Robust Systems Design

Systems Analysis & Design

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Outline

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Concepts Generation

- **Concepts generation** is the process of creating ideas for a system that meet the needs of its users.
- It involves brainstorming, research, and analysis to generate innovative ideas for a system.
- It is a creative process that encourages innovation and creativity in the design of a system.

Problems

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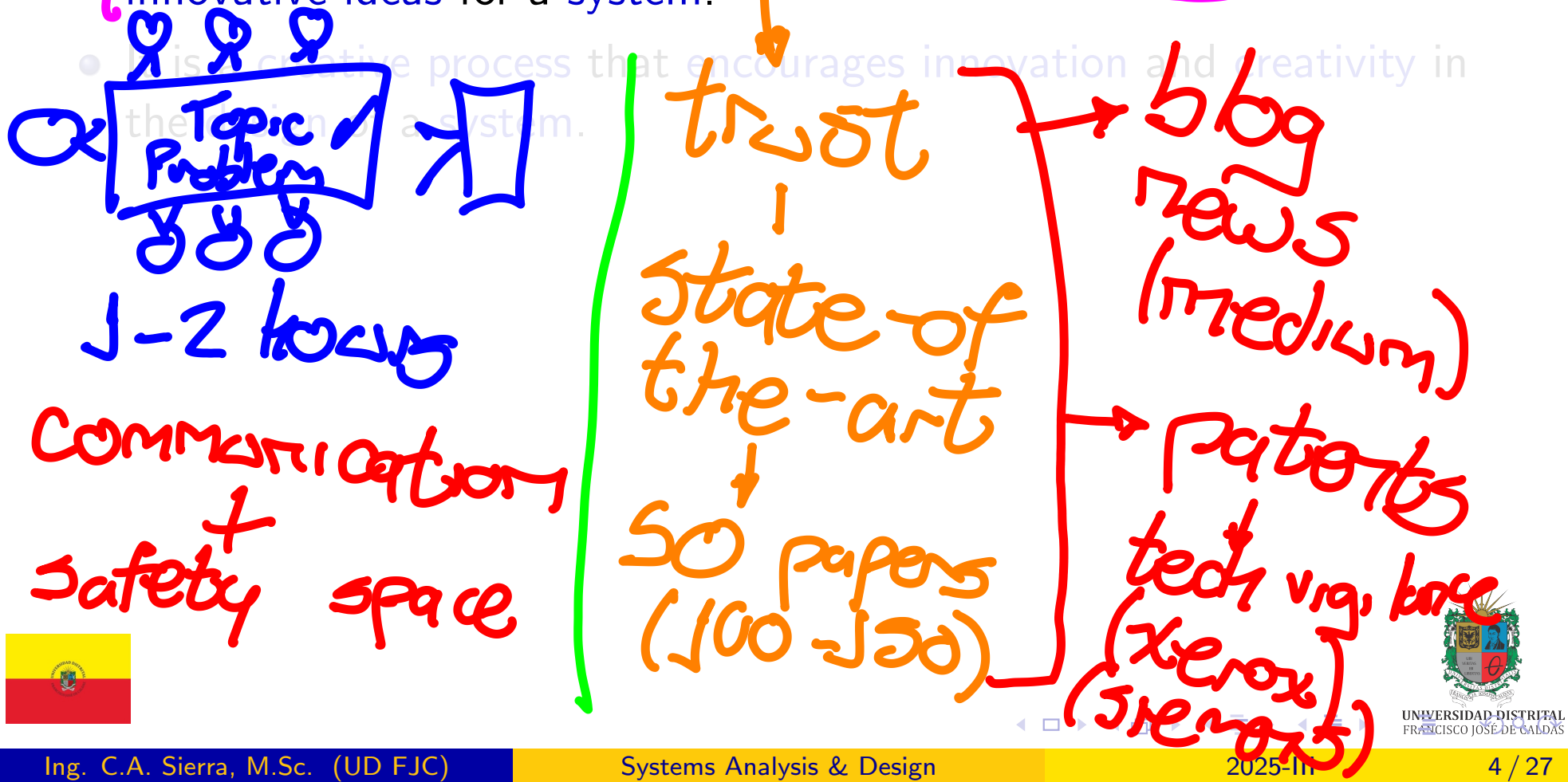

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simple + application

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Innovation and Creativity

- **Innovation** is the process of creating new ideas and solutions that improve the performance of a system.
- **Creativity** is the ability to generate original and innovative ideas that solve problems and meet the needs of users.
- They are important for ensuring that a system is robust, efficient, and effective.

