Systems Design

Systems Analysis & Design

Author: Eng. Carlos Andrés Sierra, M.Sc.
cavirguezs@udistrital.edu.co

Lecturer
Computer Engineering
School of Engineering
Universidad Distrital Francisco José de Caldas

2025-I

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Outline

Outline

Stakeholders Vs. Shareholders

- **Stakeholders** are individuals or groups who have an interest in the success of a project.

Developers + Architects + product owner
account owner

clients + final user
operation

CTO
CEO
COO

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Stakeholders Vs. Shareholders

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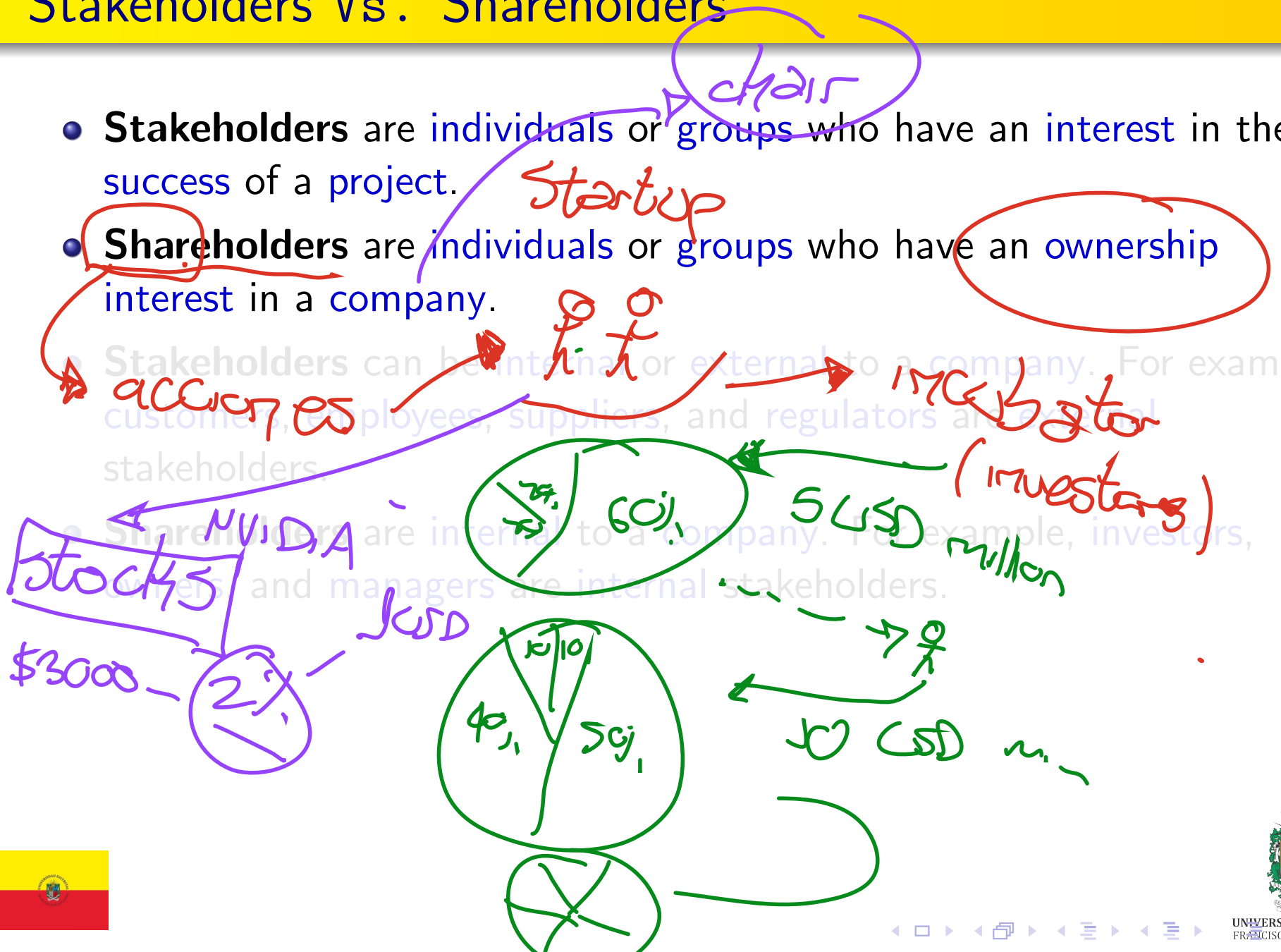

- **Stakeholders** can be internal or external to a company. For example, customers, employees, suppliers, and regulators are external stakeholders.
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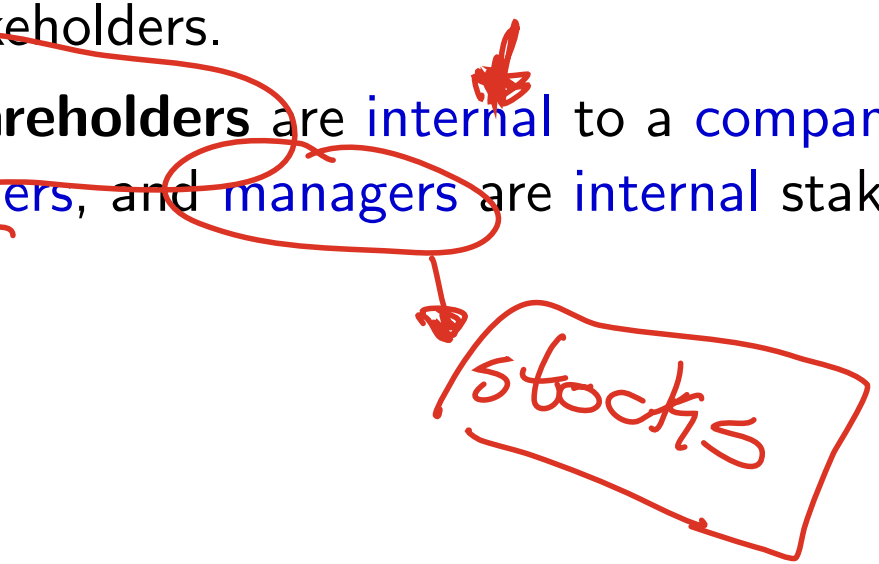

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Requirements

- **Requirements** are statements that describe the features, functions, and constraints of a system.
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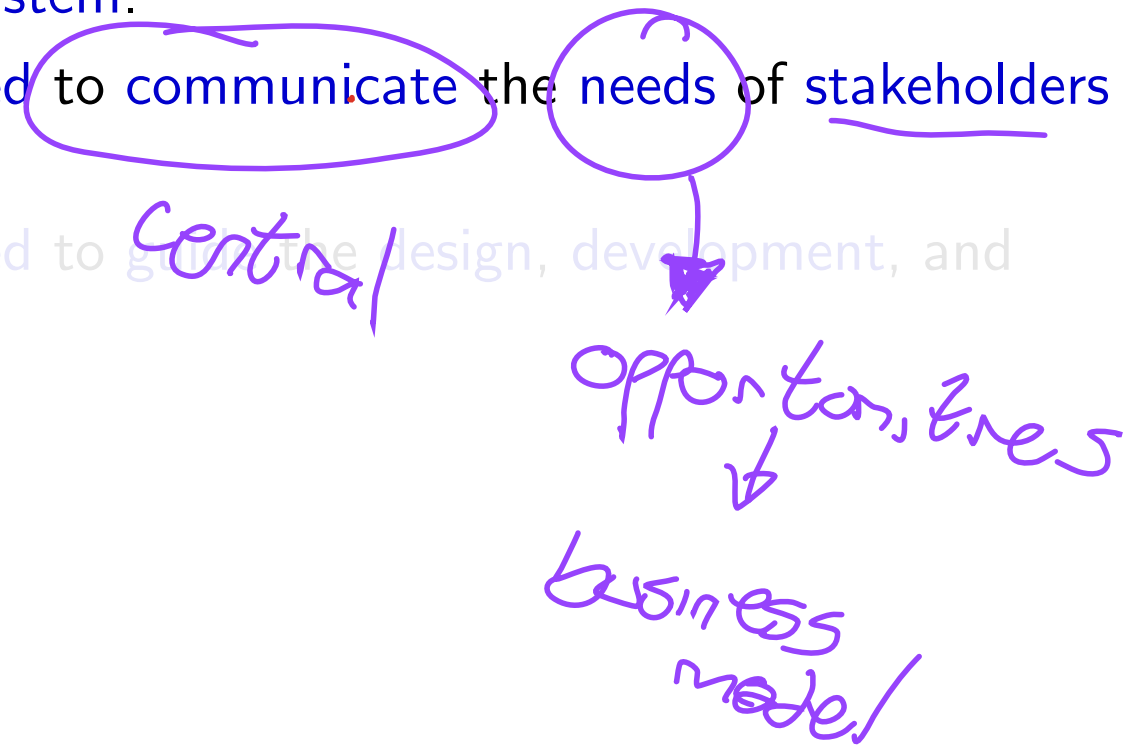

