Welcome to SENG 3130 👋

Sina Keshvadi
September 06, 2022
Thompson Rivers University

Today's Agenda

- Welcome!

- Software Requirements Basics and Definitions
- SENG 3130 Overview

- Administrative Details
- Questions?

What do we learn from today lecture?

- Why do we need to discover the requirements?
- What are the software requirements?
- Levels and types of requirements
- Product vs Project requirements
- Requirements engineering
- Summary

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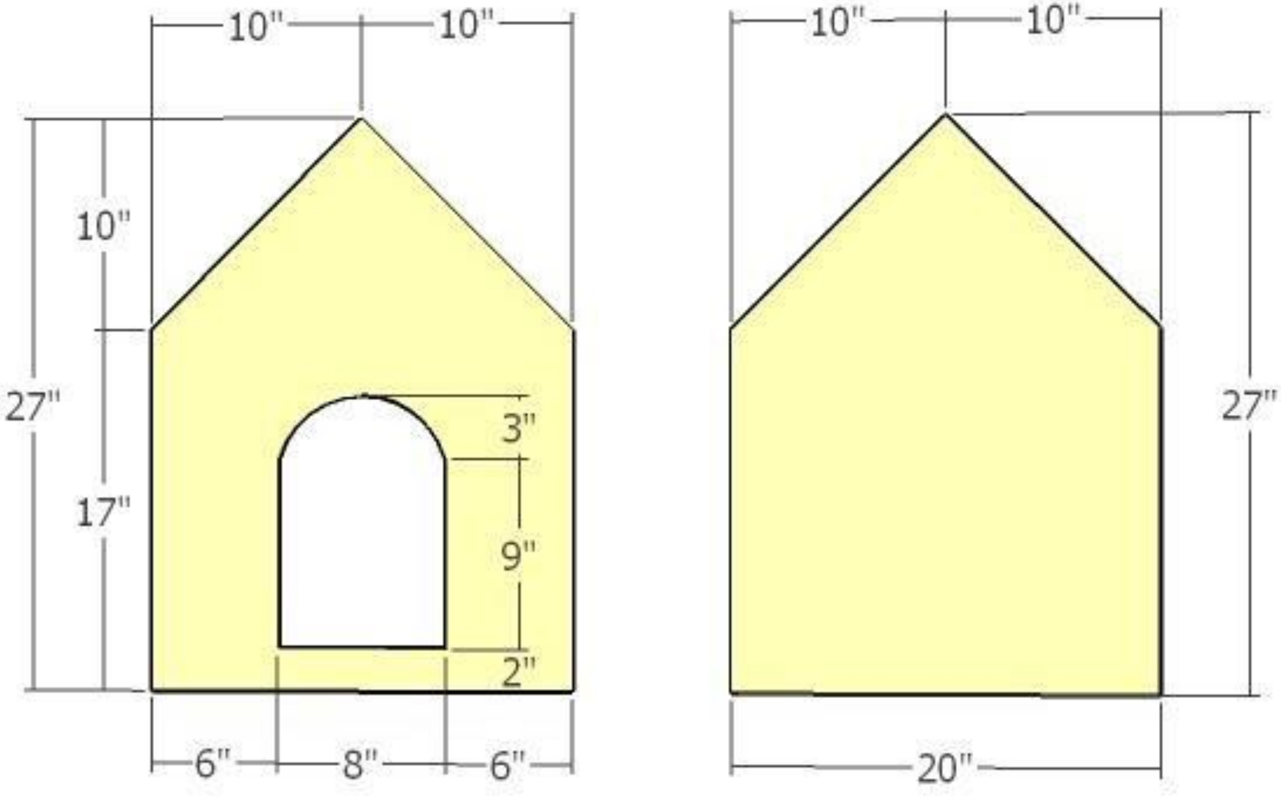
Let’s listen to this conversation

Ref: https://www.deepijatel.com/blog/uploads/images/How_to_set_up_a_call_center_in_India-01.png

It is so easy to build a software system! Just write the code

MyOutdoorPlans.com

Just write the code



MyOutdoorPlans.com

Just write the code

[1]

[1] McConnell, Steve. "Code complete", 2nd ed. 2004

It is so easy to build a software system! Just write the code

[1]

"The penalty for a mistake on a simple structure is only a little time and maybe some embarrassment" [1]

[1] McConnell, Steve. "Code complete", 2nd ed. 2004

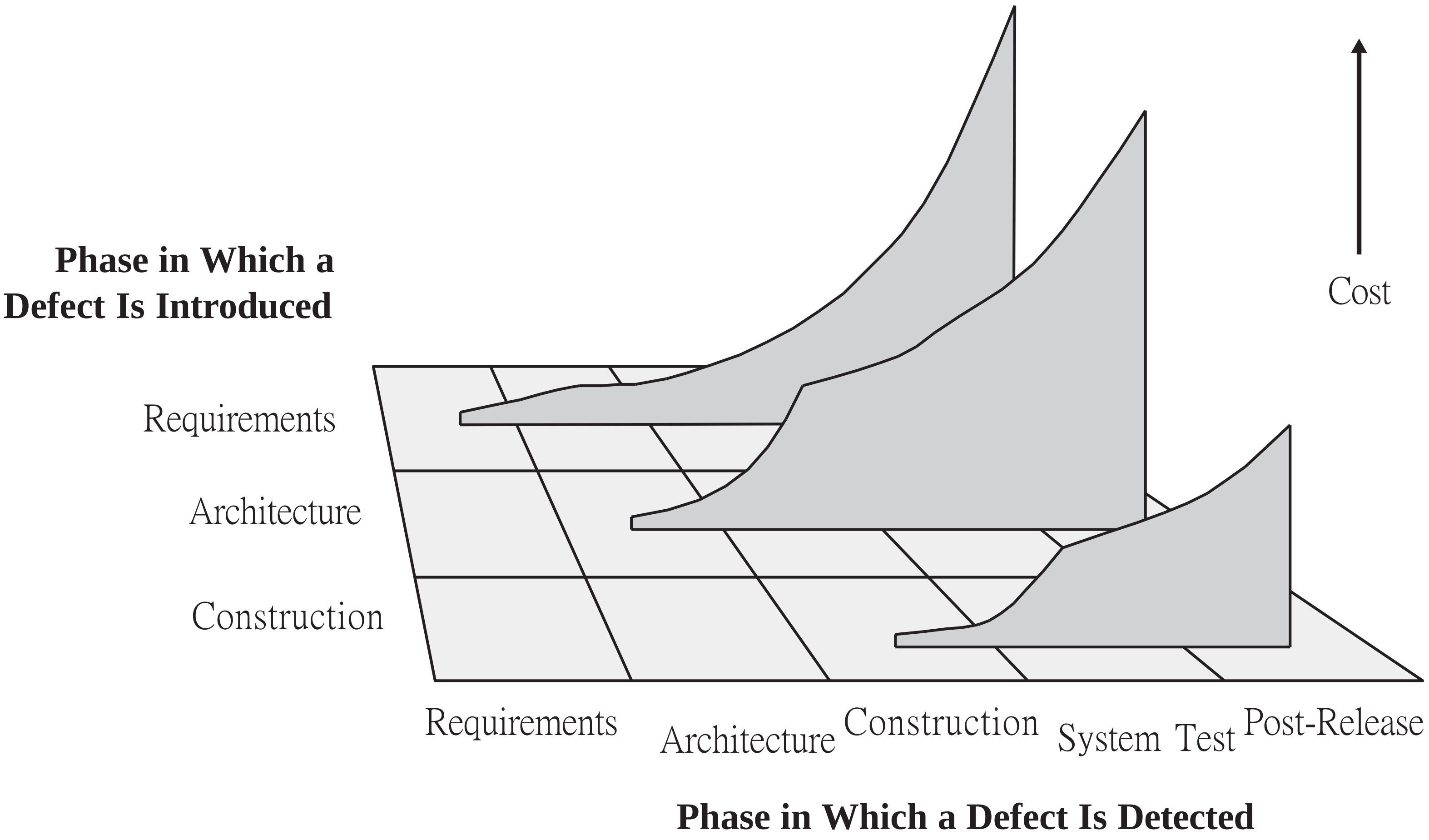
Actual software systems are very complex

