

BUSINESS SYSTEMS

Systems Analysis

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2024-I



Outline

- 1 Domain-Driven Design
- 2 Business Systems Analysis
- 3 Software Methodologies
- 4 Requirements Engineering



Outline

1 Domain-Driven Design

2 Business Systems Analysis

3 Software Methodologies

4 Requirements Engineering



Basics of Domain-Driven Design I

- DDD is focusing on the core domain and domain logic, it is a way of thinking aimed at accelerating software projects that have to deal with complicated domains.
- The essential *terms* of DDD are *context, model, ubiquitous language, bounded context, and business logic in layers*.
- DDD is a set of **principles** and patterns that help to design a system ensuring alignment with the real-world **business needs**.



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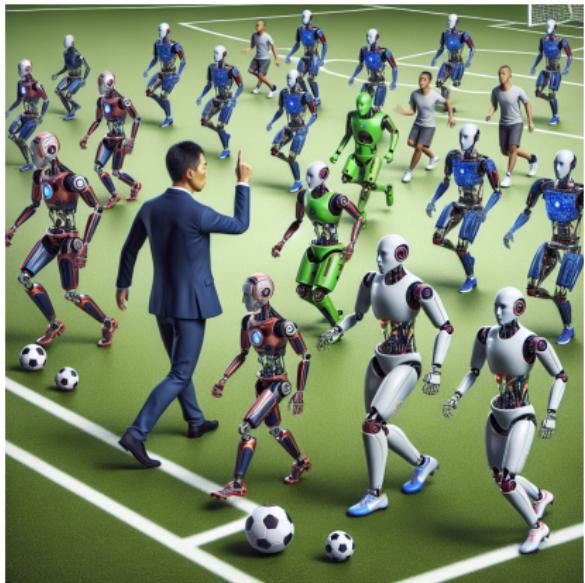


Figure: Prompt: Draw a soccer coach teaching robots soccer players.

Basics of Domain-Driven Design II



Figure: Prompt: Draw a soccer coach teaching robots soccer players.



- The main principles of DDD are:
 - Focus on the core domain.
 - Base complex designs on models of the domain.
 - Constantly collaborate with domain experts.
 - Develop a knowledge-rich model.
- The business logic in layers is showed as follows:

Basics of Domain-Driven Design II



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- time
quality
money
- A red hand-drawn diagram shows a bell curve with the word "time" at the peak. Below the curve, the words "quality" and "money" are written at the ends of the horizontal axis, with arrows pointing towards each other, suggesting a trade-off or balance between them.

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 - process
 - vocabulary
 - hypothesis
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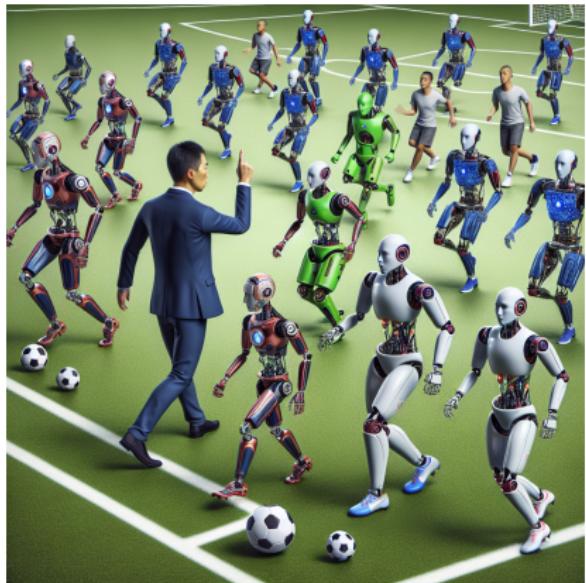
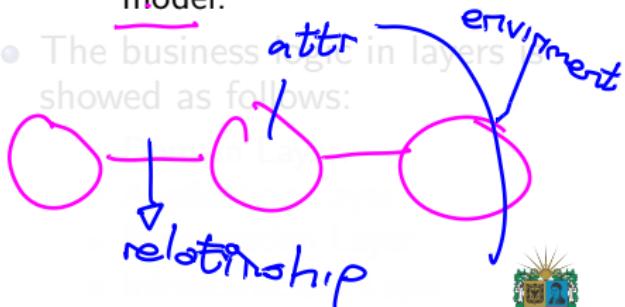


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 - Domain Layer
 - Application Layer.
 - Presentation Layer.
 - Infrastructure Layer.