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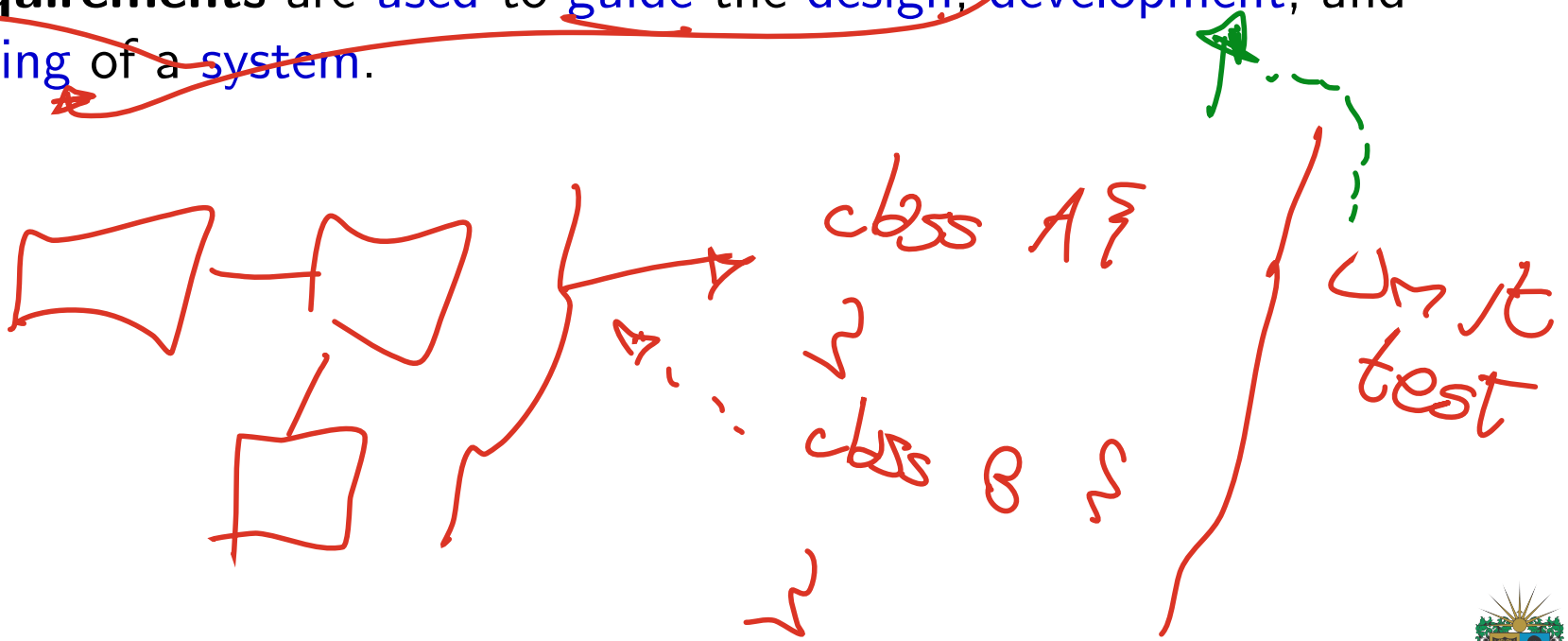
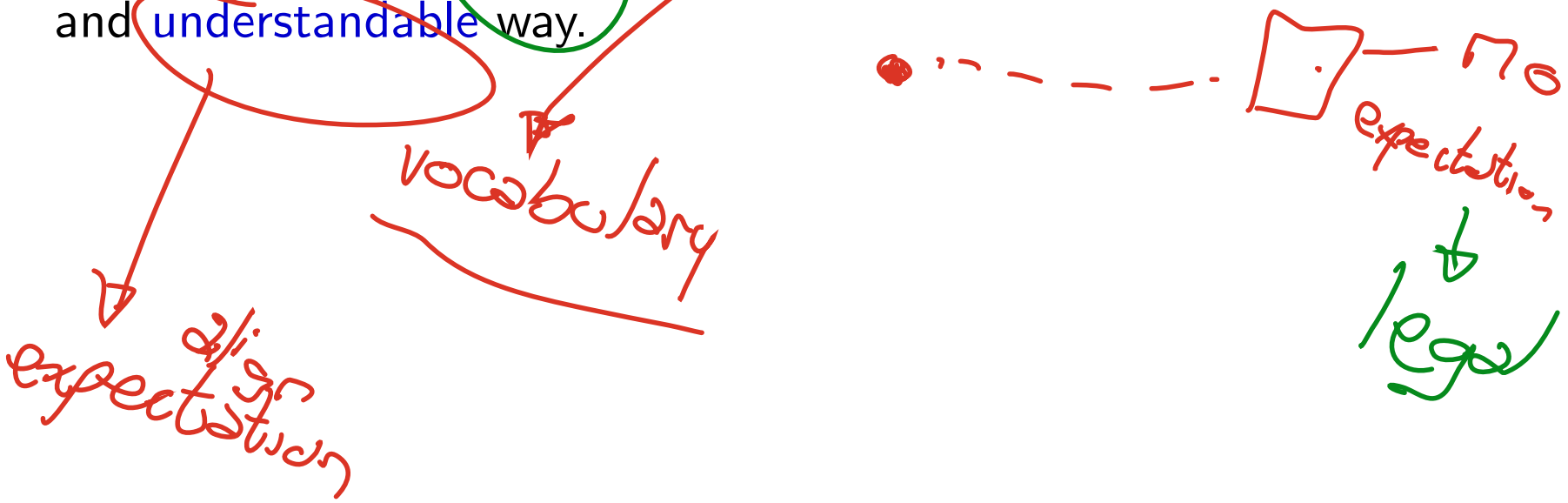
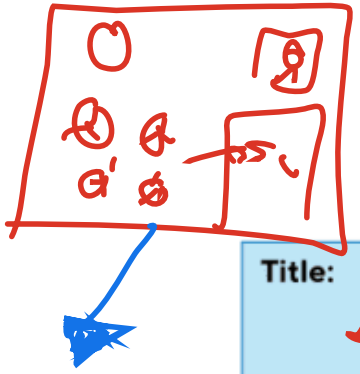


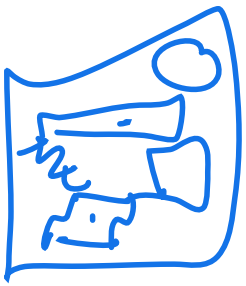
User Stories

- **User stories** are short, simple descriptions of a feature or function of a system.
- They are written from the perspective of the user and describe what the user wants to achieve.
- They are used to capture the requirements of a system in a simple and understandable way.



User Stories: Format Example





User Story

Title:	Priority:	Estimate:
User Story: As a [description of user], I want [functionality] so that [benefit].		
Acceptance Criteria: Given [how things begin] When [action taken] Then [outcome of taking action]		

ProductPlan

What is Requirements Engineering?

- **Requirements engineering** is the process of eliciting, analyzing, specifying, validating, and managing the requirements of a system.
- It is a critical activity in the systems development lifecycle that ensures that the system meets the needs of its users.
- It is a collaborative process that involves stakeholders from different backgrounds and perspectives.

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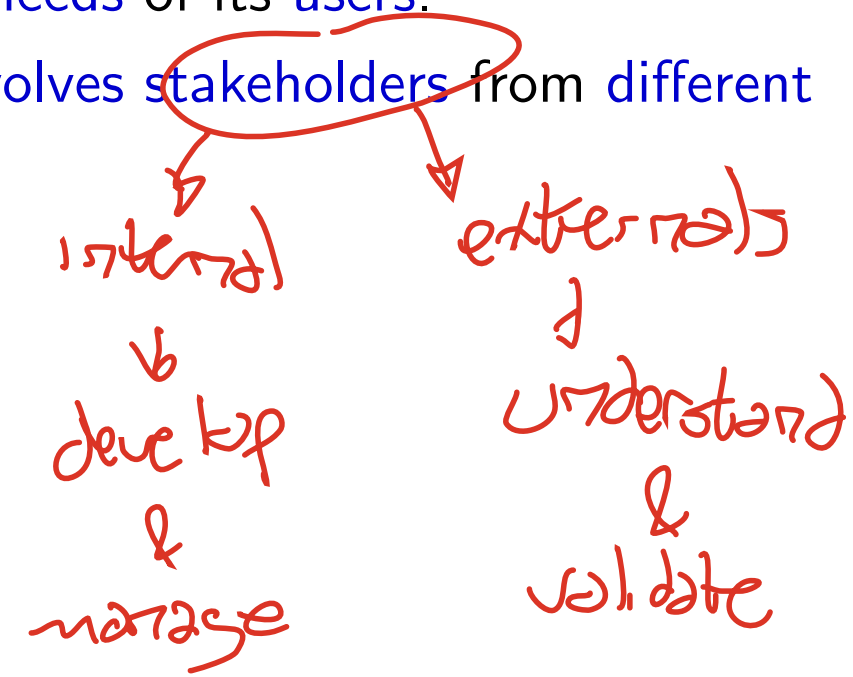
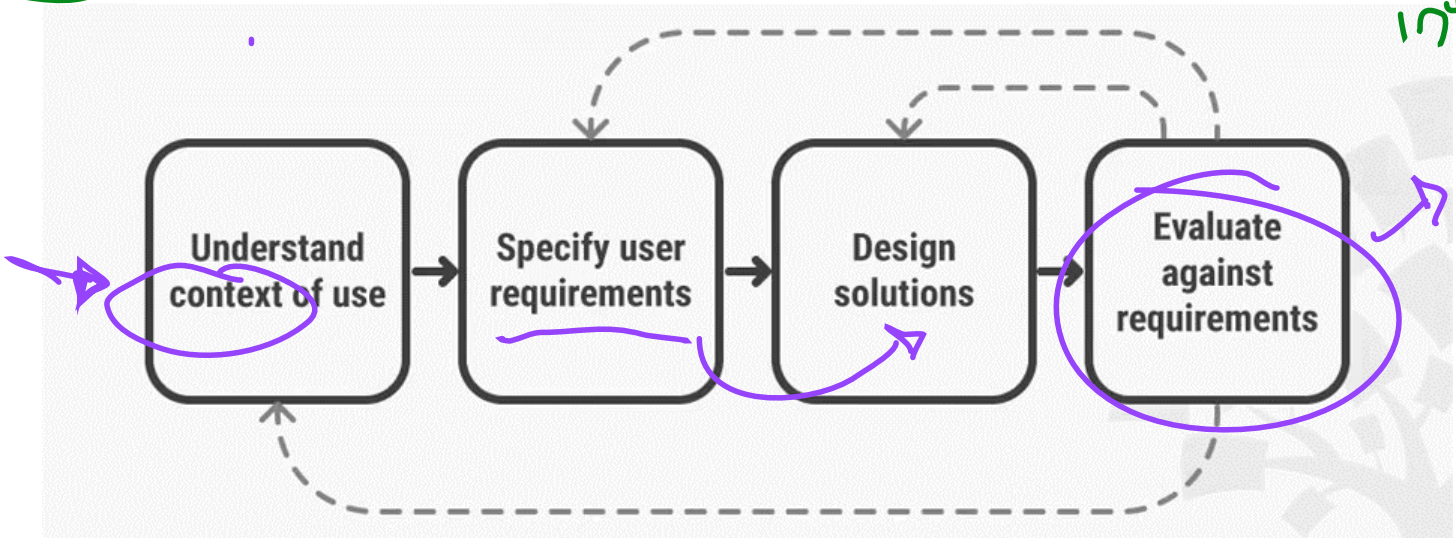