[1]

In large-scale software systems, **implementing a missing requirement** takes considerable effort.

[1] McConnell, Steve. "Code complete", 2nd ed. 2004

Fixing requirements errors are very costly



[1]

[1] McConnell, Steve. "Code complete", 2nd ed. 2004

Single requirement error can lead to a mission failure

- For example, the loss of the "Mars Climate Orbiter"
- According to NASA reports *"The root cause of the loss of the spacecraft was the failed translation of English units into metric units in a segment of ground- based, navigation-related mission software"*[1]

[1] https://mars.nasa.gov/msp98/news/mco991110.html

Single requirement error can lead to a mission failure (cont.)

- The process to verify and validate certain engineering requirements and technical interfaces between some project groups, and between the project and its prime mission contractor, was **inadequate**.

[1] https://mars.nasa.gov/msp98/news/mco991110.html

Defects in the software products can destroy your reputation

“Errors introduced during requirements activities account for 40 to 50 percent of all defects found in a software product” [1]

Summary of the importance of software requirements

Determining the success of your product

Economic impact

Impacts your brand reputation

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What makes a successful project?

- Think about the best software that you like and tell us why you liked it?

What are the software requirements?

“Requirements are a specification of what should be implemented.They are descriptions of how the system should behave, or of a system property or attribute.They may be a constraint on the development process of the system.” [1]

[1] Ian Sommerville and Pete Sawyer (1997)

What do we learn from today lecture?

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- **Levels and types of requirements**
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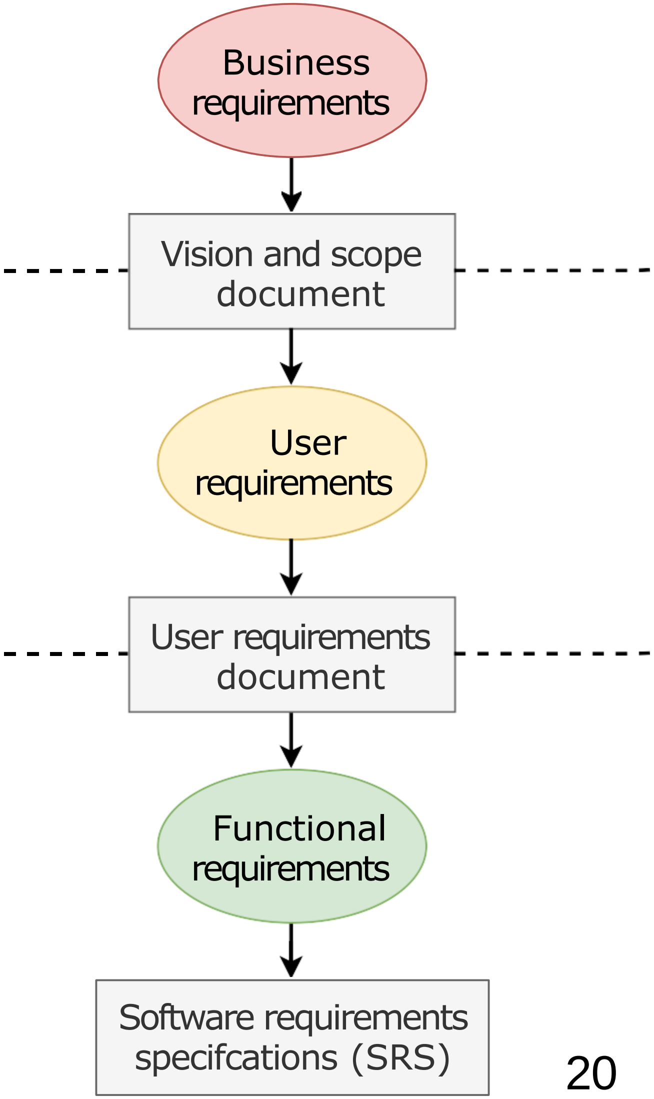
Levels and types of requirements

- We have three levels of **requirements**:

(1) business requirements

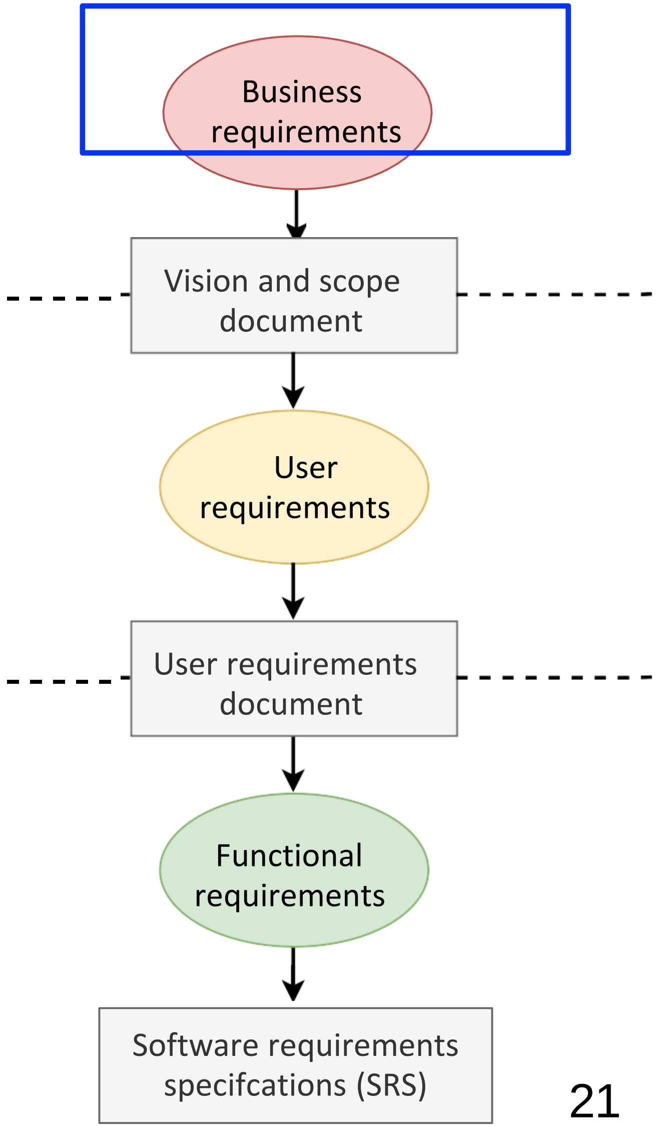
(2) user requirements

(3) functional requirements


Business requirements
Vision and scope document
User requirements
User requirements document
Functional requirements
Software requirements specifcations (SRS)

Levels and types of requirements

"Business requirements represent **high-level business objectives** of the organization that builds the product or of a customer who procures it."[1]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How to identify the high-level business objectives?

- Business requirements reflect the answer to these questions:
  1) Why the organization is implementing this system?
  2) What are the benefits the organization hopes to achieve?

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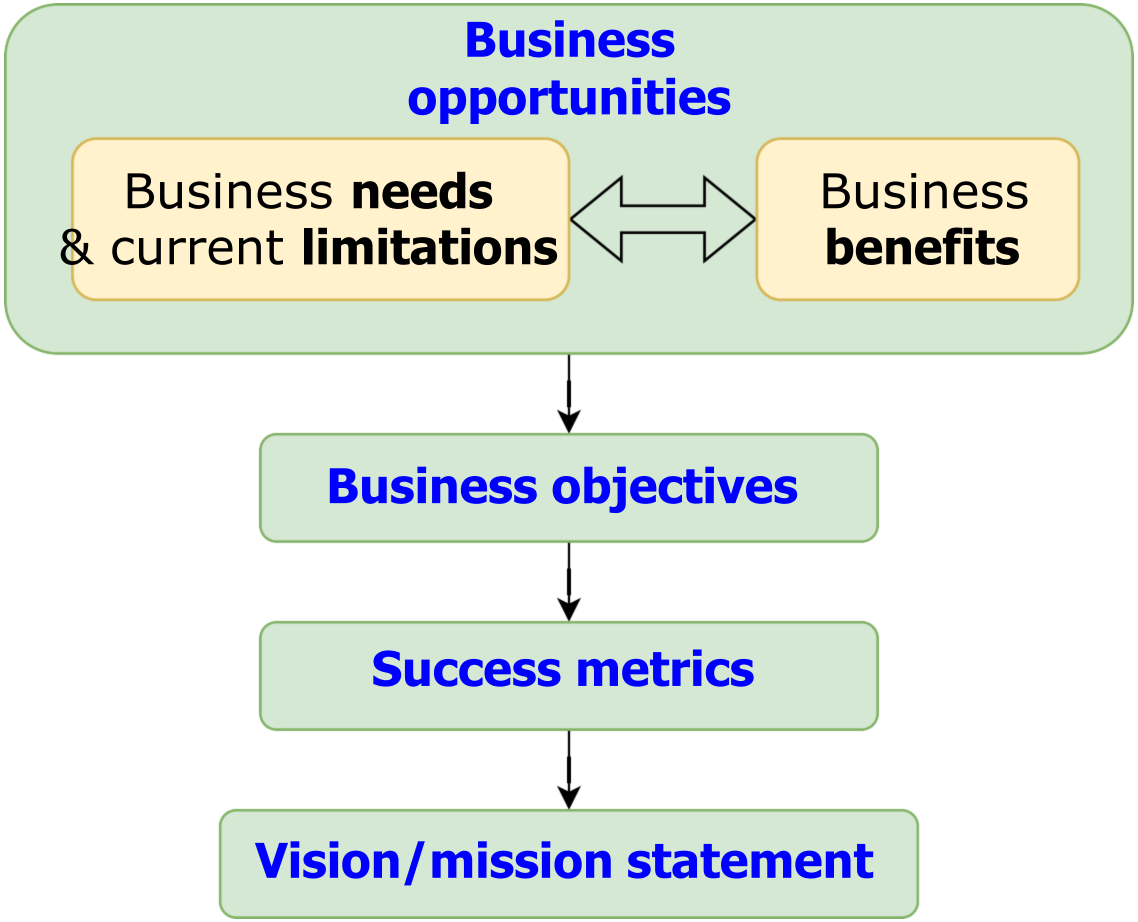
> *“Suppose an airline wants to reduce airport counter staff costs by 25%.This goal might lead to the idea of building a kiosk that passengers can use to check- in for their flights at the airport.”* [1]

How to identify the high-level business objectives?



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How to identify the high-level business objectives?

- Business requirements
  - Defined by the business needs, market needs, or a new product concept
  - Stored in the “vision and scope document”
  - Include the vision statement or mission statement
  - Should represent short, simple, and clear objectives