1. Understanding
2. metrics
3. Concepts
   - optimization

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feasible

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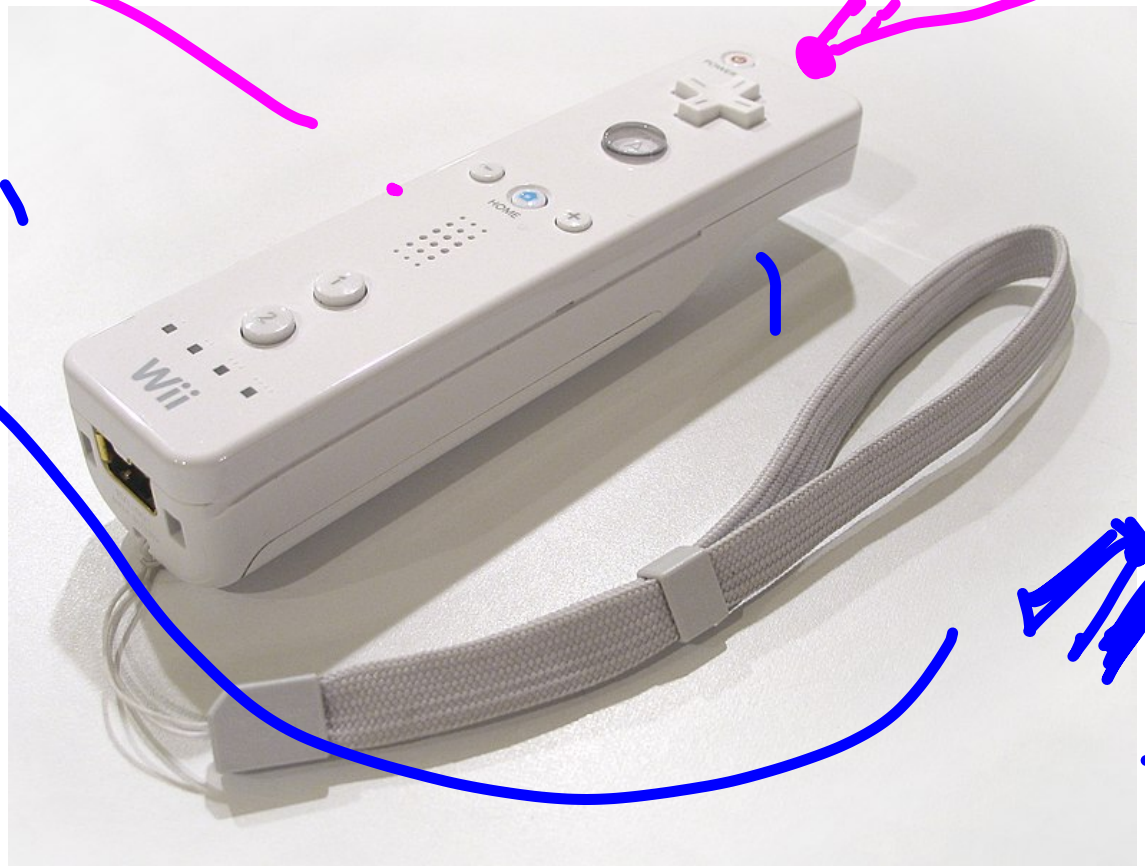
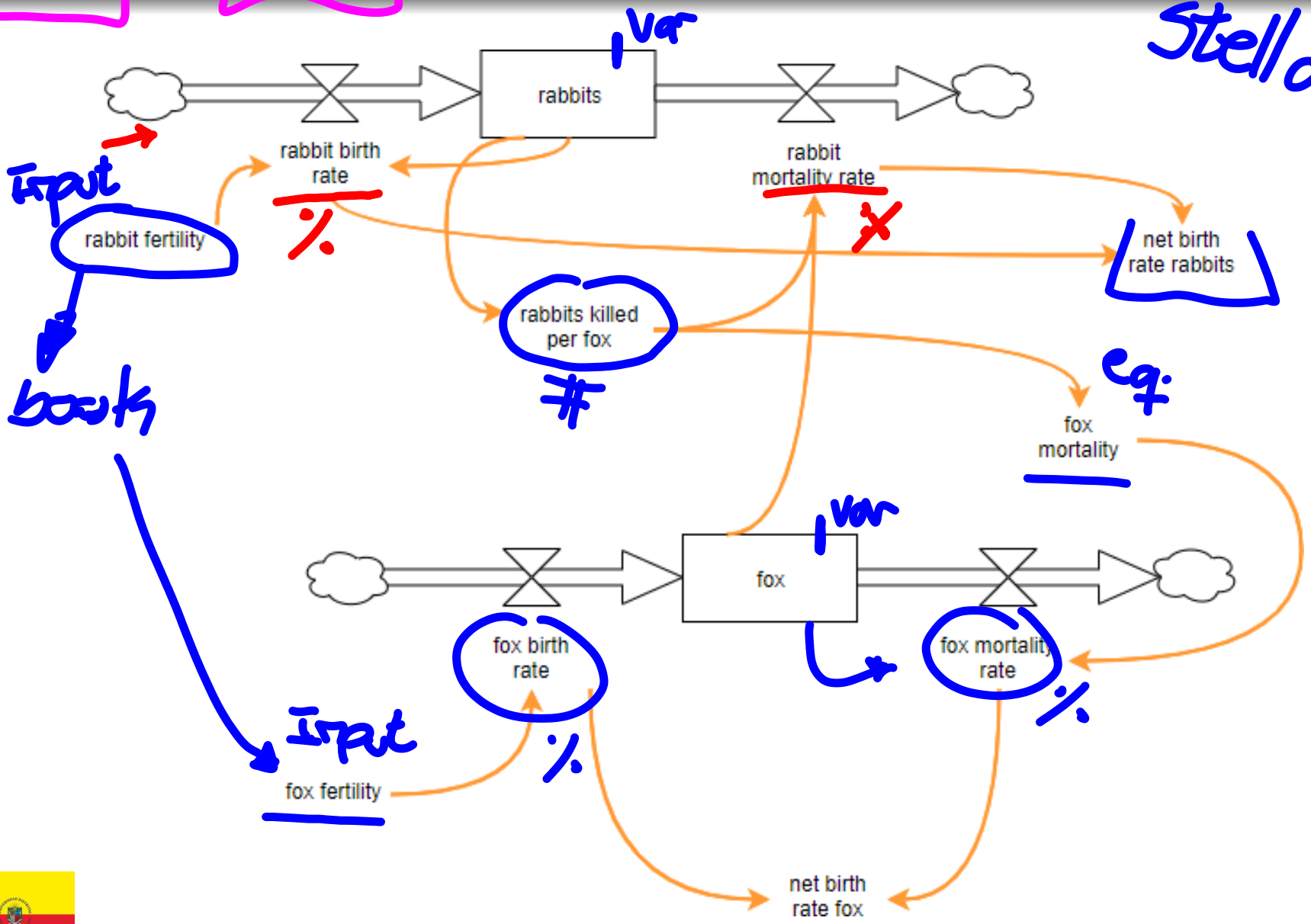
Is this Innovation & Creativity?