User Centered Design(UCD)

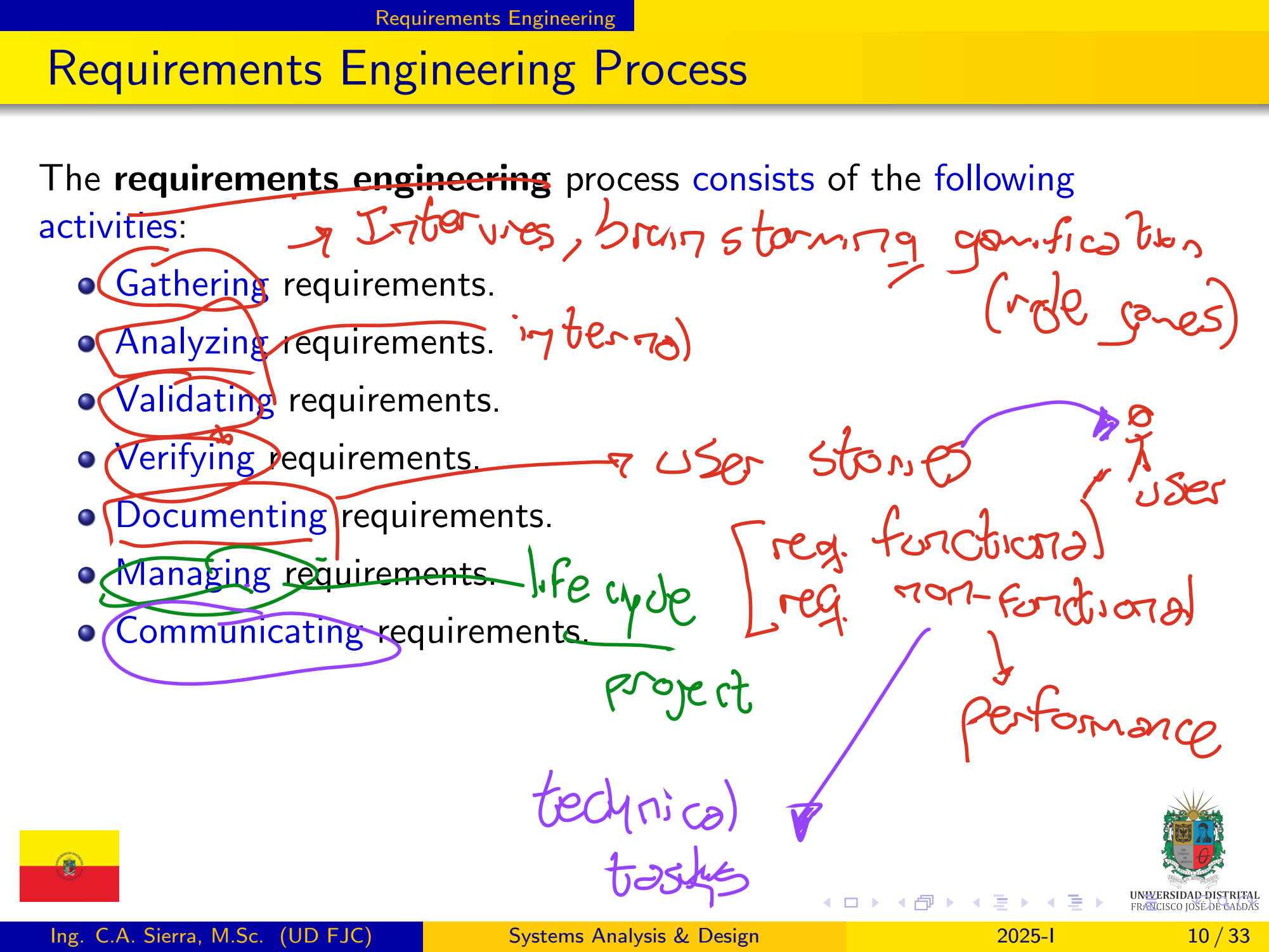
- **User-centered design** (UCD) is an iterative design process that focuses on understanding the needs, preferences, and behaviors of users.
- UCD is a collaborative process that involves users in the design and development of a system.
- UCD is used to create systems that are usable, efficient, and satisfying to users.



Requirements Engineering Process

The **requirements engineering** process consists of the following activities:

- Gathering requirements.
- Analyzing requirements.
- Validating requirements.
- Verifying requirements.
- Documenting requirements.
- Managing requirements.
- Communicating requirements.



Gathering Requirements

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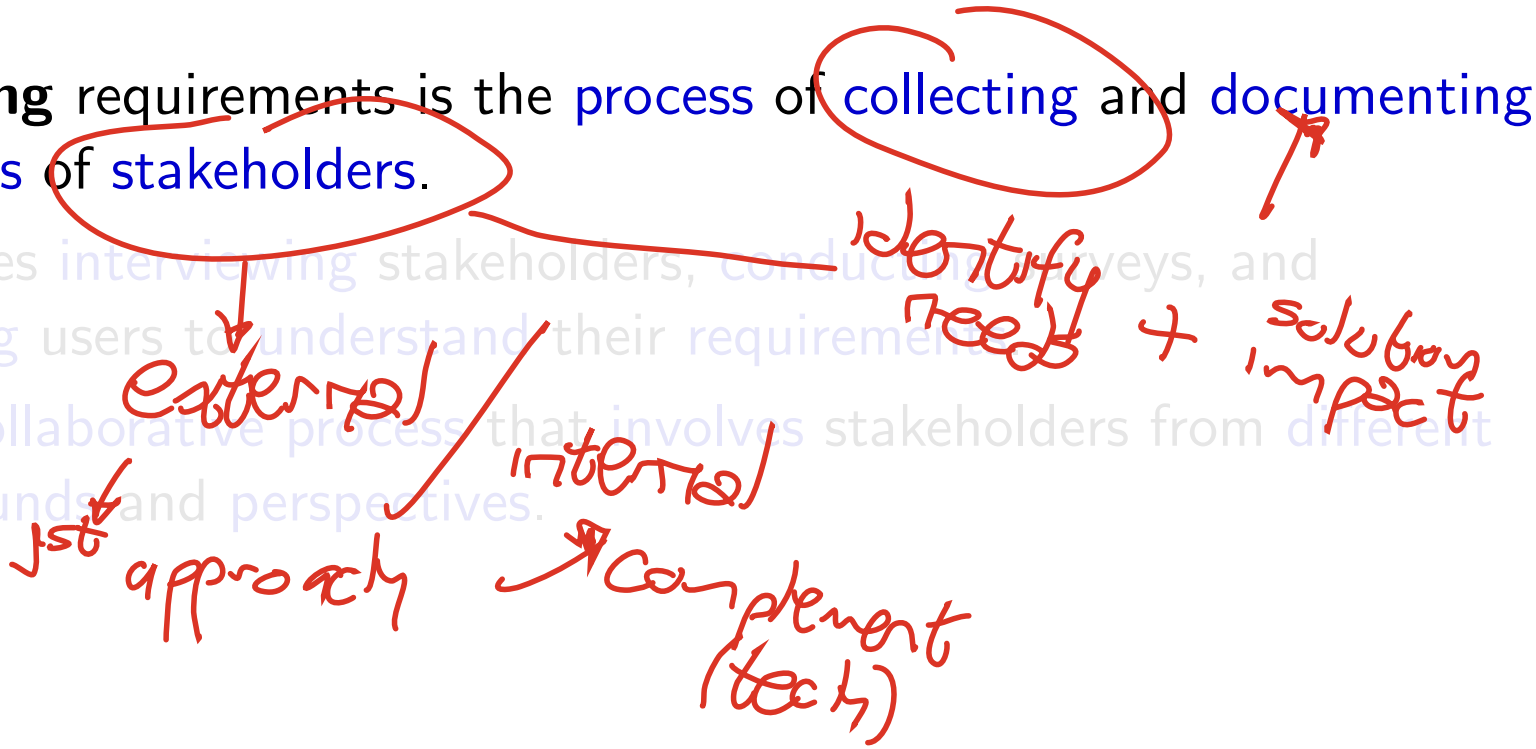