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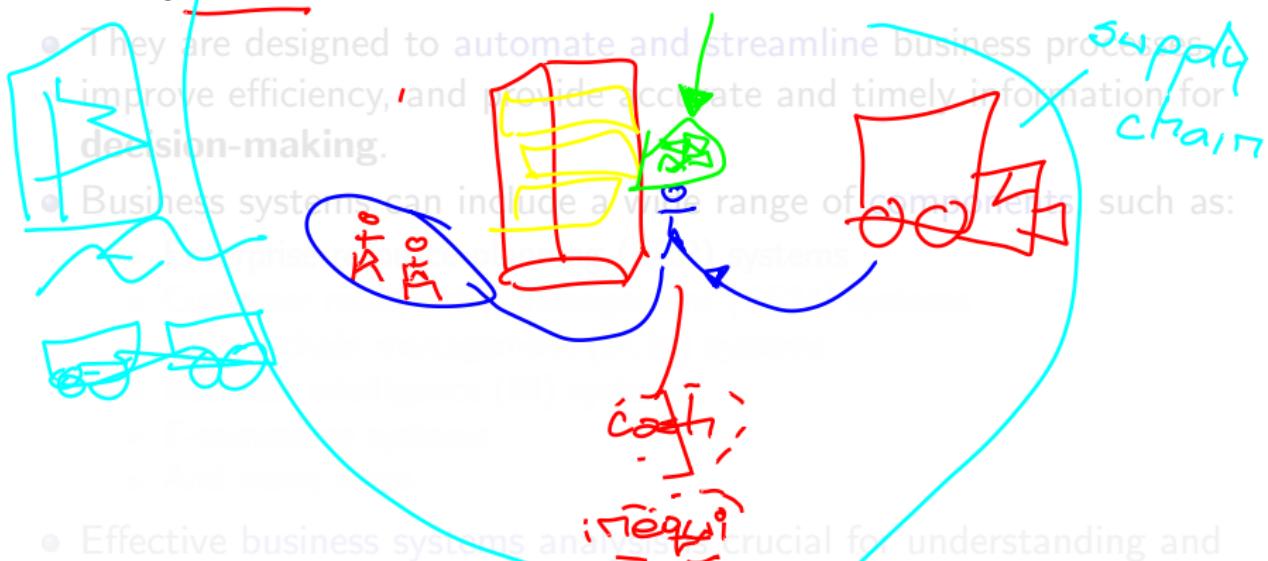
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Business Systems

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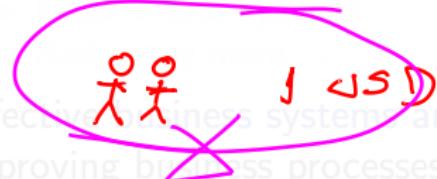
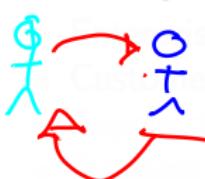


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- They are designed to **automate** and streamline **business processes**, improve efficiency, and provide accurate and timely information for **decision-making**.
- Business systems can include a wide range of components, such as:



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 - And many more...
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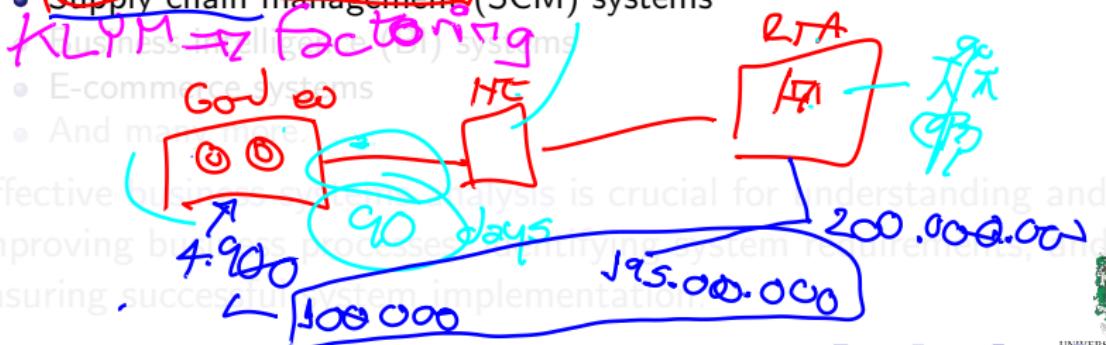
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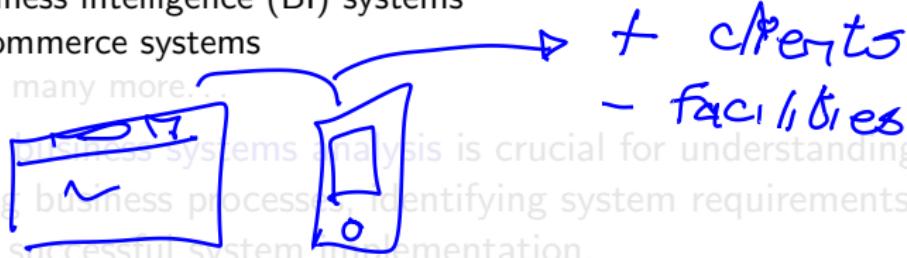
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Business Analysis