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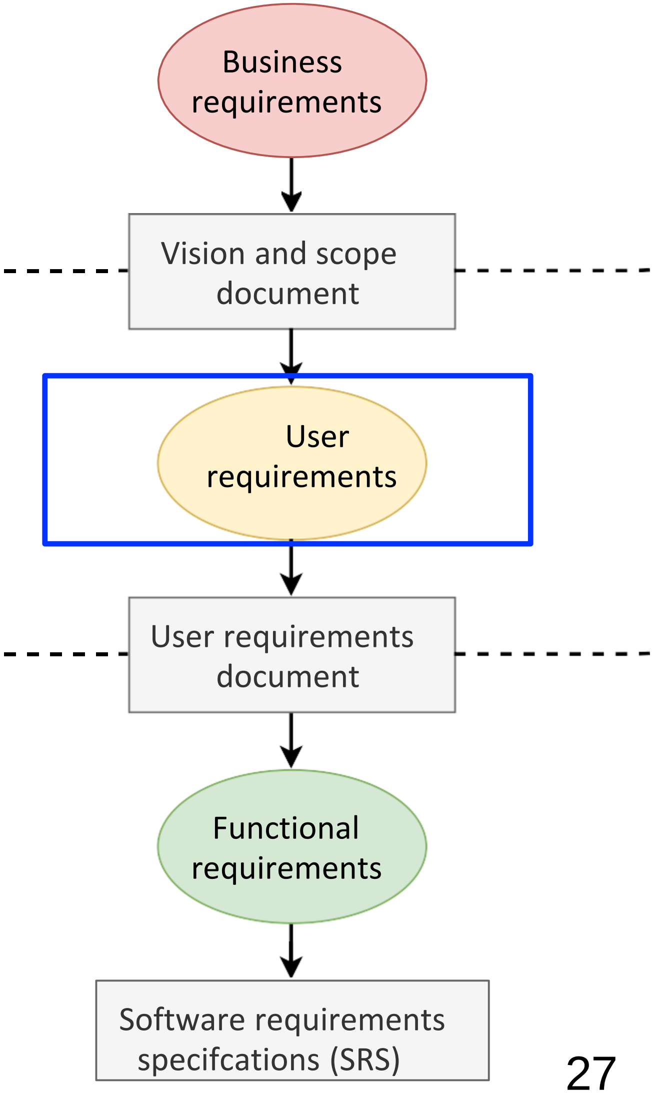
> *"Perhaps the most famous mission statement is President Kennedy's 'To put a man on the moon by 1970'"*[1].

[1] Discovering requirements: How to specify products and services

Levels and types of requirements

User requirements describe

1. the goals or tasks the users must be able to perform with the product
2. the product attributes or characteristics that tare important to user satisfaction.[1]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Identifying user requirements

- The definition of user requirements should be with a granularity level suitable for the users of the system.
- User requirements should provide an answer to the question "what the user will be able to do with the system?"

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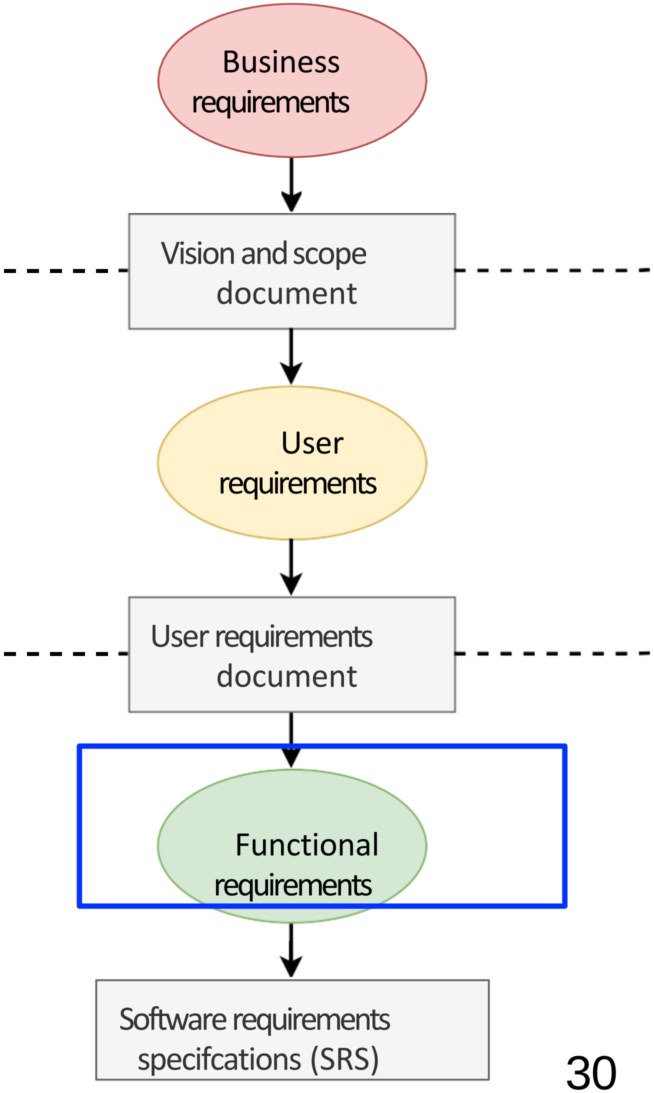
For the airline system, *"Check-in for a flight"* and *"Check the flight status"* describe the airline system's user requirements. [1]

Levels and types of requirements

Functional requirements describe the behaviors the product will exhibit under specific conditions.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User requirements
User requirements document
Functional requirements
Software requirements specifcations (SRS)

Identifying functional requirements

- Functional requirements should provide answer to the question what the developers must implement to enable users to accomplish their tasks (i.e., user requirements)
- Functional requirements are written using the *"shall statements"*