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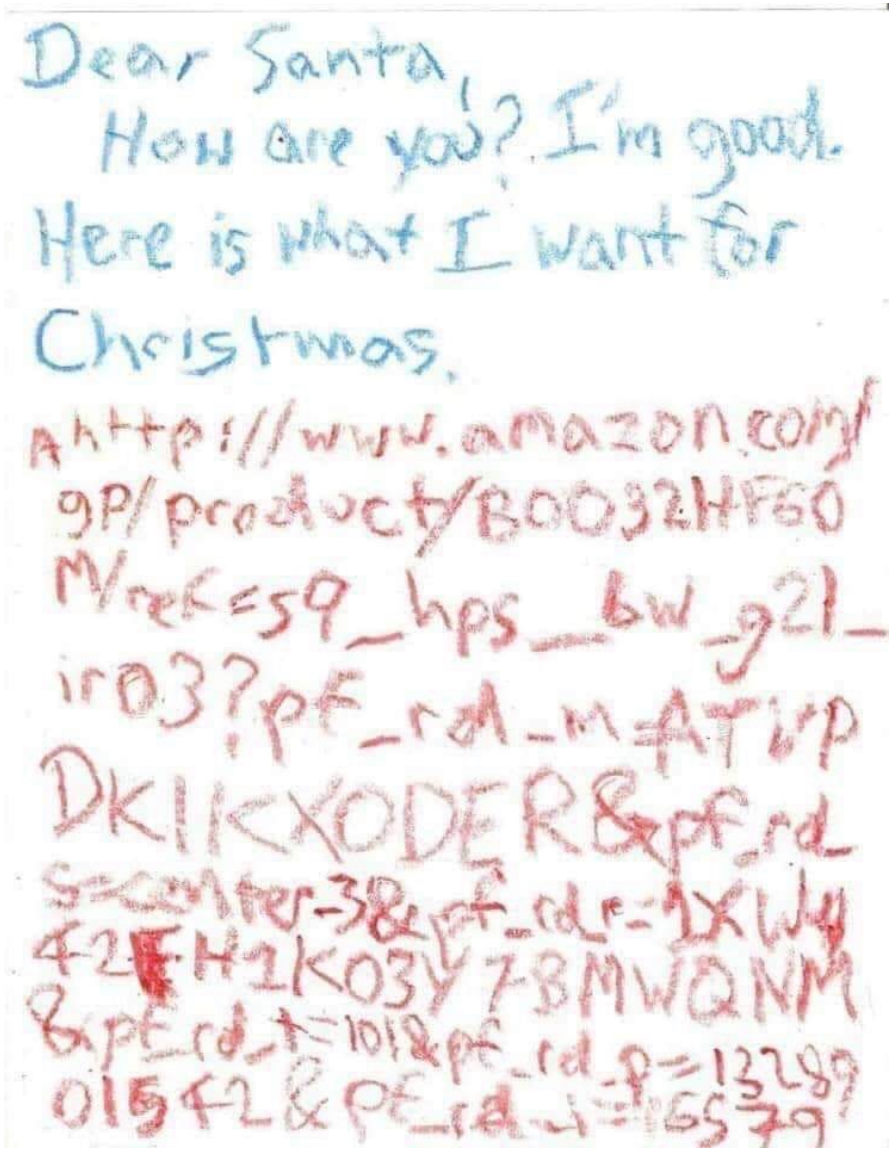
Clients are not always right

adjust requirement

discuss with the client



Analyzing Requirements

- **Analyzing** requirements is the process of examining and understanding the requirements of a system.
- It involves identifying dependencies, conflicts, and inconsistencies in the requirements.
- It is a critical activity that ensures the requirements are complete, consistent, and correct.

systemic approach

systems thinking

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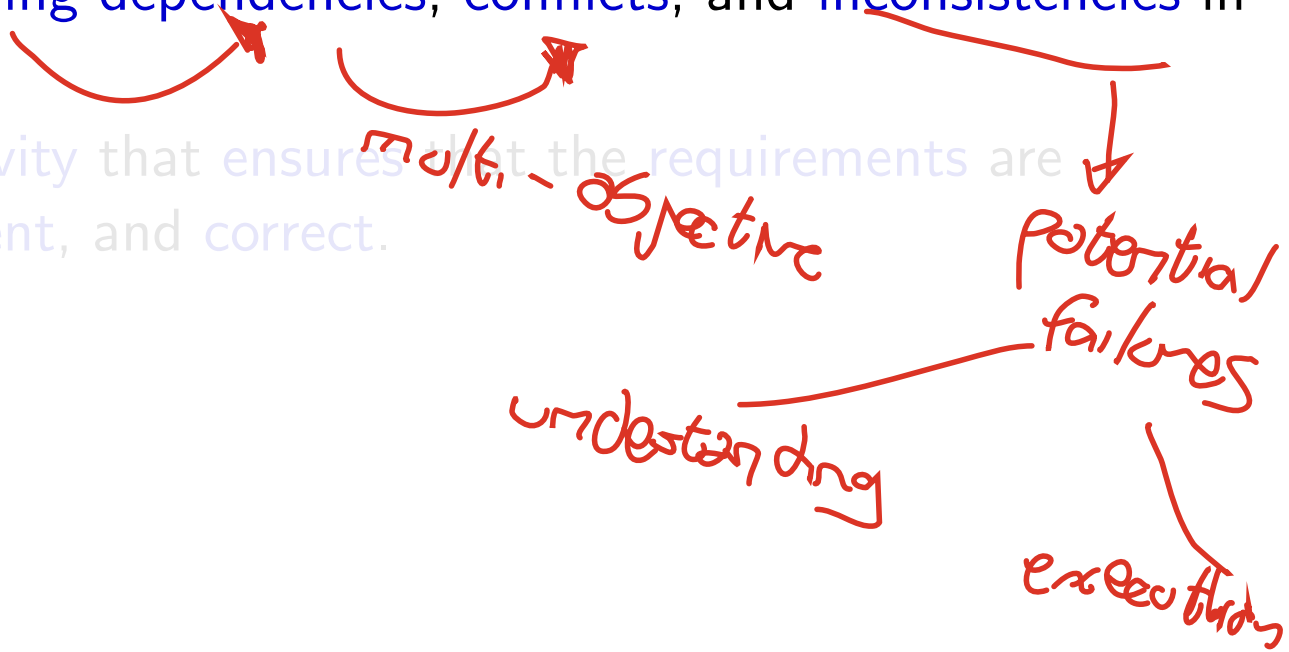

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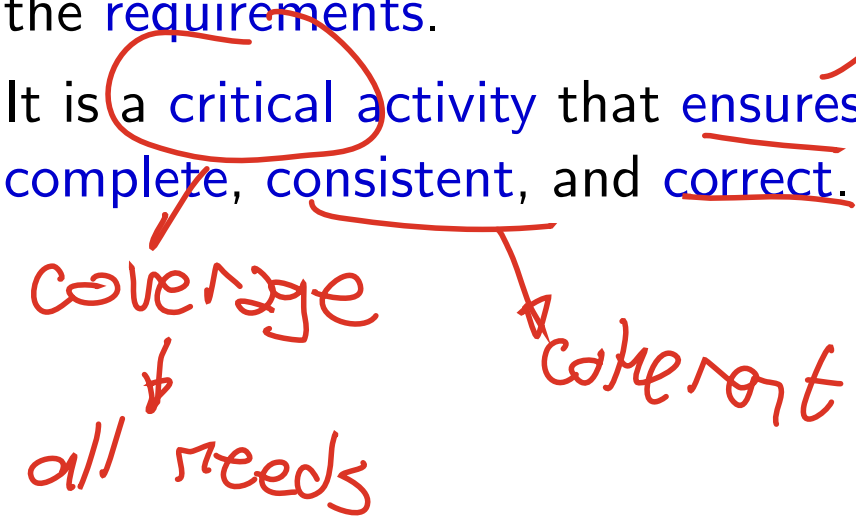

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Documenting Requirements

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format?
artifacts?
plots? summary?
descriptive analysis?