- **Business analysis** is the process of identifying business needs and determining **solutions** to **business problems**.
- It involves understanding the **current state** of the business, analyzing requirements, and recommending improvements.
- Business analysts use various **techniques** and **tools** to gather and document requirements, such as interviews, surveys, and workshops.
- The goal of business analysis is to align business objectives with IT solutions and ensure that the resulting **systems meet** the needs of the business.
- Key activities in business analysis include:
 - Gathering requirements
 - Analyzing requirements
 - Designing solutions
 - Implementing solutions
 - Evaluating solutions

user stories



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 - Analyzing and prioritizing requirements
 - Creating business process models and diagrams
 - Defining system requirements and architecture



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- Key activities in business analysis include:
 - Understanding business processes and workflows
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 - Creating business process models and diagrams
 - Collaborating with stakeholders to validate requirements



IT Project Management

Information technologies

- IT Project Management is the process of planning, organizing, and controlling the resources and activities required to complete an IT project.

- It involves defining project goals, creating a project plan, allocating resources, managing risks, and monitoring project progress.

- Key components of IT Project Management include:

- Project initiation and planning
 - Scope definition
 - Resource management

- Common IT Project Management methodologies include:

- Waterfall

- Agile

- Scrum

- PRINCE2



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 - Project monitoring and review
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- A hand-drawn Waterfall diagram illustrating the sequential phases of a project. The phases are: Requirements, Design, Code, Test, and Deployment. A large green bracket on the left groups 'Requirements' and 'Design'. A red arrow points from 'Design' to 'Code'. Another red arrow points from 'Code' to 'Test'. A red 'X' is placed over 'Test'. A red arrow points from 'Test' to 'Deployment'. Above the 'Deployment' phase, the letters '60s' are written in pink. To the right of the diagram is a red circle containing a stylized drawing of a person's head and shoulders.



IT Project Management



Pair Programming

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1997

- Scrum

- Kanban

Agile

Manifesto → J2



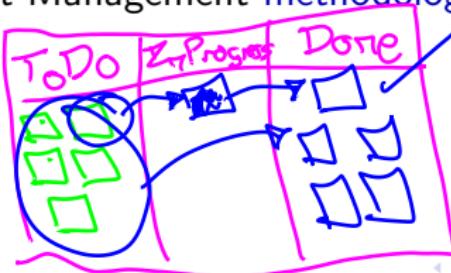
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- 2005 ~ Popular
- Agile + business



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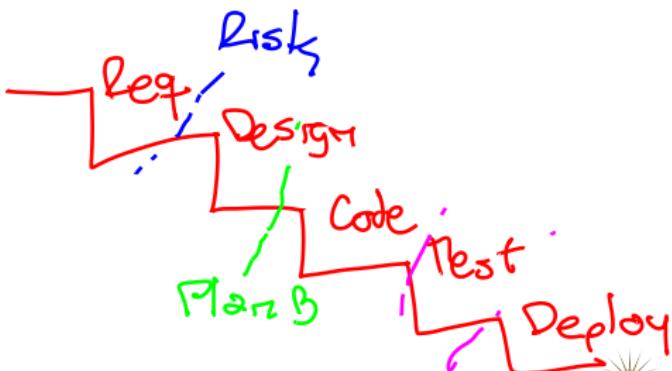
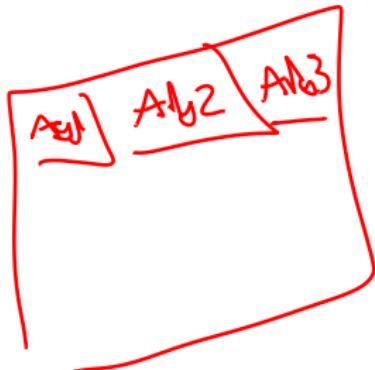
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Software Methodologies

- Methodologies are a **set of steps** to complete tasks or to perform processes.
- They are next level of algorithms, more complex, more detailed.

business →



Traditional Methodologies

- At the beginning, methodologies to solve software problems were **big**, tons of steps, documentation of decisions taken, and looking for a lot of explanations for everything.
- Some problems required *old school methodologies* to be solved. However, there are just a few cases of them.
- Big methodologies required a lot of resources, as humans, knowledge, time and money. Sadly, in real-world, you rarely have all those things to solve problems.

