can vary
  - open-ended (difficult to analyse results)
  - semi-structured
    - questions provide structure
    - but can pursue unexpected responses (probes)
  - structured
    - like questionnaire (but with direct contact)
- choose subjects, place, time carefully

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## The Interview 2

- recording
  - take notes
    - anticipated responses can be pre-coded
    - use the interview form to structure notes
  - can use audio/video tape
    - but don't rely on recorded data alone
  - write up summary immediately!
    - include related info (e.g., your impressions)

The Interview 3 from Lindgaard, p. 161

- identify
  - what you want to find out
  - who has the information
- choose an appropriate kind of interview
- define
  - outline and/or
  - questions
- check
  - question
    - relevance
    - clarity
  - answer codes/categories

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<ul> <li>• during interview</li> <li>make interviewees at ease</li> <li>explain purpose</li> <li>warm-up questions</li> <li>debriefing (give interviewee chance to ask questions)</li> <li>• debriefing (give interviewee chance to ask questions)</li> <li>• debriefing (give interviewee chance to ask questions)</li> </ul>			<ul> <li>The Questionnaire 1</li> <li>interview vs questionnaire: <ul> <li>questionnaires suitable for closed, structured questions</li> <li>generally less costly per subject to administer and analyse</li> <li>keep the cost down for the subject - otherwise they won't fill it in!</li> <li>questionnaires collect lower quality input from a larger sample of stakeholders</li> </ul> </li> </ul>				
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Th	e Questionnaire	2		Scenarios 1			
<ul> <li>question de</li> <li>brief, clea</li> <li>can use</li> <li>multiple</li> <li>rank ord</li> <li>semantia</li> <li>magnitut</li> <li>Likert se</li> <li>open res</li> </ul>	esign ar, relevant e choice lering c differential ide estimate cale (level of agreement) sponse		<ul> <li>Scenarios of task-rel – use cases</li> <li>provide a requireme</li> <li>can be dev</li> </ul>	are (relatively) detailed des ated activity s are based on scenarios shared setting for investiga nts veloped by various stakehol	scriptions ting lders		
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Scenarios 2			Prototypes			
<ul> <li>use</li> <li>scenario interview</li> <li>scenario</li> <li>elicit a</li> <li>explor</li> <li>validat</li> </ul>	construction as form of semi-st w "walkthrough" to activity structure e exceptional actions ('what if') te proposed requirements	tructured	<ul><li>prototype</li><li>more abo</li></ul>	es play a role similar to scen out prototypes later	arios	
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