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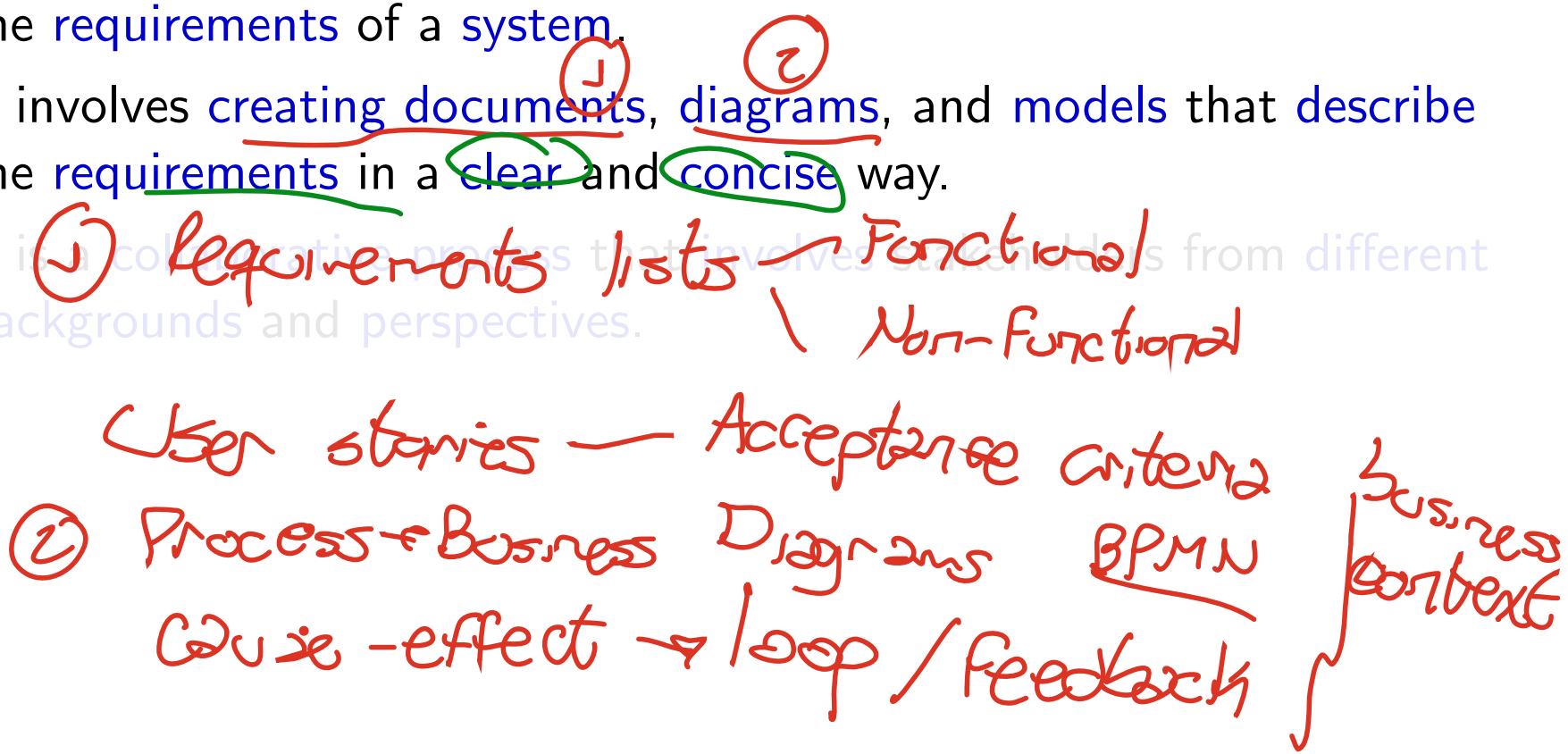

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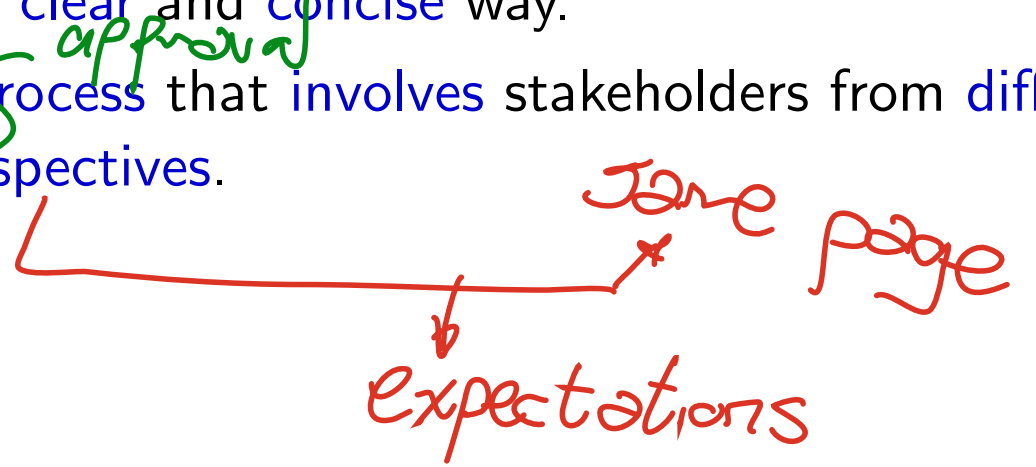

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Everyone hates to write Documentation

PyCon Col.
volunteers
(no money)

Handbook
1. ...
2. ...
3. ...
2-3 pages

?

Validating Requirements

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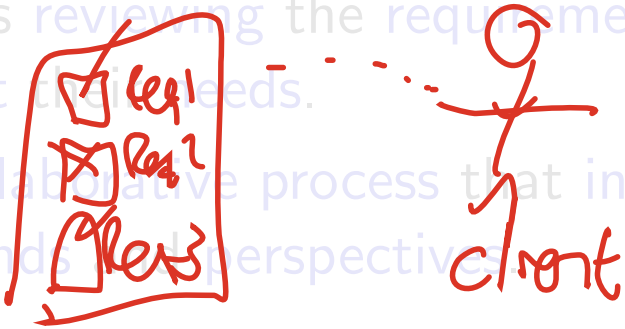

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Holistic

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NOT Clear Understanding of Requirements

Dad Jokes
@Dadsaysjokes

My dad told me his password is: MickeyMinnieGoofyDonaldPlutoHueyLouieDeweyDublin.

Because he was told his password had to contain 8 characters and at least one Capital.

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Verifying Requirements

- **Verifying** requirements is the process of ensuring that the requirements are correctly implemented in the system.
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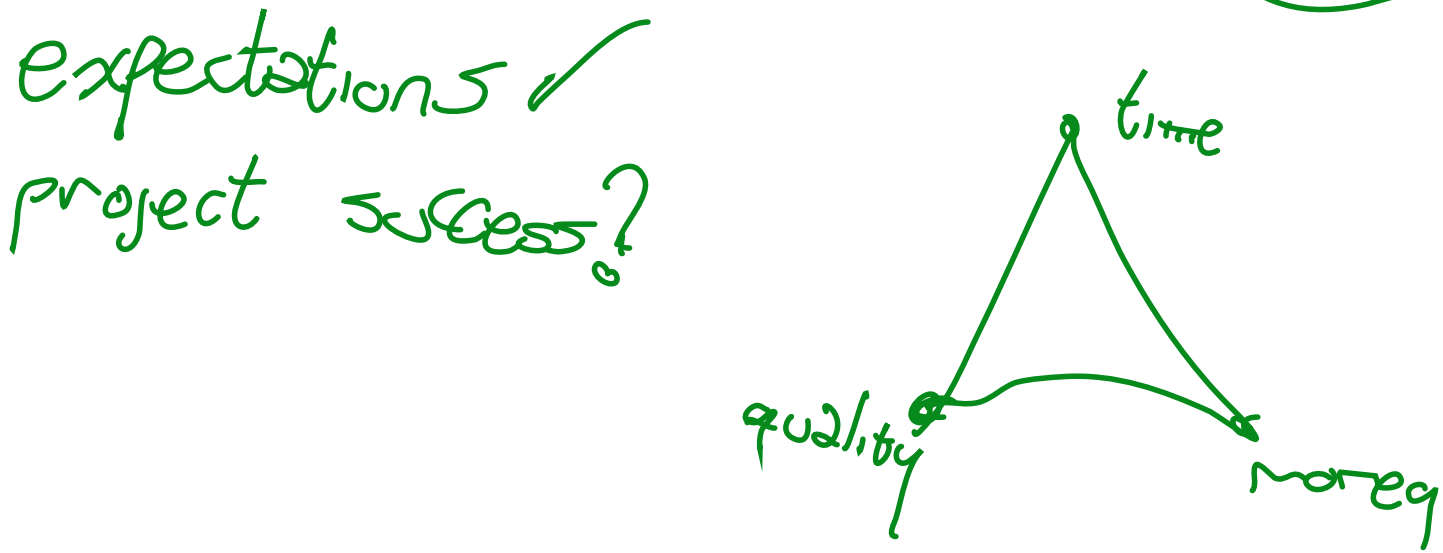
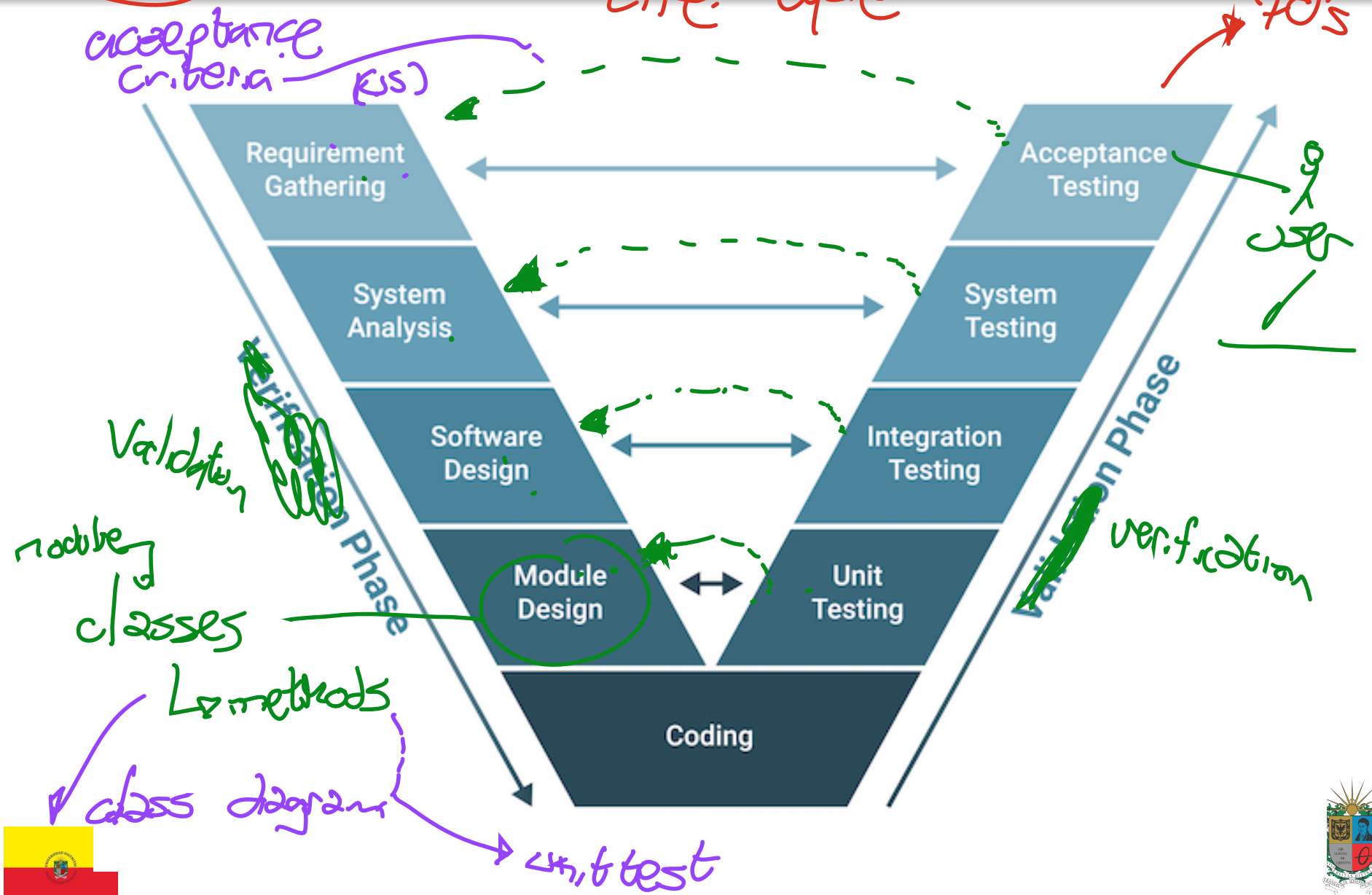