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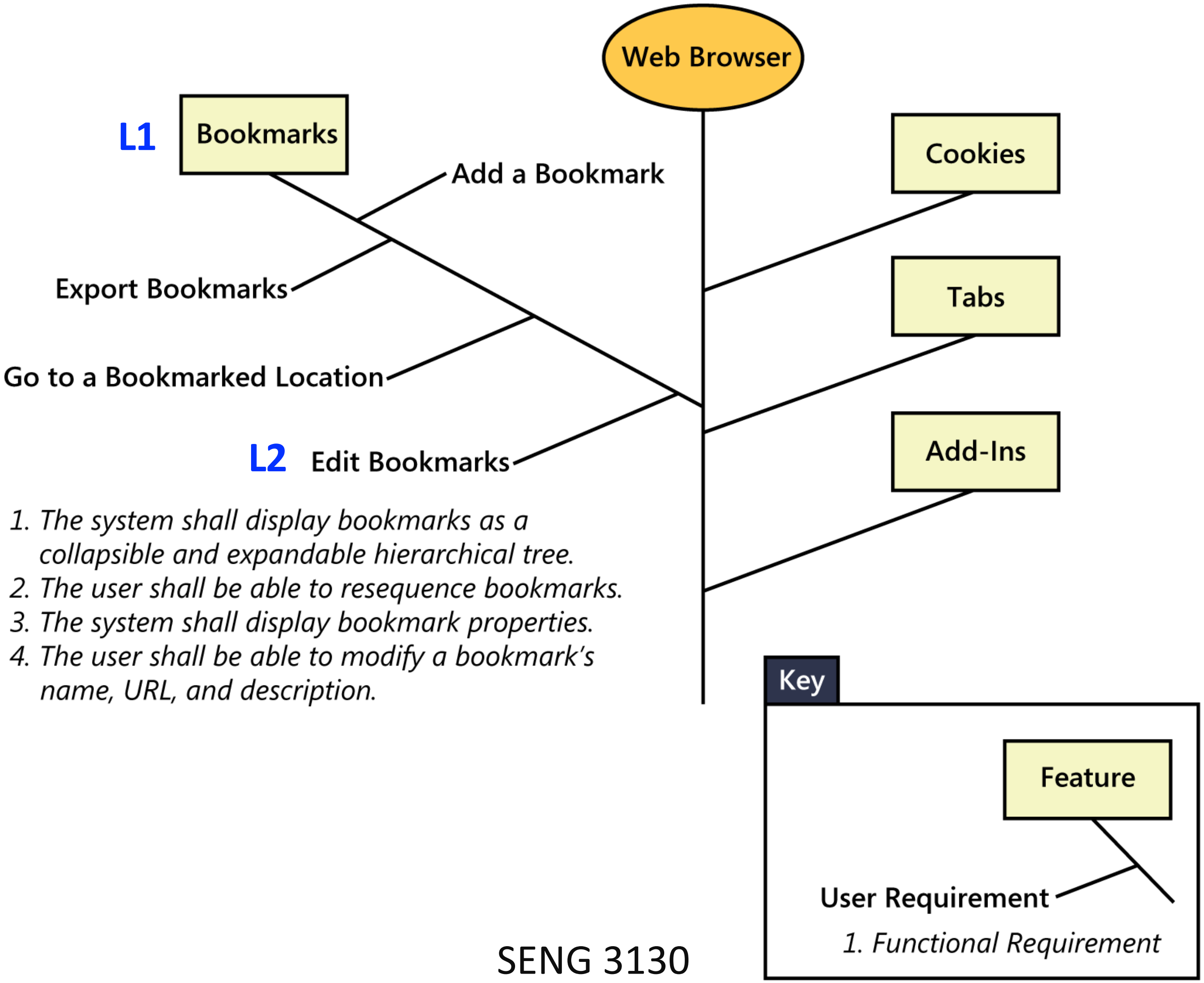
- Functional requirements are written using the "shall statements"

For the airline system, "The Passenger shall be able to print boarding passes for all flight segments for which she/he has checked in" or "If the Passenger's profile does not indicate a seating preference, the reservation system shall assign a seat." [1]

Group user requirements into features



Web Browser

L1 Bookmarks

Add a Bookmark

Export Bookmarks

Go to a Bookmarked Location

L2 Edit Bookmarks

1. *The system shall display bookmarks as a collapsible and expandable hierarchical tree.*
2. *The user shall be able to resequence bookmarks.*
3. *The system shall display bookmark properties.*
4. *The user shall be able to modify a bookmark's name, URL, and description.*

Cookies

Tabs

Add-Ins

Key

Feature

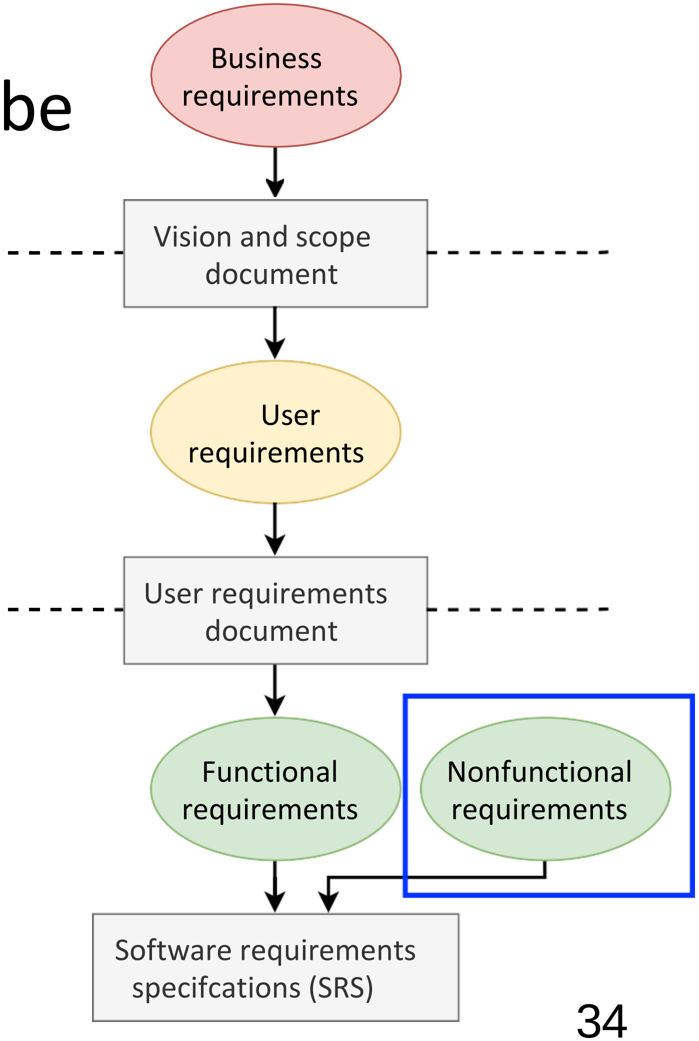
User Requirement

1. Functional Requirement

[1]

What are the nonfunctional requirements?

