

UML AND CLASS DIAGRAMS

Advanced Programming

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Outline

1 Unified Modeling Language (UML)

2 UML Diagrams

3 UML Class Diagrams



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Basics of UML



Figure: Prompt: Draw a software architect drawing some software designs.



- The Unified Modeling Language (UML) is a general-purpose, developmental, modeling language in the field of software engineering, that is intended to provide a standard way to visualize the design of a system.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.
independent of programming language



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- The **UML** represents a **collection of best engineering practices** that have proven **successful** in the modeling of **large and complex systems**.

Importance of UML

- The UML is a standard language for specifying, visualizing, constructing, and documenting the artifacts of software systems.
- It is a powerful and flexible graphical language that is used to model systems in an object-oriented way.



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List of UML Diagrams

- UML has **14 types** of diagrams, which can be divided into two categories:
 - **Structural Diagrams:** These diagrams represent the **static** aspects of the system. Here are some examples: **Class Diagram**, **Object Diagram**, **Component Diagram**, **Deployment Diagram**, among others.
 - **Behavioral Diagrams:** These diagrams represent the **dynamic** aspects of the system. Here are some examples: **Activity Diagram**, **Sequence Diagram**, **State Diagram**, among others.

Code → General Definitions

Production *YAML*
DevOps



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Objects

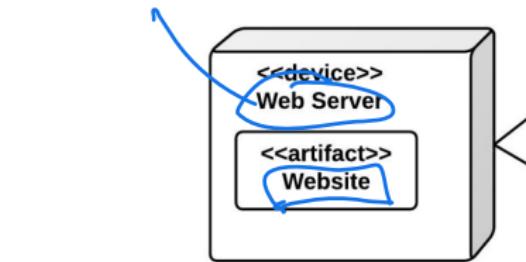
classes
communication



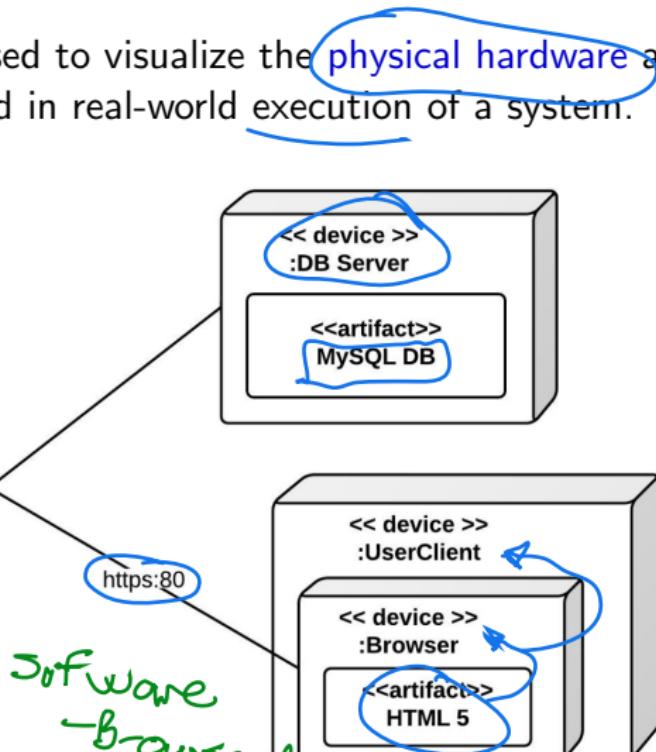
UML Deployment Diagrams I

Deployment diagrams are used to visualize the physical hardware and software expected to be used in real-world execution of a system.