Typical Mistakes when Testing

Disturbing Chinese calorie app...

カシューナッツ	(cashew)	1粒	9	kcal
ジャムパン	(Pomeranian)	1個	327	kcal

V-Model inn SDLC



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Conceptual Design

- Once the initial set of requirements are defined, the next step is to create a **conceptual design** of the system.
- **Conceptual Design** is a high-level design that defines the `structure` and `behavior` of the system. It is achieved by the recognition of the appropiates components, connections, and responsabilities.
- The **conceptual design** is used to communicate the vision of the system to stakeholders and to guide the development of the system.

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Process Definition

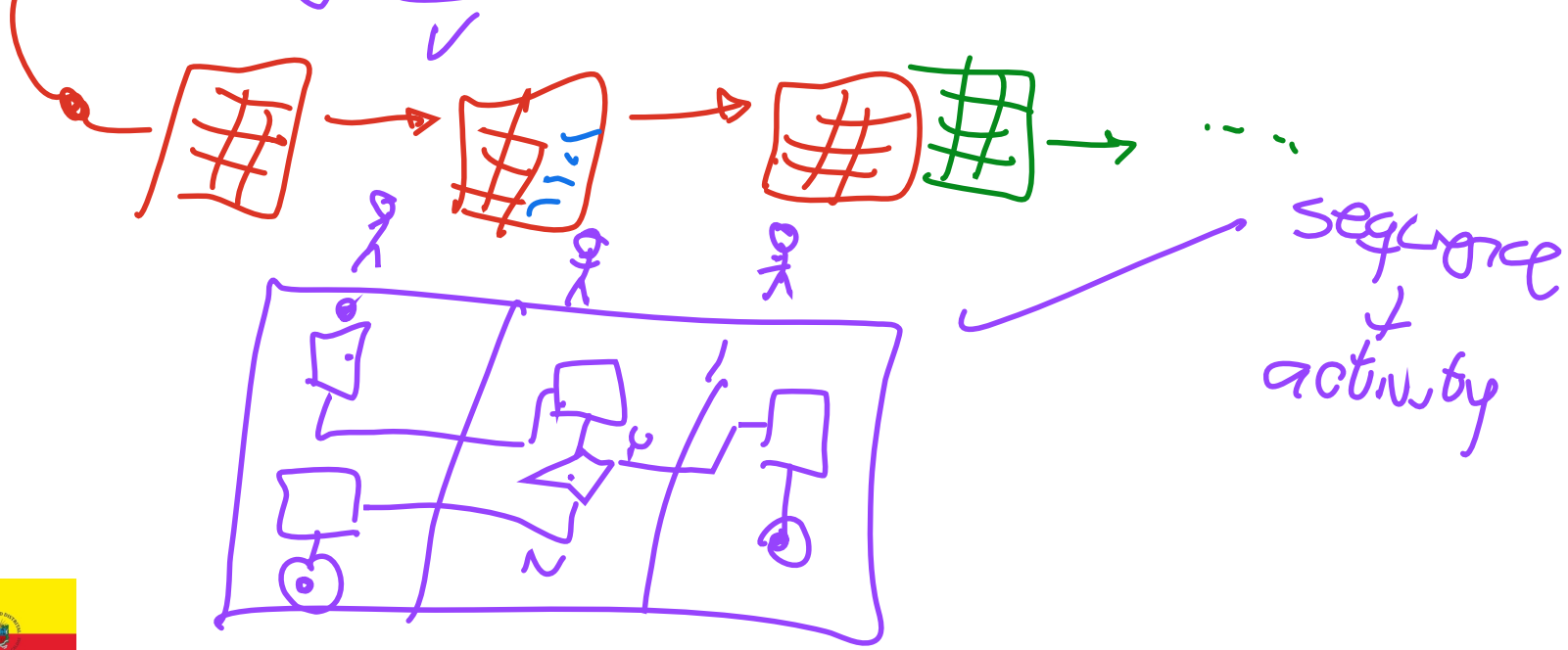
- A **Process** is a series of steps or actions taken to achieve a particular end.
- Processes are used to **organize** and **manage** work.

Workflows

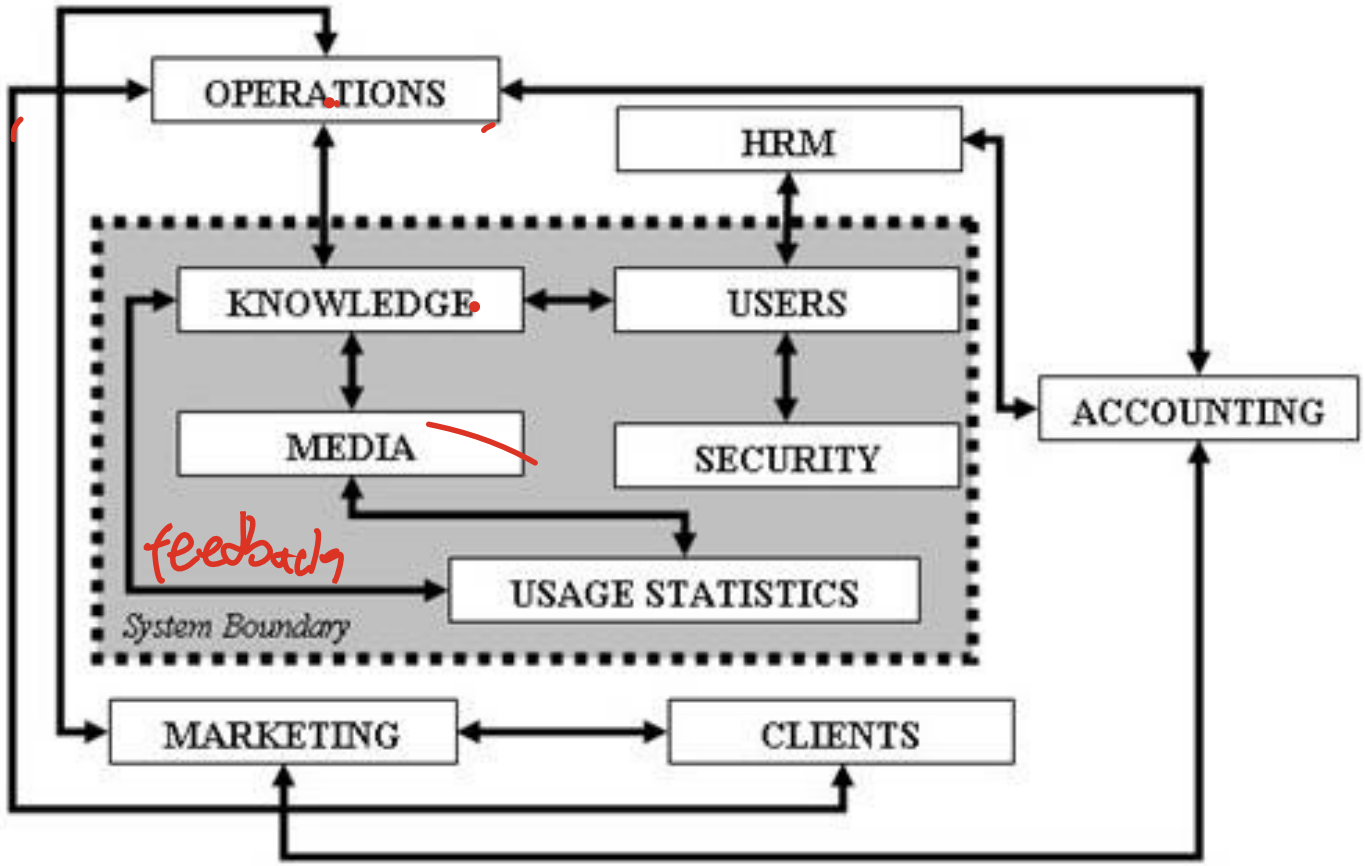
- A **Workflow** is a series of tasks that are performed in a specific order to achieve a goal.
- **Workflows** are used to automate and optimize business processes.
- **Workflows** can be sequential, parallel, conditional, or repetitive.