Concepts Selection

- **Concepts selection** is the process of evaluating and choosing the best ideas for a system.
- It involves analysis, comparison, and evaluation of concepts to determine which ones are the most feasible and effective.

Stock and Flow Diagram



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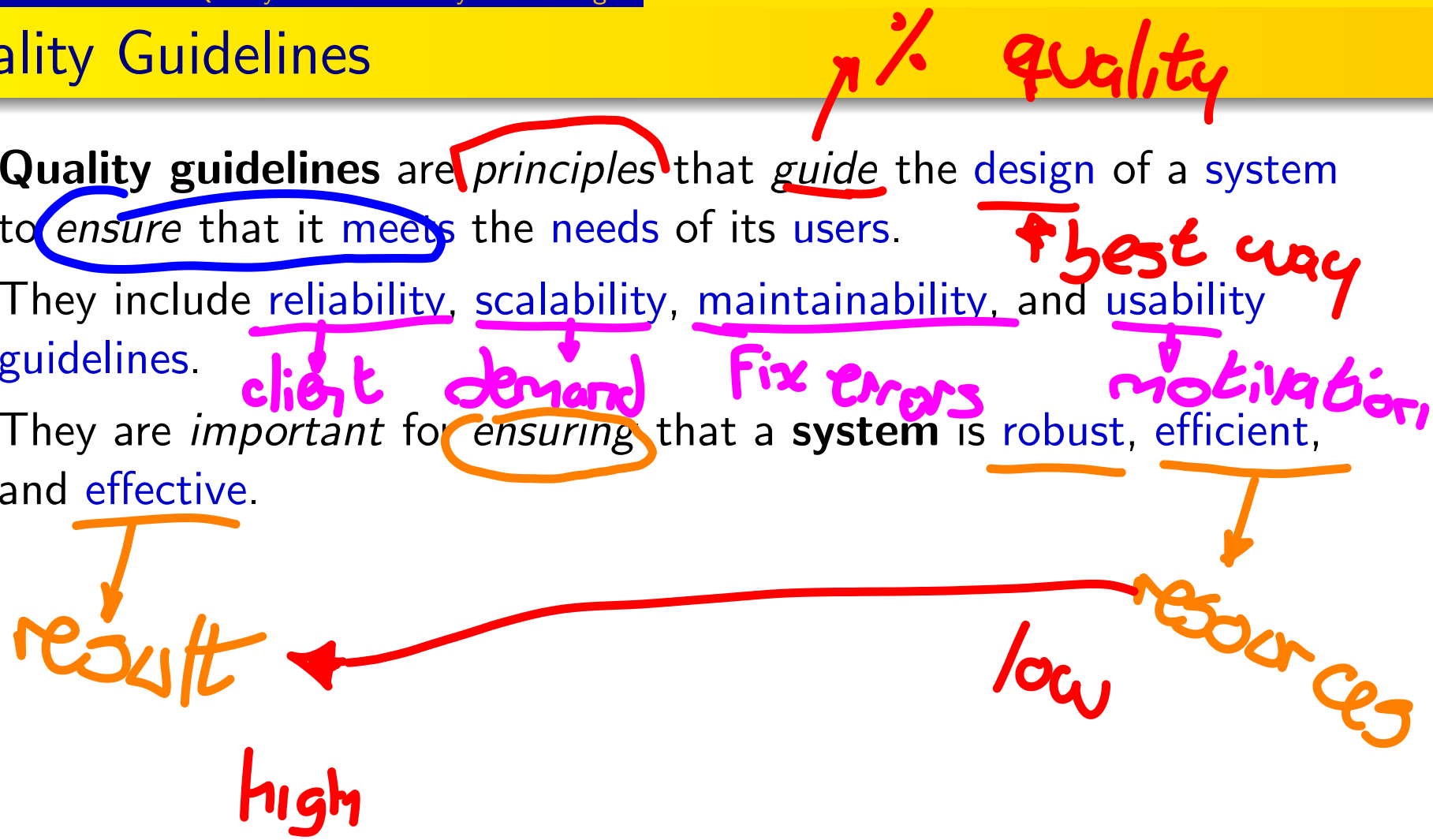
Quality Guidelines

- **Quality guidelines** are *principles* that *guide* the design of a system to *ensure* that it meets the needs of its users.
- They include reliability, scalability, maintainability, and usability guidelines.
- They are *important* for *ensuring* that a **system** is robust, efficient, and effective.