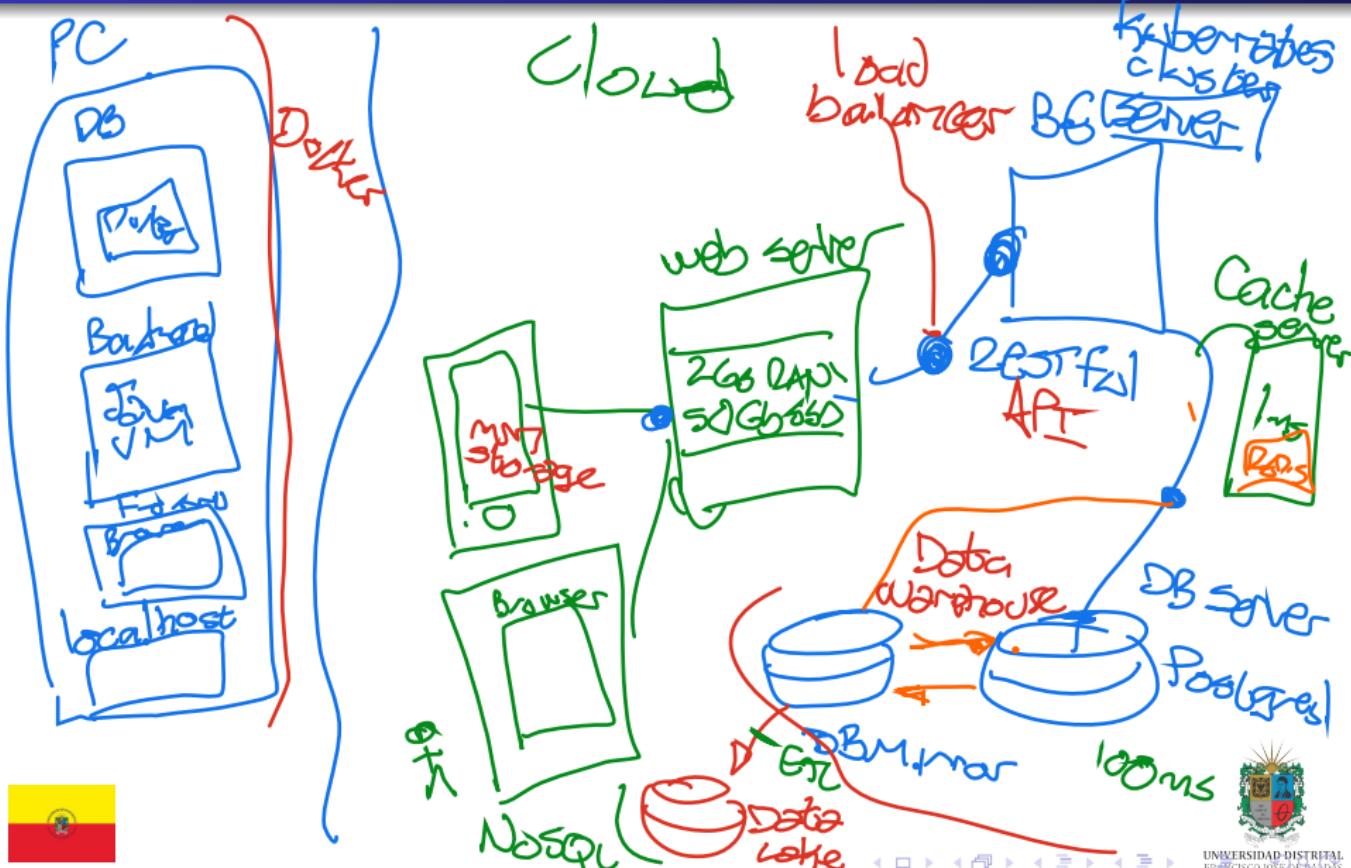
On-premises
cloud



Physical
2 servers
↓ client
Internet



UML Deployment Diagrams II 



UML Activity Diagrams I \Rightarrow Ads

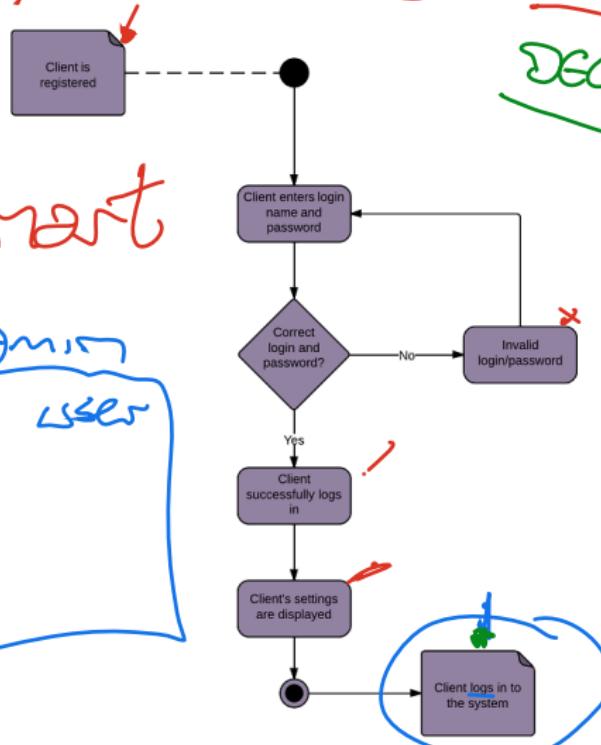
Activity diagrams are used to model **workflow** and **business processes**.