Process Models

- A **Process Model** is a representation of a process that shows the sequence of steps and the relationships between them.
- **Process models** are used to analyze, design, and improve processes.
- Examples of process models include `flowcharts`, `data flow diagrams`, `activity diagrams`, `business process model and notation (BPMN)`, `petri nets`, `state diagrams`, among others.



System Schema Example: Company Structure



Causal Loops

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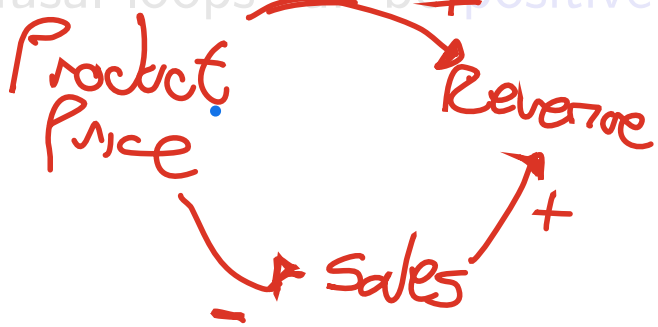
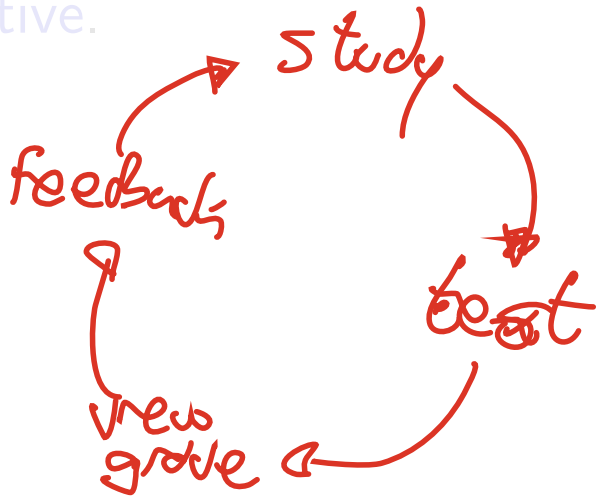
- Causal loops can be positive or negative.





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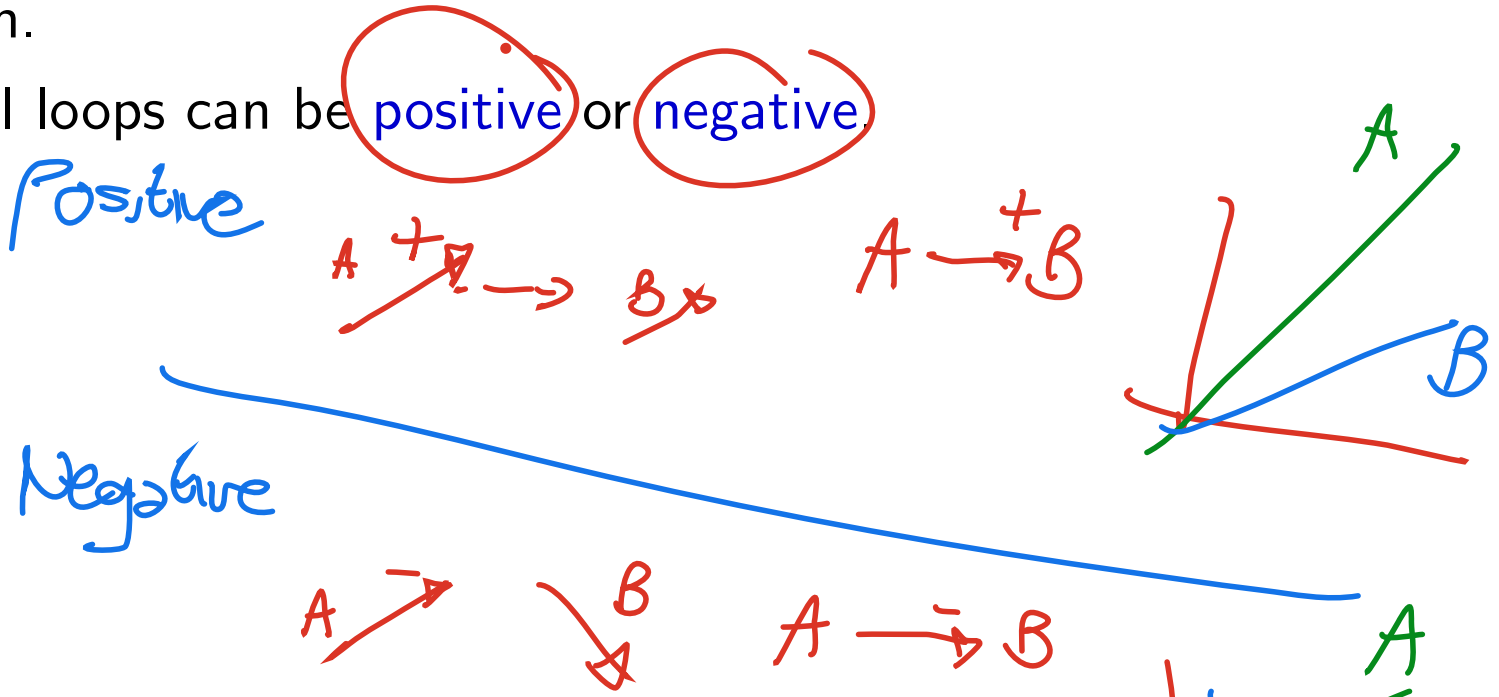
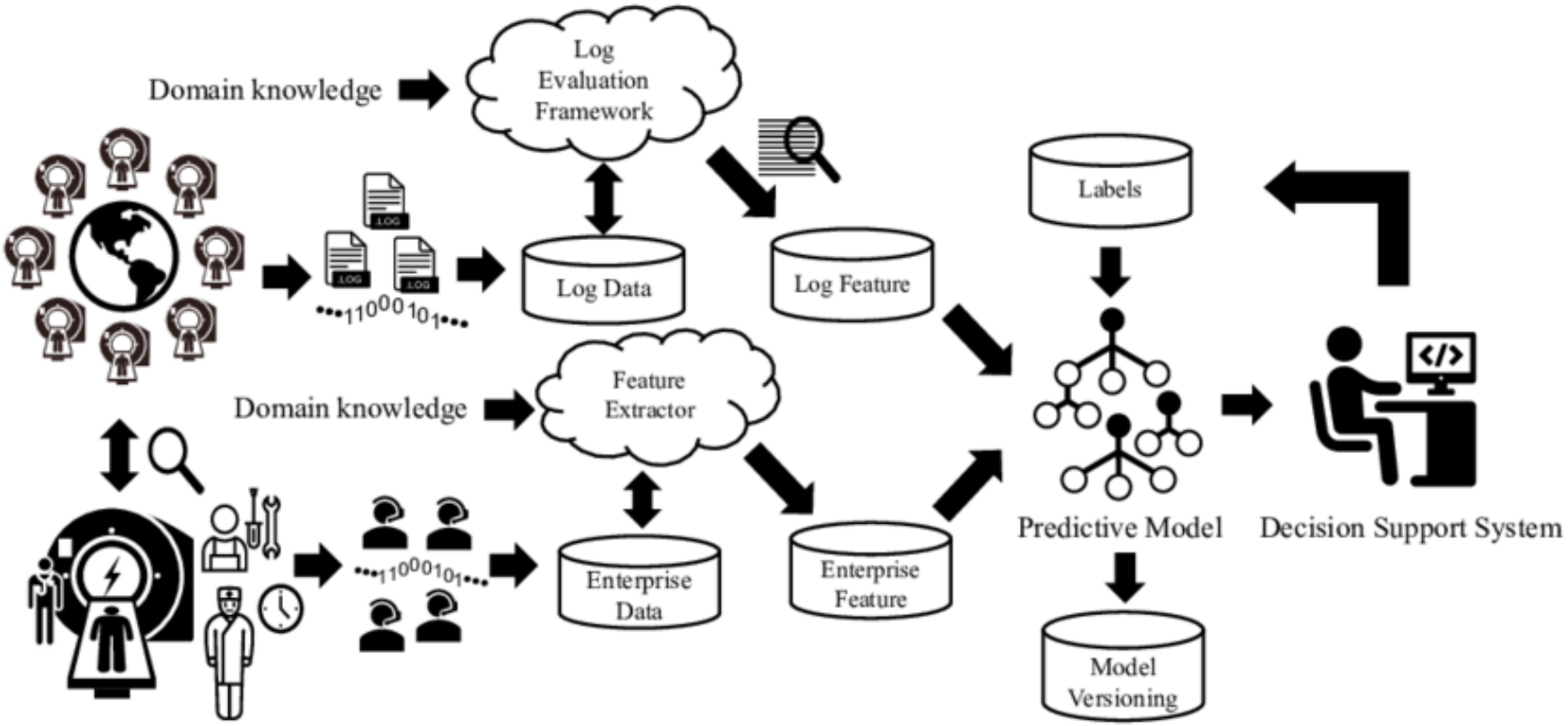
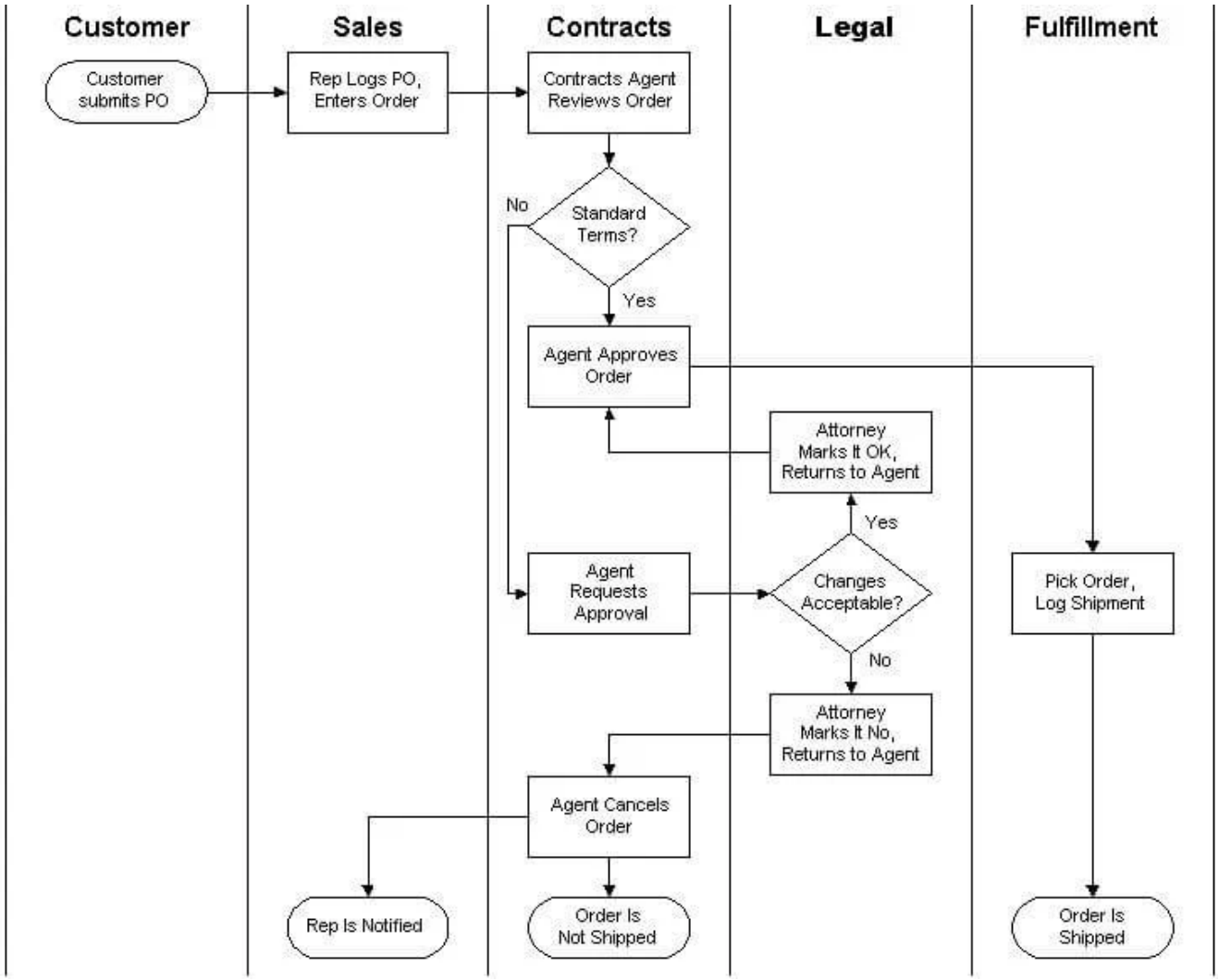