Q.D.P. \Rightarrow IBM \Rightarrow Government

↳ 2-3 years

↳ +5 persons in same project



Agile Methodologies

- Agile methodologies were created and developed for small technology companies unconsciously around thirty years ago.
- Some technology companies are tricky. Start with small teams, with a few of members but with big potential growth.

- The term startups group this kind of companies. If you want to develop a product with small teams and no so much budget, you need to think smart and think fast.
- Agile methodologies focus on final product more than in processes and documentation.
- It means, have a good leadership, a good team culture, a good learning curve, share knowledge, make the client a strong part of the process, and have quickly new versions of the product.



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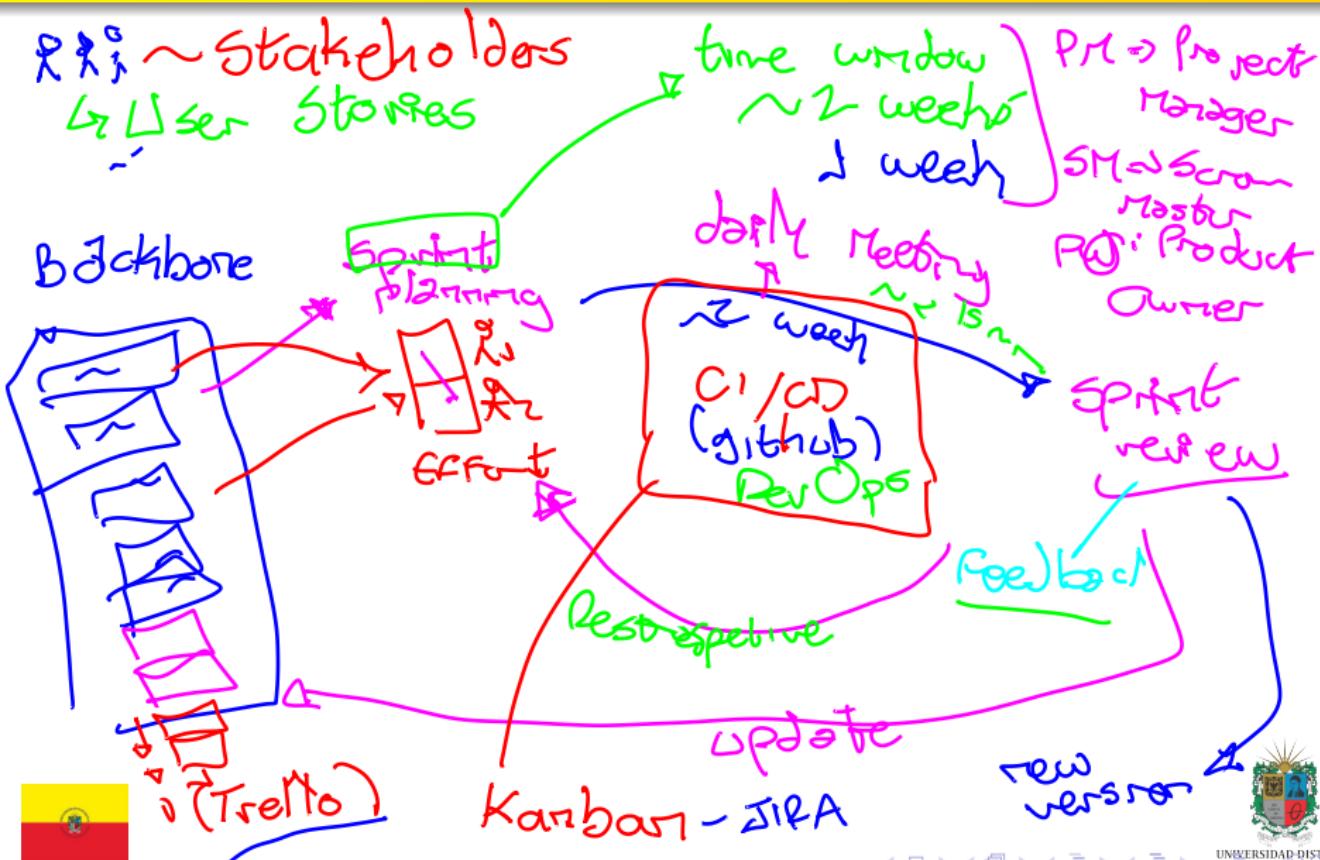