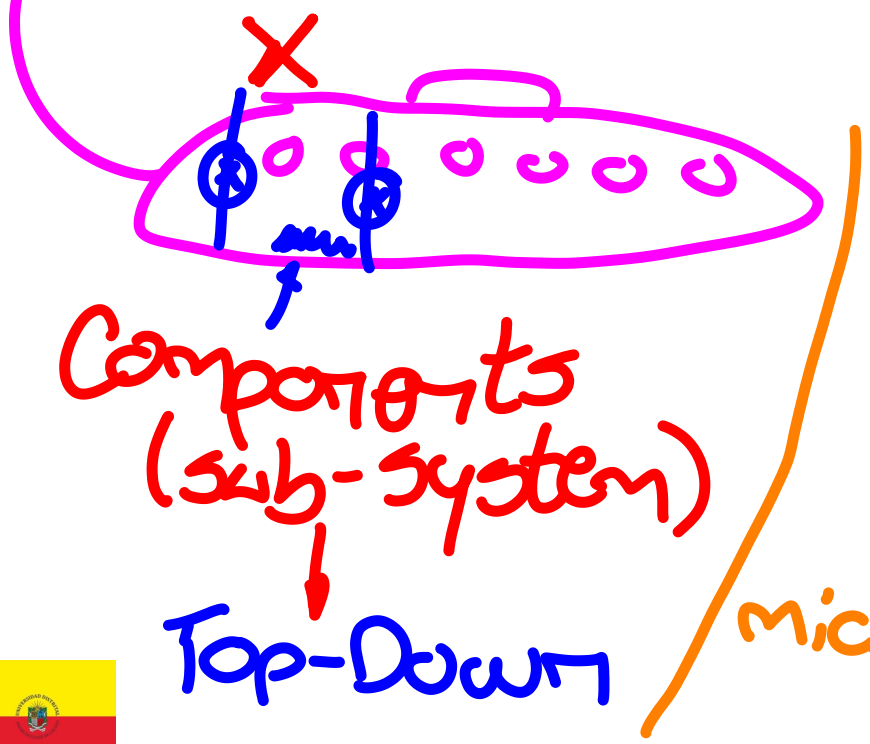


Reliability Guidelines

- **Reliability guidelines** are *principles* that *guide* the design of a system to *ensure* that it is reliable and dependable.
- They include fault-tolerance, redundancy, and error-handling guidelines.
- They are *important* for *ensuring* that a system is robust and resilient to failures.

