L3 - Requirements during inception

CS3028 - Principles of Software Engineering

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3.1 Reminding past issues and mapping them to current topics

Where are we now?

Software development paradigms

$\Rightarrow$ The Unified Process (UP) paradigm

$\Rightarrow$ UP phases and UP disciplines (activities) within each phase

$\Rightarrow$ Inception (first UP phase)

$\Rightarrow$ Business modelling during inception

$\Rightarrow$ Requirements during inception

$\Rightarrow$ Product vision

$\Rightarrow$ Initial business case

$\Rightarrow$ Specification of critical functionalities and properties

$\Rightarrow$ ······

3.2 Requirements - what to do before actual software development

What to do before software development begins

A software project begins when someone sees an opportunity to create business value using ICT. However, before actual SW development:

1. The SW product *goals*, *expectations*, *key features*, *constraints* must be identified. This provides a **vision** for the software product.
2. The *business value* of the SW product must be assessed.

   A *feasibility analysis* (*economical*, *technical*, and *organisational*) must be performed to decide whether to proceed with the project.

   These two tasks show whether benefits outweigh costs and risks.
   If so, their outcomes provide a **business case** for developing the SW.
3. A top-level specification of critical product *functionalities* and *properties* must be developed. This provides the initial working version of the product **requirements specification**.

3.3 Requirements - product vision and business case

What is a vision?

A plain language description that gives a non-technical reader an overall understanding of the system to be developed, providing:

- a self-contained overview of the system to be built
- the motivations behind building it
- extracts and summaries of the business case *('Long' Vision only)*
- extracts and summaries of the associated business models *(LV only)*
- extracts and summaries of the system use-case model *(LV only)*

A long vision document (as opposed to a 'short' vision paragraph of no more than 50 words) is often referred to as a **white paper**.

To know more on white papers, see the MyAberdeen CS3028 section on Documentation skills

How to assess the business value of a SW product

You must be able to provide a realistic, convincing, and positive answer to the following questions:

- Are there marketing opportunities in your product? Which ones?
- How much are you estimating to earn by selling your product? In which way (i.e. following which business model)? How long would it takes? What upfront expenses will you incur before sales can start?
- Does your product have competitive advantages w.r.t. competition? Which ones? Are they immediately clear? How important are these advantages to customers?
- Is the product or service clearly focused on a specific customer group?
- Is the product or service limited to a clearly defined and limited range?

You can use PEST analysis to help you in this task (search on Google)

3.4 Requirements - the feasibility analysis

Economical feasibility analysis

- Answer the following:
  - Is it worth developing the system?
  - Should *WE* develop it?
- In order to answer, do **analyse**:
  - Development costs
  - Annual operational costs
  - Annual benefits
  - Intangible costs and benefits
- Remember that

  Return on Investment (ROI) = (Total Turnover - Total Costs) / Total Costs

Technical feasibility analysis

- Answer the following:
  - Can the system be developed?
  - Can *WE* develop the system?
- In order to answer, **analyse**:
  - Familiarity with application
  - Knowledge of business domain
  - Familiarity with technology
  - Compatibility with existing company technologies
  - Project size
  - Number of people, time, and features

Organisational feasibility analysis

- Answer the following:
  - How can the system be developed?
  - How can *WE* develop it?
- In order to answer, **analyse**:
  - Alignment between project goals
    and the company's business strategy & objectives
  - Stakeholders
  - Organisational management
  - System users

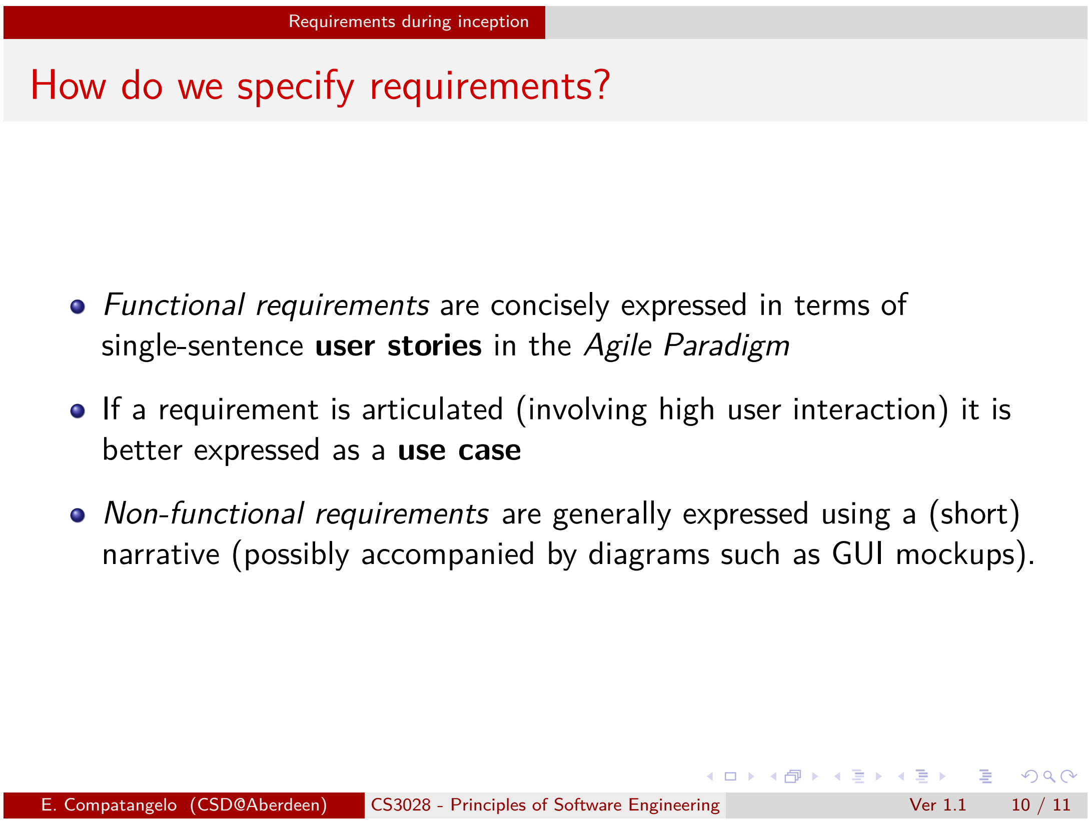
You can use SWOT analysis to help you in this task (search on Google)