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Study Case: Scrum



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Requirements Engineering I

- Requirements engineering is the process of gathering, documenting, and managing the requirements for a software project.
- It involves understanding the needs of the stakeholders, defining the scope of the project, and creating a shared understanding of the requirements.
- Requirements engineering is critical to the success of a software project, as it helps to ensure that the resulting system meets the needs of the ~~users~~ stakeholders.
- Key activities in requirements engineering include:
 - Make reports ✓



Requirements Engineering I



J60



18

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- Key activities in requirements engineering include:
 - Eliciting requirements from stakeholders
 - Analyzing and documenting requirements
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 - Managing changes to requirements



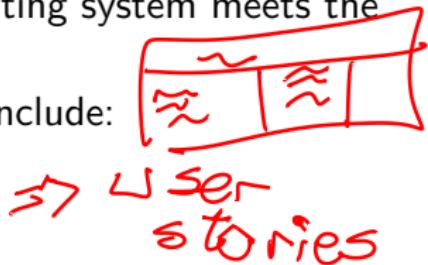
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Team ~ left

Requirements Engineering II

- Requirements engineering is the set of **processes and tools** to gather a project requirements in the best possible way.
- It is normal the clients do not know what they want. They are confused, or with **wrong expectations**, even with **bad understanding** of the problem.
- Gather right information means make the right questions. At the same time, it is important to understand **business domain**, define business rules, and create the right shared vocabulary.
- Always be honest, understand client's expectations, and define processes align with those **expectations**.
- Effective requirements engineering requires good communication with stakeholders, a clear understanding of the business domain, and the ability to translate business needs into technical requirements.



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- It is normal the **clients do not know what they want**. They are confused, or with **wrong expectations**, even with **bad understanding** of the problem.
- Gather right information means make the right questions. At the same time, it is important to understand business domain, define business rules, and create the right shared vocabulary.
- Always be **honest**, understand client's expectations, and define processes align with those **expectations**.
- Effective requirements engineering requires good communication with stakeholders, a clear understanding of the business domain, and the ability to translate business needs into technical requirements.



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Requirements Engineering III



- The classical theory talks about **two kind** of requirements: functional and non-functional. However, they are described in a very technical way.
- There are strategies to get information for clients: interviews, brainstorms, analysis current client process documentation. All depends of the nature of the problem, and the impact of that on the organization.
Performance quality
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Requirements Engineering III

Theory of Games



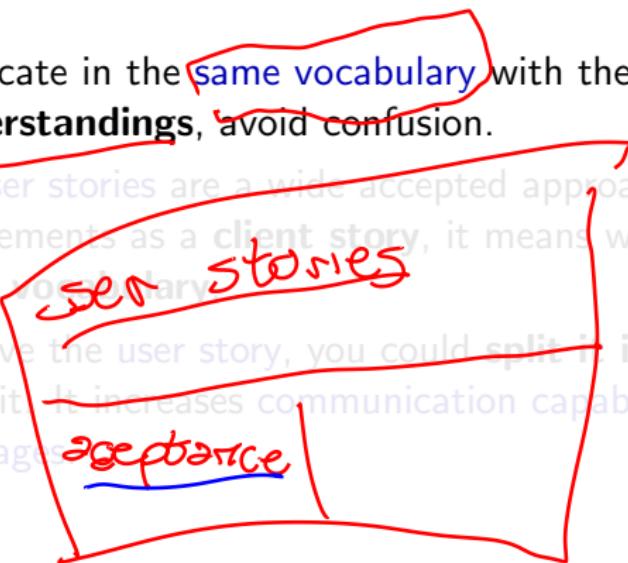
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User Stories

- To communicate in the **same vocabulary** with the client **decreases** the **misunderstandings**, avoid confusion.
- Nowadays user stories are a wide accepted approach, a the idea is to define requirements as a client story, it means write the requirement in the **client vocabulary**.
- Once you have the user story, you could split it into technical tasks to complete it. It increases communication capabilities, and better validation stages.