Meli \Rightarrow FB
API \Rightarrow \$

flowchart

logs - GUI Admin

database action user

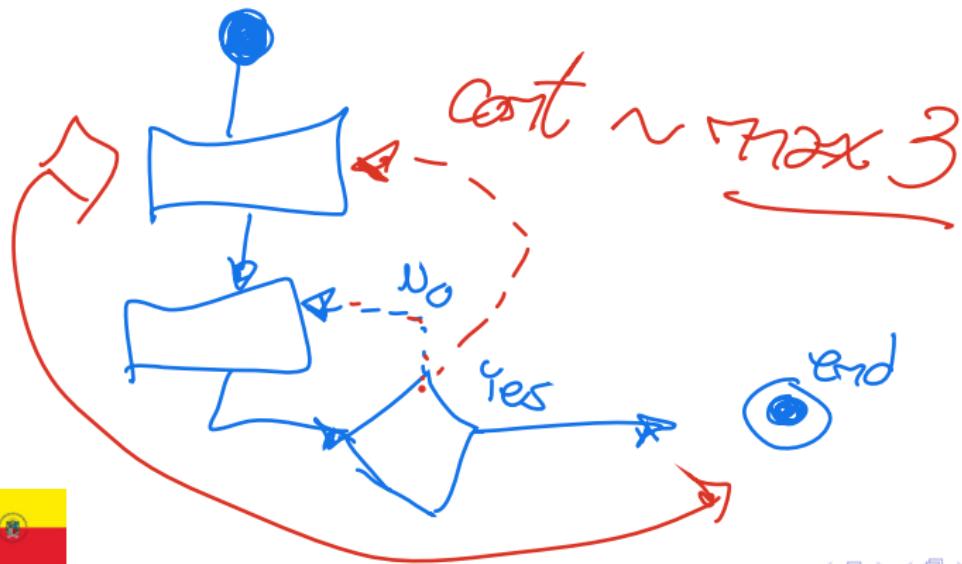
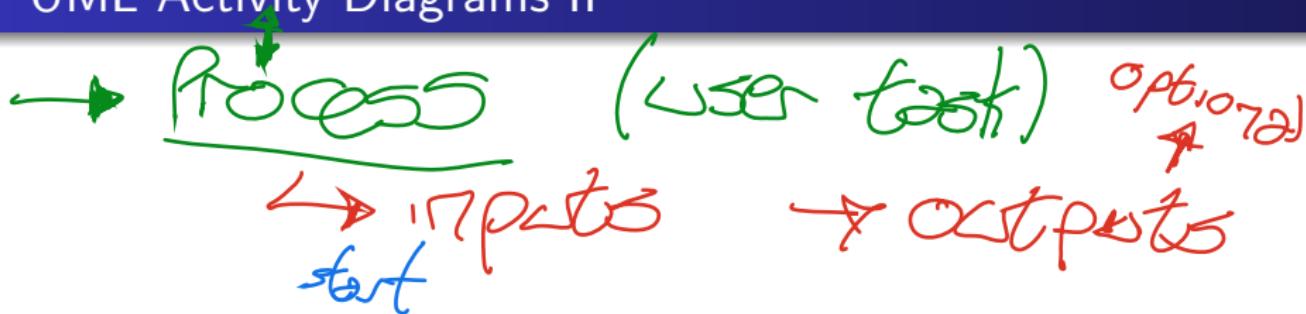