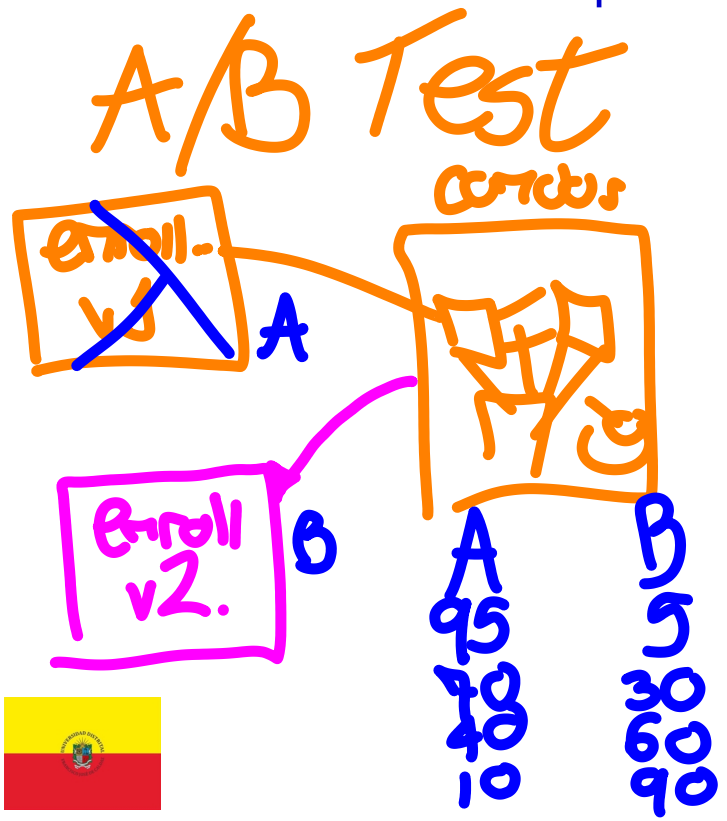
Scalability Guidelines

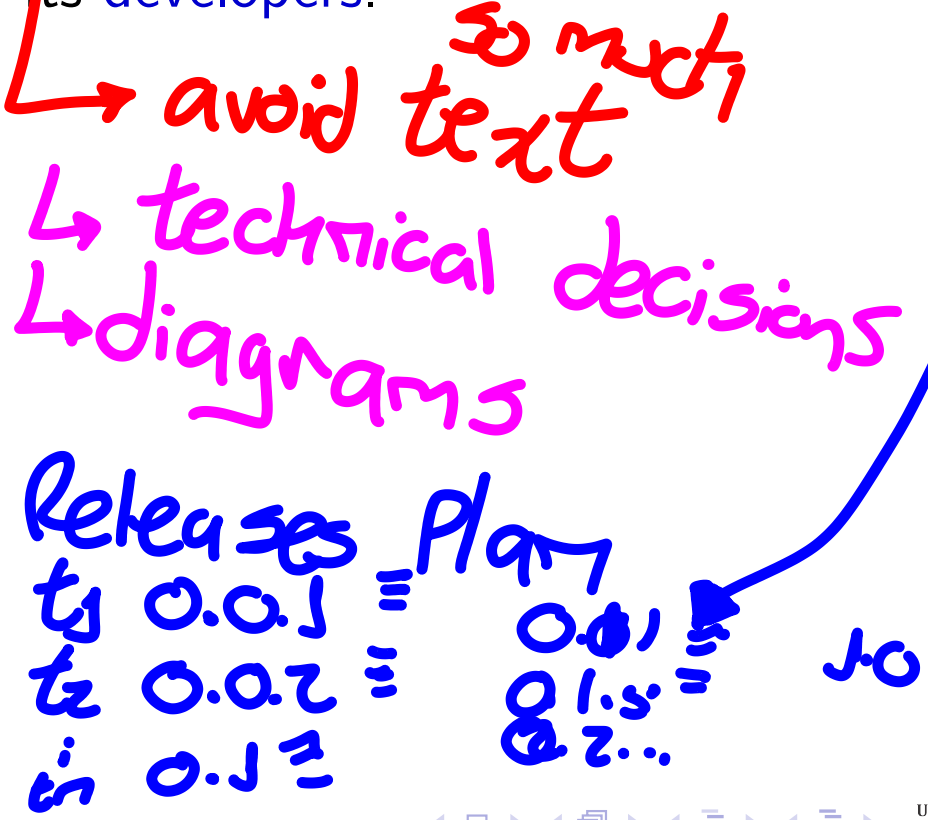
- **Scalability guidelines** are *principles* that *guide* the design of a system to *ensure* that it is scalable and flexible.
- They include modularity, extensibility, and performance guidelines.
- They are *important* for *ensuring* that a system can grow and adapt to changing requirements.



Maintainability Guidelines

- **Maintainability guidelines** are *principles* that *guide* the design of a system to *ensure* that it is easy to maintain and update.
- They include modularity, documentation, and versioning guidelines.
- They are *important* for *ensuring* that a system can be easily maintained and updated by its developers.





Quality Standards

- **Quality standards** are benchmarks that *define* the level of quality that a system must meet.
- They include ISO 9000, CMMI, and Six Sigma standards.

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ISO 9000

- **ISO 9000** is a `quality standard` that *defines* the **requirements** for a quality management system.
- It is *designed* to help organizations `ensure` that they meet the needs of their customers and stakeholders.
- It is *based* on a `number` of `quality management principles`, including customer focus, leadership, and continuous improvement.

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ISO 27001

- **ISO 27001** is a quality standard that *defines* the **requirements** for an information security management system.
- It is *designed* to help organizations protect their information and ensure that it is secure and confidential.
- It is *based* on a number of information security management principles, including risk assessment, security policies, and incident response.

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CMMI

- **CMMI** is a quality standard that *defines* the **requirements** for a mature software development process.
- It is *designed* to help organizations improve their software development processes and deliver high-quality products to their customers.
- It is *based* on a number of best practices for software development, including requirements management, project planning, and process monitoring.

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Six Sigma

- **Six Sigma** is a `quality standard` that *defines* the **requirements** for a process that is *capable* of producing high-quality products.
- It is *designed* to help organizations `improve` their processes and reduce defects in their products and services.
- It is *based* on a `number` of `quality management principles`, including data-driven decision-making, process improvement, and customer focus.

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What is a System Architecture?

- A **system architecture** is the structure of a system that defines its components, interactions, and relationships.
- A **system architecture** is the blueprint of a system that guides its development and implementation.
- A **system architecture** is the foundation of a system that ensures that it meets the needs of its users.