User Stories

clients

As role, I want -----, so what ---

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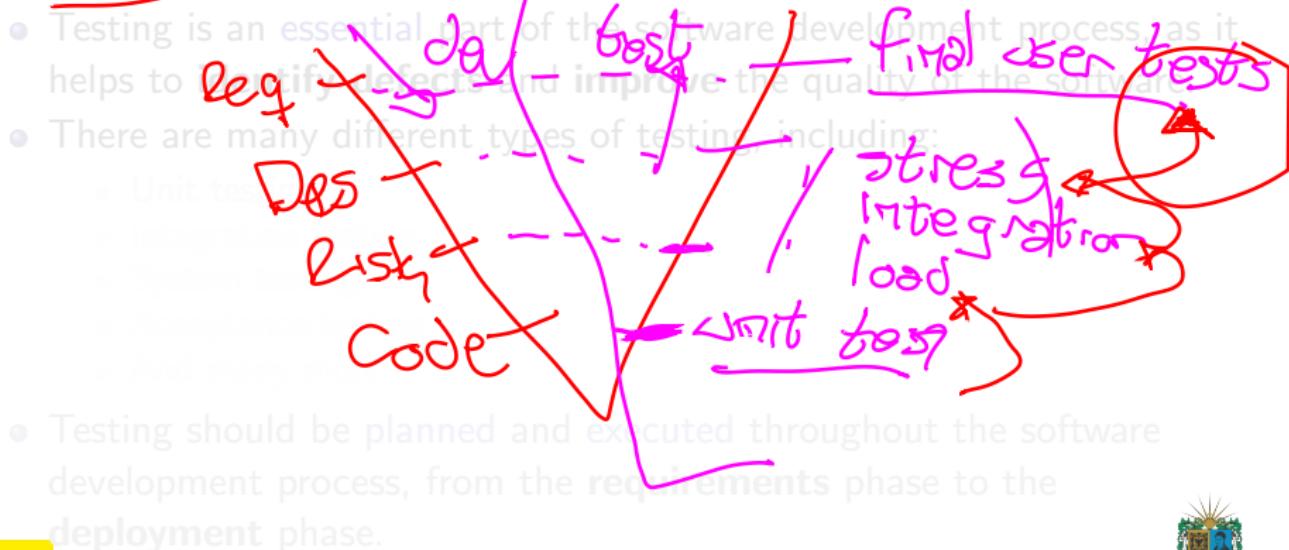
Project Owner \Rightarrow Scrum
 ↳ tech lead - project manager

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Testing and Requirements Validation

- Testing is the process of **evaluating** a system or application to **ensure** that it meets the **requirements** and **expectations** of the stakeholders.



Testing and Requirements Validation

M2 VJ

M30 V JG0

M2Q VSCG
edge case

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- Testing is an **essential** part of the software development process, as it helps to **identify defects** and **improve** the quality of the software.
- Unit test \Leftrightarrow For 1 J \Rightarrow Imps \Rightarrow Out J
1. 0 \Rightarrow Error
2. 78 \Rightarrow 2.8
S. J \Rightarrow Error
- X \Rightarrow test case

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Grt

web services ↗ flower
subsystems ↗ flower



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Stress → JMeter

Load → JMeter

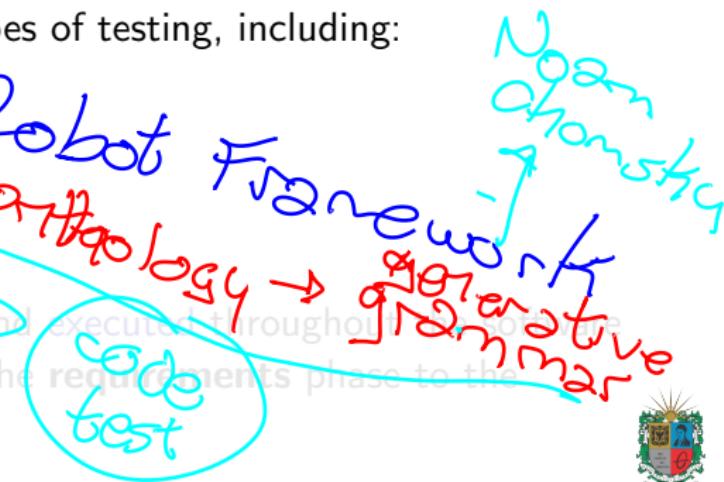
Performance → JMeter

JMeter rows



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Outline

- 1 Domain-Driven Design
- 2 Business Systems Analysis
- 3 Software Methodologies
- 4 Requirements Engineering



Thanks!

Questions?



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