Nonfunctional requirements describe
1) quality attributes
2) constraints
3) external interfaces
of the product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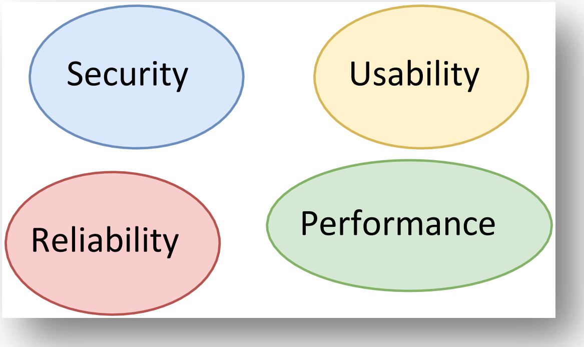
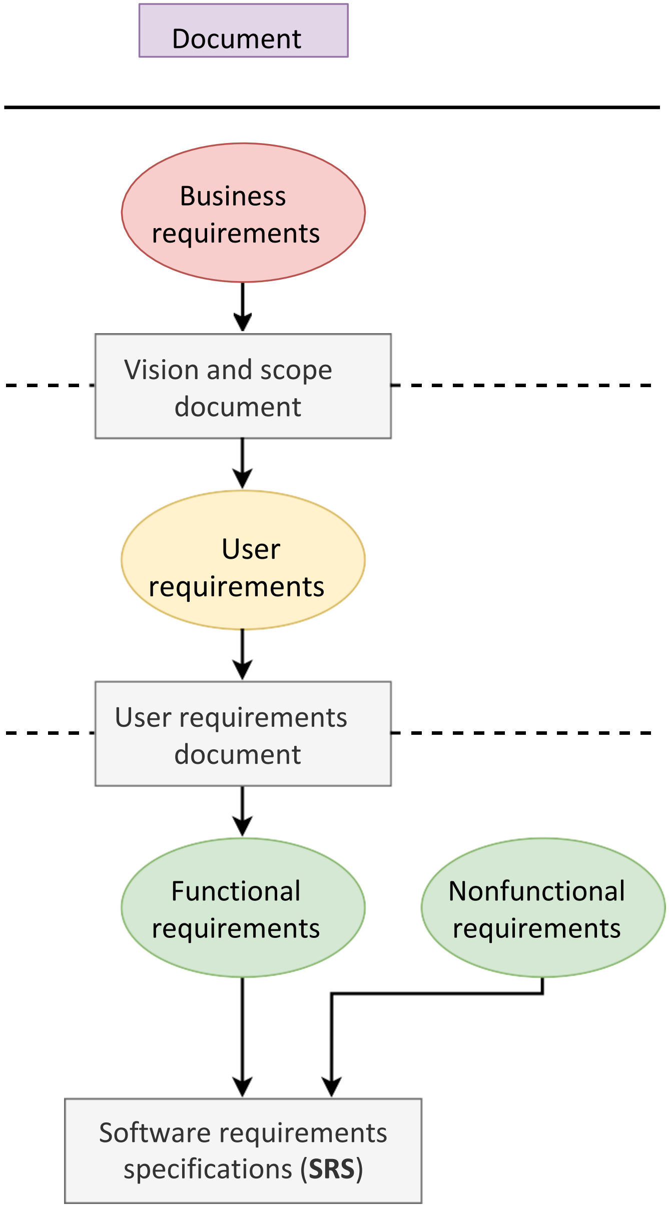
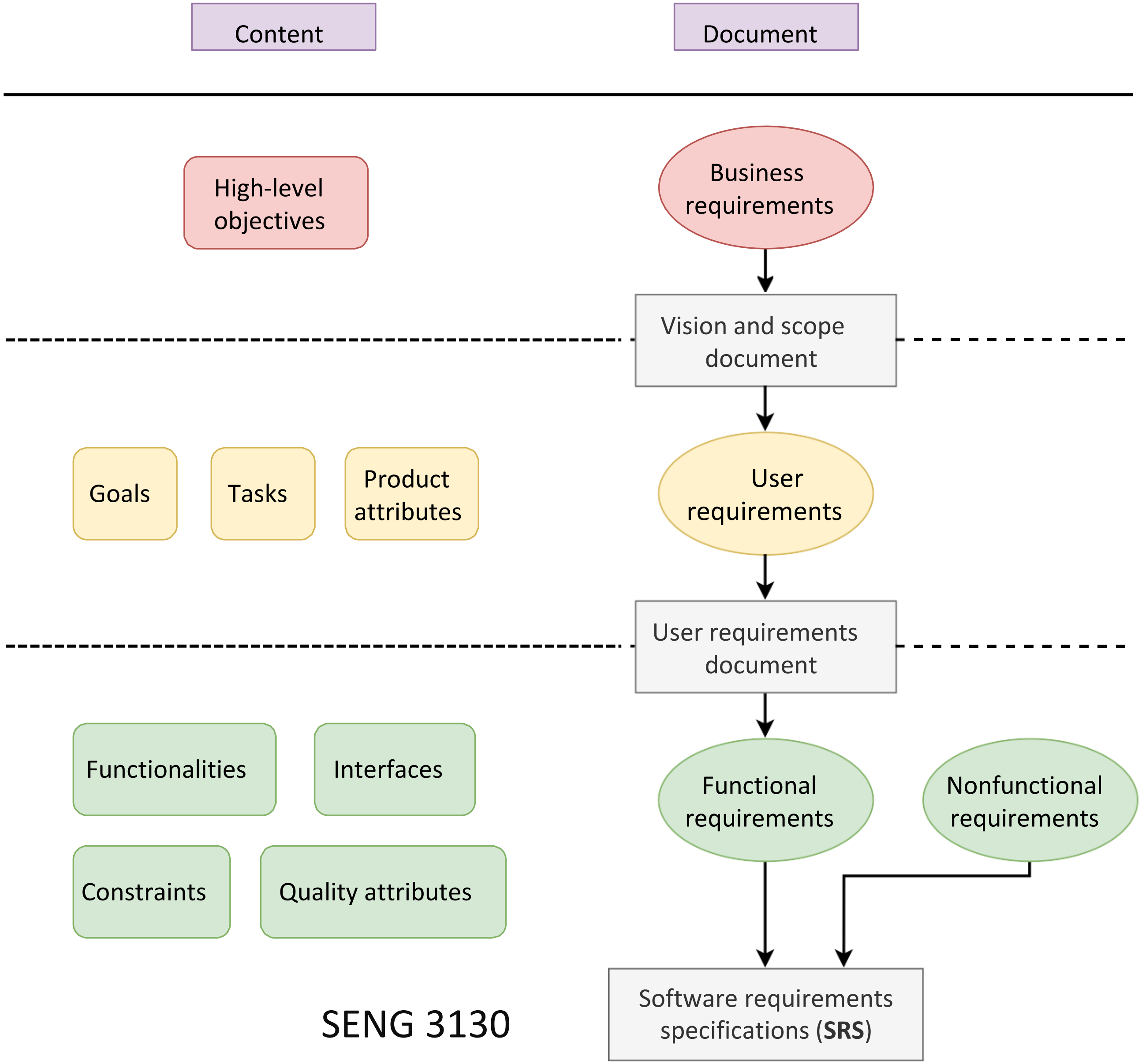