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Types of System Architectures

- There are several types of system architectures that are used in systems development.
- They include monolithic, client-server, peer-to-peer, and distributed architectures.
- Each type of architecture has its own advantages and disadvantages that depend on the specific requirements of the system.

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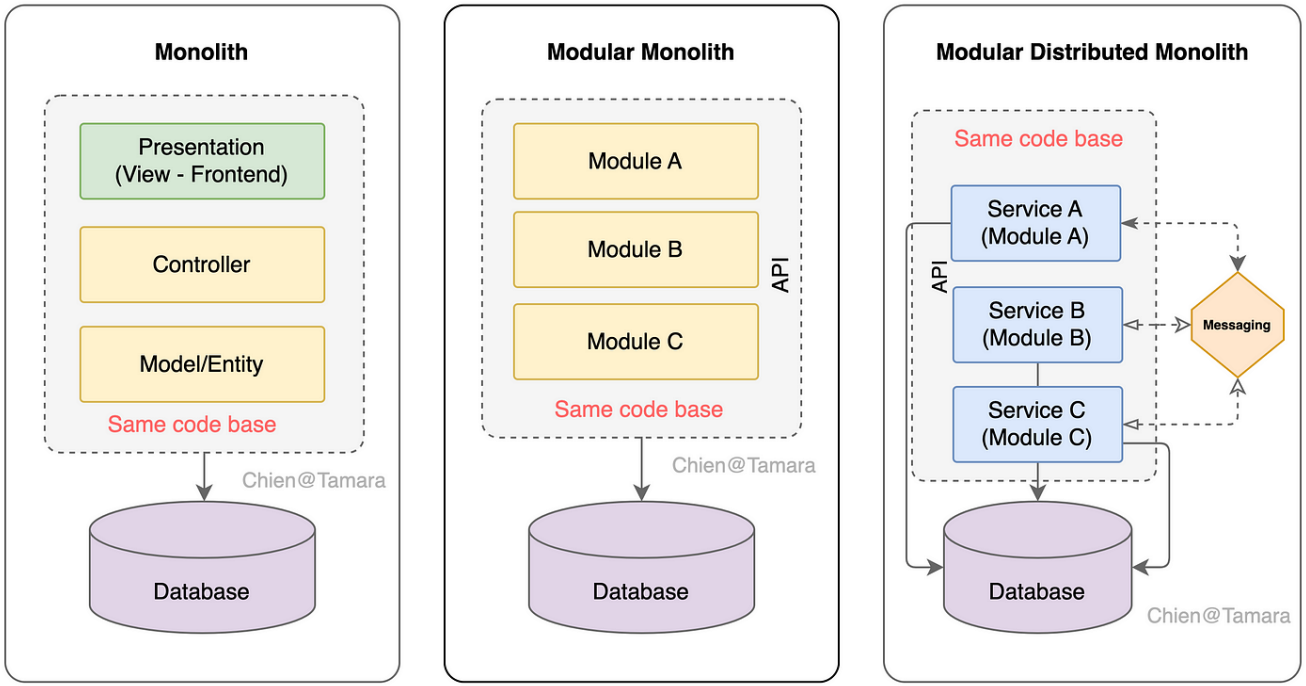
Monolithic System Architecture

- A **monolithic system architecture** is a single-tier architecture that *consists* of a single unit that *performs* all the functions of the system.
- It is simple, easy to develop, and maintain, but it is not scalable and flexible. It is *used* for small systems that do not require high performance or reliability.



Client-Server System Architecture

- A **client-server system architecture** is a two-tier architecture that *consists* of a client and a server that *communicate* with each other over a network.
- It is scalable, flexible, and efficient, but it is *complex* and *difficult* to develop and maintain. It is *used* in medium to large systems that require high performance and reliability.

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Peer-to-Peer System Architecture

- A **peer-to-peer system architecture** is a two-tier architecture that *consists* of a network of peers that *communicate* with each other directly.
- It is scalable, flexible, and efficient, but it is *complex* and *difficult* to develop and maintain. It is *used* in medium to large systems that require high performance and reliability.

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Distributed System Architecture

- A **distributed system architecture** is a multi-tier architecture that *consists* of a network of nodes that *communicate* with each other over a network.
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Thanks!

Questions?

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