3.5 Requirements - the technical specifications

What is a requirements specification?

Statements of what a system must do / what characteristics it must have.

- **Functional requirements**: processes that a system must perform and/or information it must contain
- **Non-functional requirements**: behavioural properties that a system must have (e.g. performance, usability).



Requirements during inception

How do we specify requirements?

- *Functional requirements* are concisely expressed in terms of single-sentence **user stories** in the *Agile Paradigm*
- If a requirement is articulated (involving high user interaction) it is better expressed as a **use case**
- *Non-functional requirements* are generally expressed using a (short) narrative (possibly accompanied by diagrams such as GUI mockups).

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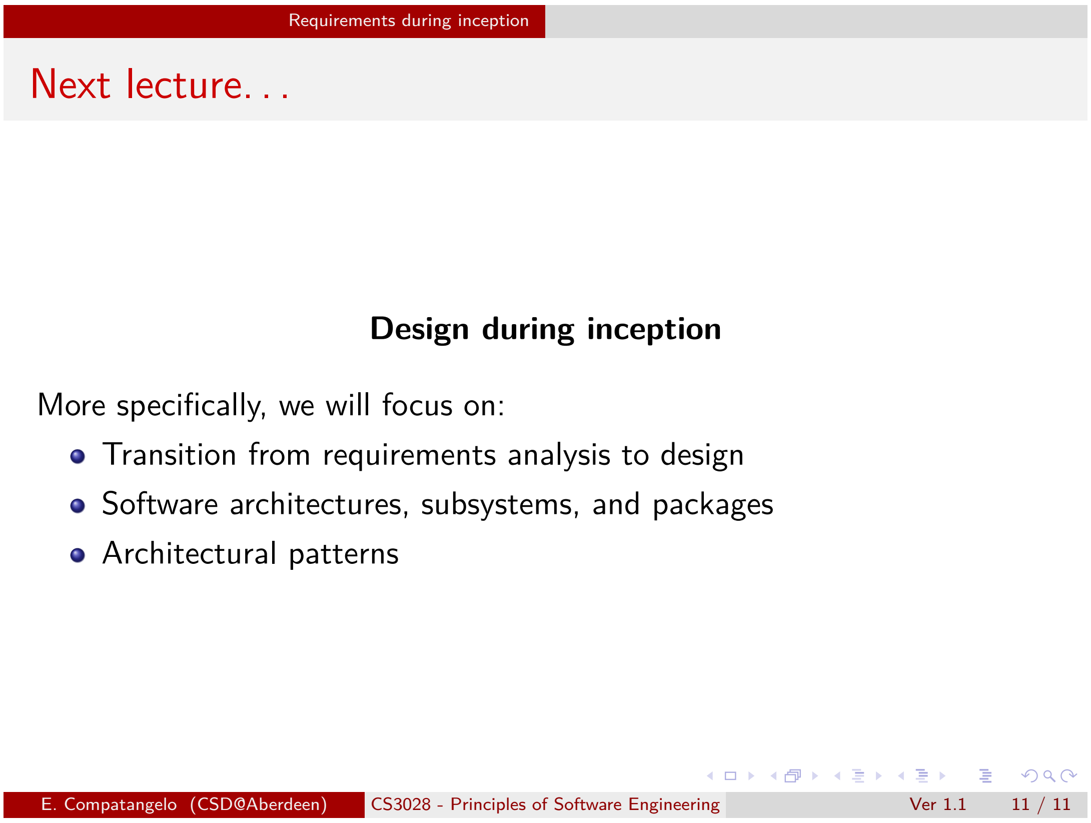
3.5.1 Requirements stages

1. Acquisition (elicitation and gathering):
   - Find the right information sources (people/documents/field studies)
   - Collect and integrate the information
2. Formalisation (functional modelling and specification):
   - Find models (e.g. a templates) to express requirements
   - Establish correspondences between these models
3. Analysis (structural and behavioural):
   - Determine which 'component structures' provide the functionalities and the actions defined in the specifications
   - Determine how components dynamically interact to generate the expected functionalities

3.6 Preparing for the topic ahead



Requirements during inception

Next lecture...

Design during inception

More specifically, we will focus on:

- Transition from requirements analysis to design
- Software architectures, subsystems, and packages
- Architectural patterns

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