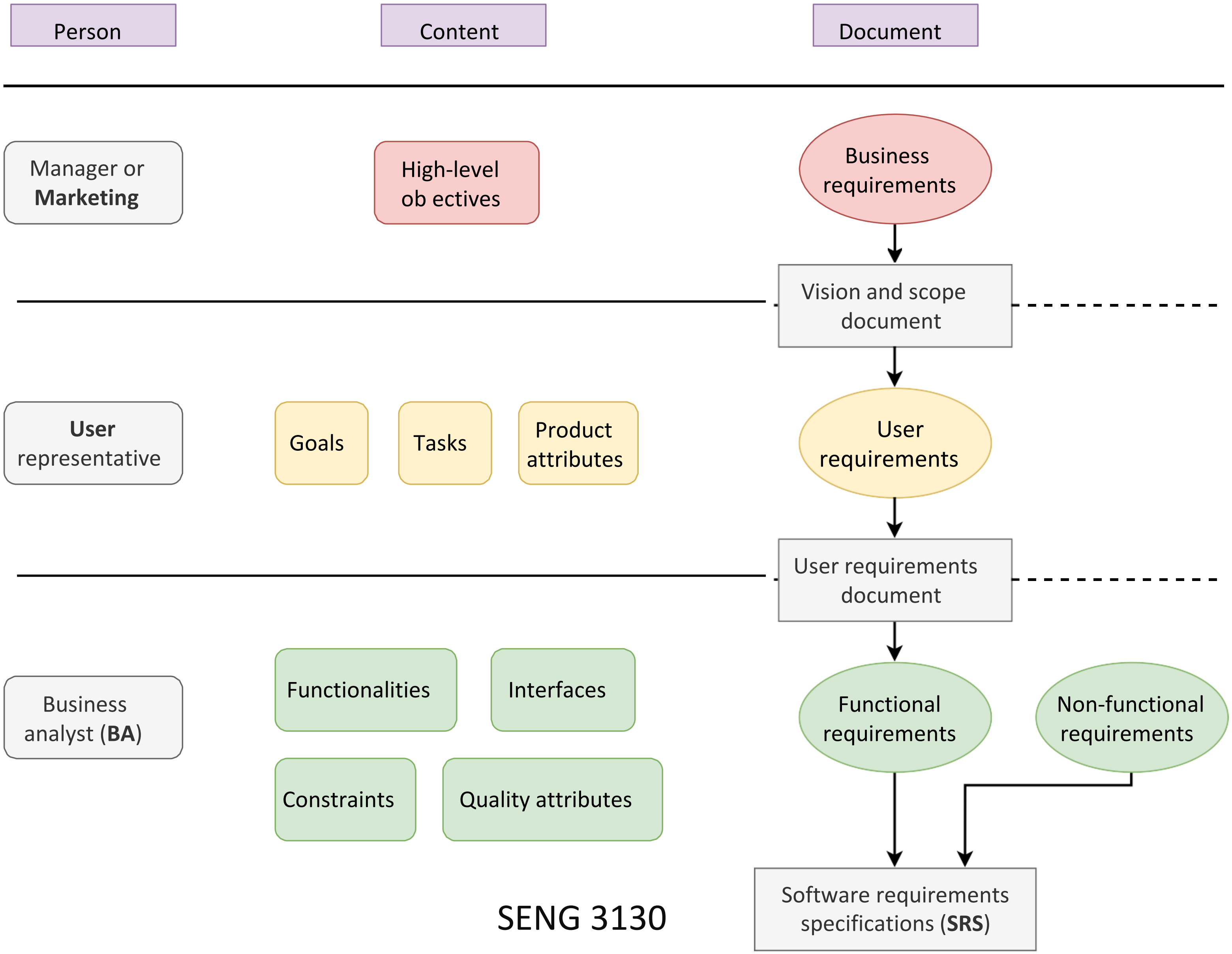
Connecting all pieces


Document
Business requirements
Vision and scope document
User requirements
User requirements document
Functional requirements
Nonfunctional requirements
Software requirements specifications (**SRS**)

Connecting all pieces



Connecting all pieces



Person

Content

Document

Manager or **Marketing**

High-level ob ectives

Business requirements

Vision and scope document

User representative

Goals

Tasks

Product attributes

User requirements

User requirements document

Business analyst (**BA**)

Functionalities

Interfaces

Constraints

Quality attributes

Functional requirements

Non-functional requirements

Software requirements specifications (**SRS**)

What do we learn from today lecture?

- Why do we need to discover the requirements?
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- Levels and types of requirements
- **Product vs. Project requirements**
- Requirements engineering
- Summary

Product vs. Project requirements

- **Product requirements** represent business requirements, user requirements, functional and non-functional requirements.

- **Project requirements** represent the resources needed to plan, develop, deploy, and maintain the project, such as **training** and **infrastructure capabilities**.

Requirements of the “Online Purchase System”

Auditing manager can export a summary report of the purchases of the last 12 months

Users shall enter his name and password to login

Buyers need a system that speeds up the ordering process

The system needs to be deployed on 60 different machines distributed across two contents