System Schema Example: Processing Pipeline



Business Process Model and Notation (BPMN)



Technical Design

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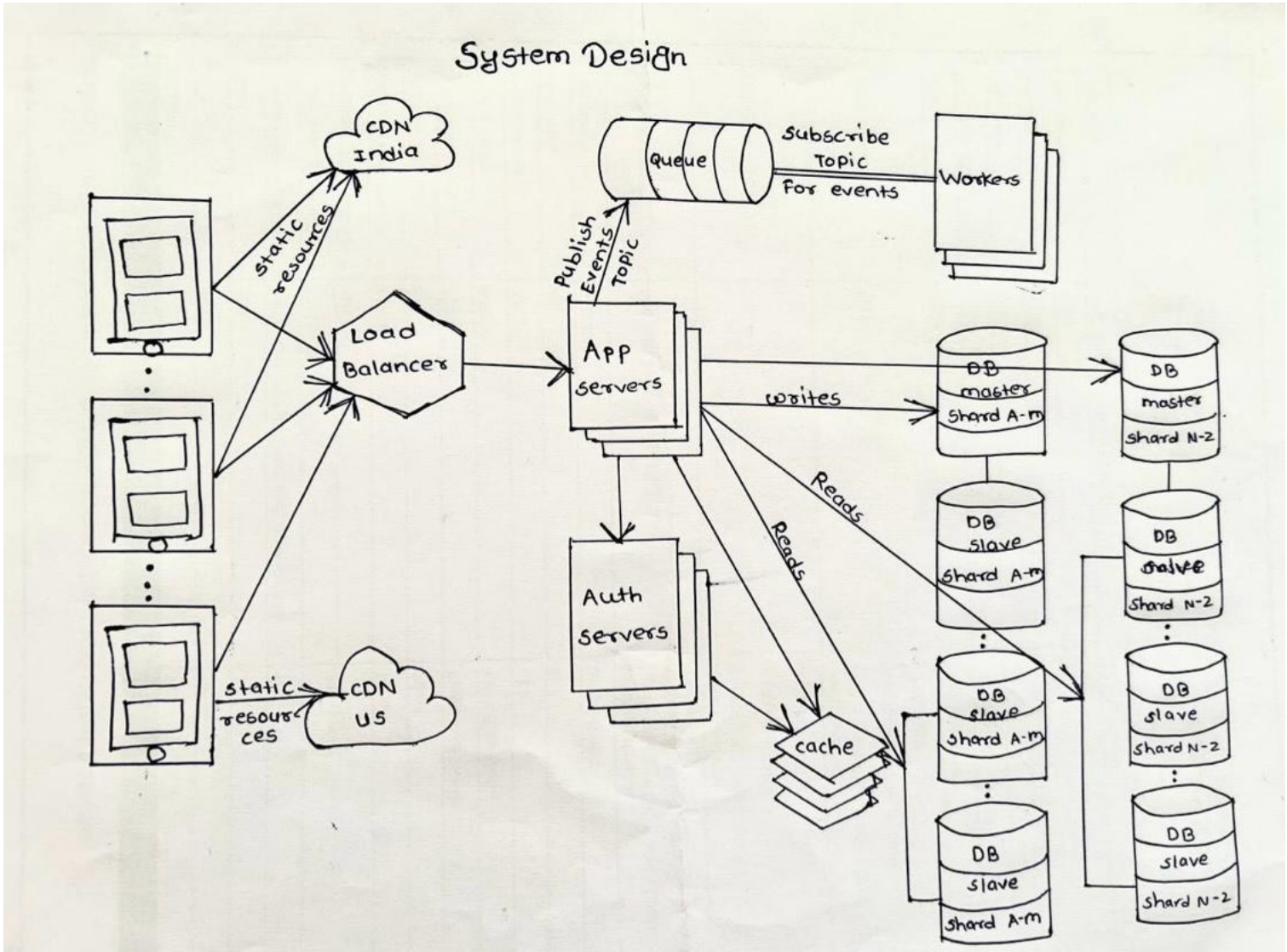
Systems Design applied to Software Architectures



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Thanks!

Questions?

Repo: *https://github.com/EngAndres/ud-public/tree/main/courses/systems-analysis*

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