Business requirements

User requirements

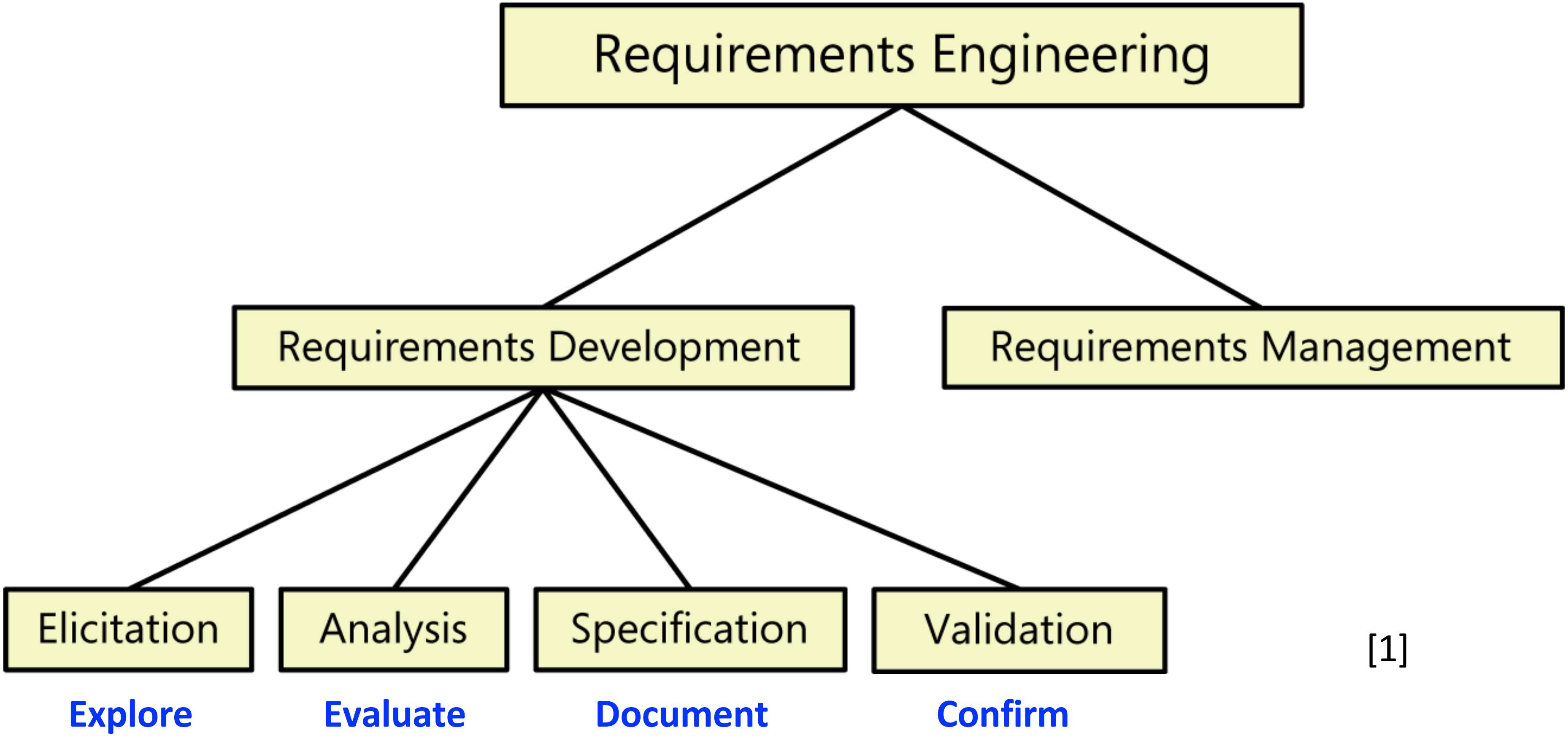
Functional requirements

Project requirements

What do we learn from today lecture?

- ○ Why do we need to discover the requirements?
- ○ What are the software requirements?
- ○ Levels and types of requirements
- ○ Product vs. Project requirements
- ○ **Requirements engineering**
- ○ Summary

Requirements engineering (RE)



[1]

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Summary

- Identifying requirements-related issues in the **early phases** of the project saves money, effort, and company reputation.

- Business analyst (BA) explores requirements in phases.
  - Each phase describes the requirements from a **particular perspective** and with a certain **level of details**.

- RE is an **iterative process** thought the requirements are explored, evaluated, documented, and confirmed.

Summary

✗ ✓

Things to do

- Read chapter 1 of the textbook
- Start building your team for the course project

References

1. Software Requirements (Developer Best Practices) Karl Wiegers, Joy Beatty, 3rd Edition, Microsoft Press, 2013, ISBN-10: 0735679665

How to reach me?

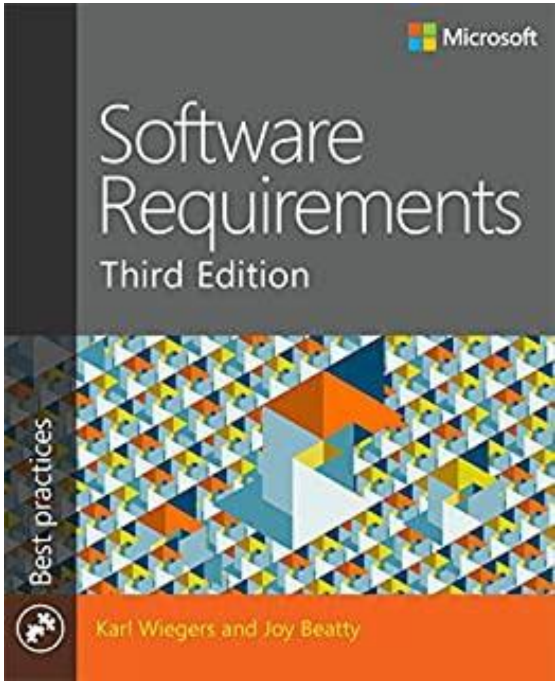
- Email: skeshvadi@tru.ca
- Office hours:
    - Mondays 1:00 PM - 3:00 PM
    - Or by appointment

Course format

- **Lectures** (two slots)
  - Tuesday and Thursday
  - 10:00am - 11:15am, OM 1791
  - Lectures will explore theory and practices of software requirements engineering process

- **Labs** (one slot)
  - Wednesday 3:30pm - 5:20pm, OM 1791
  - Labs will explore software requirements using Requirement Management tools

Textbook



Software Requirements (Developer Best Practices) Karl Wiegers, Joy Beatty, 3rd Edition, Microsoft Press, 2013, ISBN-10: 0735679665.

Overall evaluation scheme

Item	Weight	Due
A1: Vision and scope document	10 %	September 23, 2022 (11:59pm)
Midterm 1	5 %	October 05, 2022
A2: User requirements document	10 %	October 14, 2022 (11:59pm)
A3: SRS (functional aspects)	10 %	November 04, 2022 (11:59pm)
Midterm 2	5 %	November 08, 2022
A4: SRS (non-functional aspects)	10 %	November 18, 2022 (11:59pm)
Final presentation	5 %	November 30, 2022
Final Report	10 %	December 02, 2022 (11:59pm)
Lab Activities	5 %	N/A
Final Exam	30 %	TBA

Semester-long project

- Topic: Write the requirements of the Volunteer Management System
- Format: Team project
- Four assignments: Vision and scope document (A1), user requirements (A2), Functional requirements (A3), Non-functional requirements (A4)
- Final presentation & final report
- No programming needed

What to do in labs

- All labs are mandatory to attend
- Sina gives Labs on software requirements using Requirement Management tools
- You exercise the techniques covered in the Labs

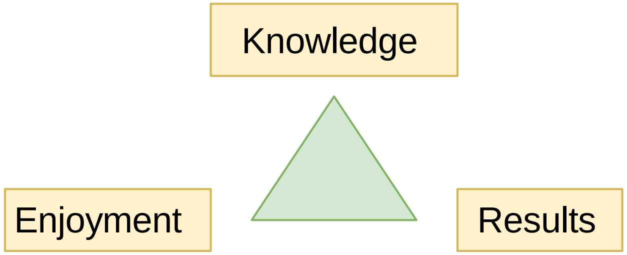
What do we learn from the course?

- Understand the software requirements engineering process
- Differentiate functional and non-functional software requirements
- Apply the knowledge of software requirements specifications in various application domains
- Write and analyze the software requirements of a project

Teaching philosophy

- Learning is a journey, during this journey we should

  1. Gain knowledge
  2. Enjoy
  3. Achieve high-quality results



- My teaching vision is to bridge the gap between the academic concepts and the needed practical hands- on experience

Questions?