DELETE sin WHERE

DB Trigger log

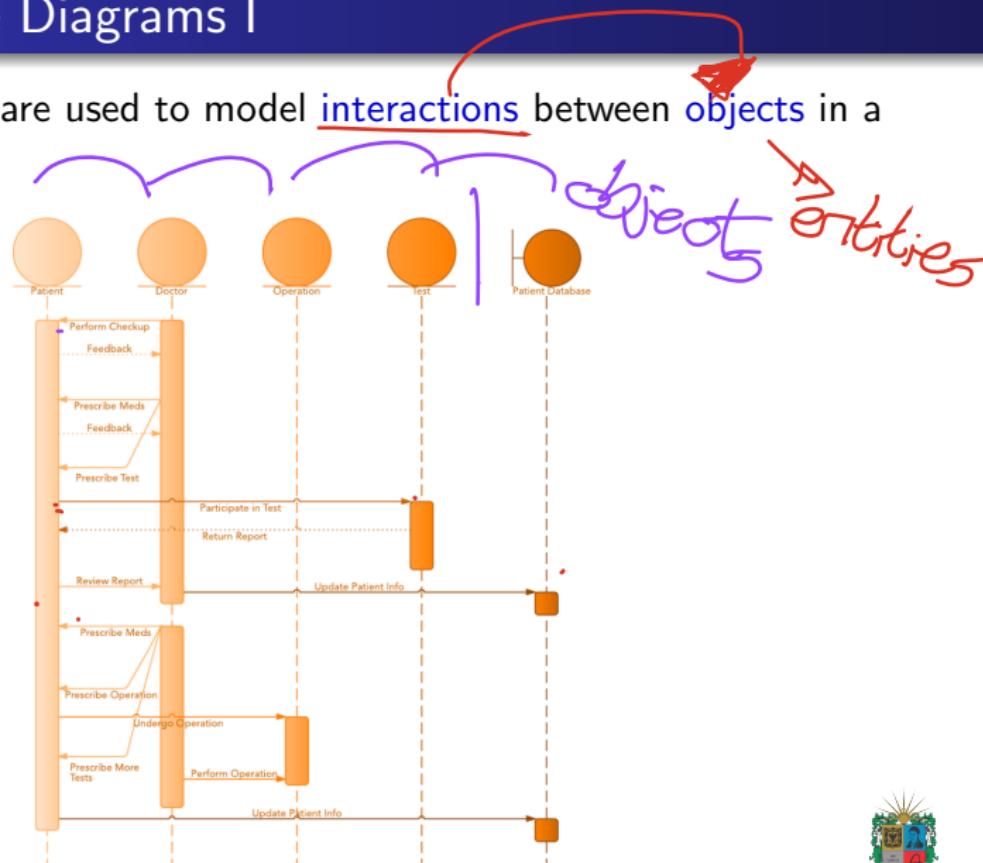


UML Activity Diagrams II



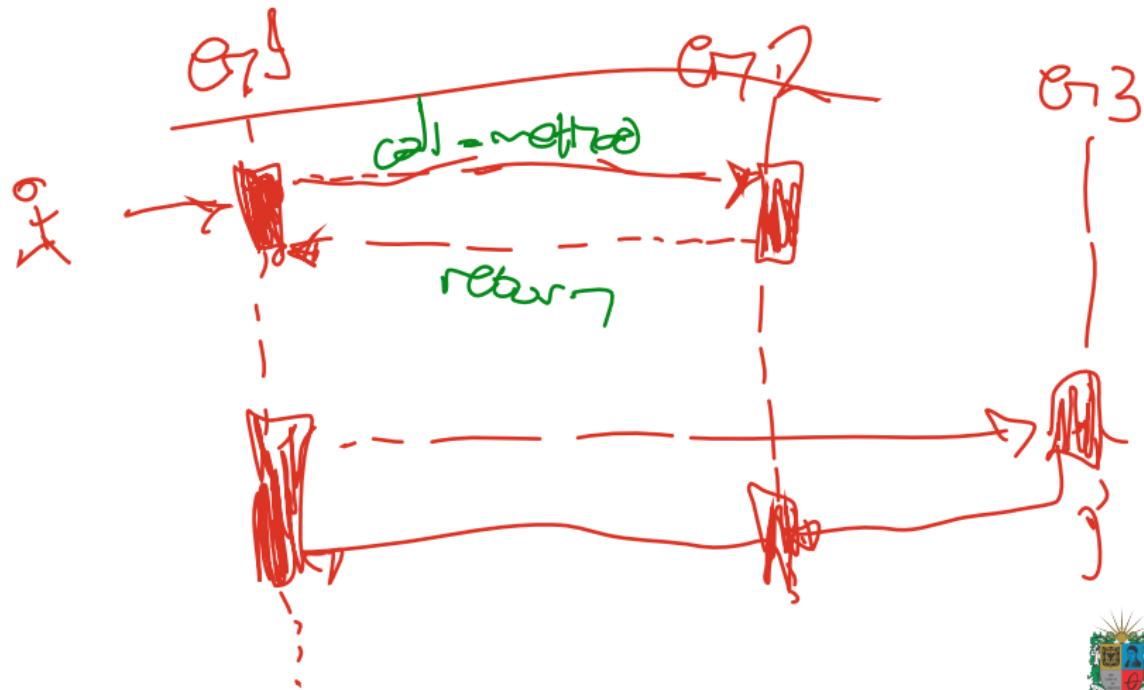
UML Sequence Diagrams I

Sequence diagrams are used to model interactions between objects in a system.



UML Sequence Diagrams II

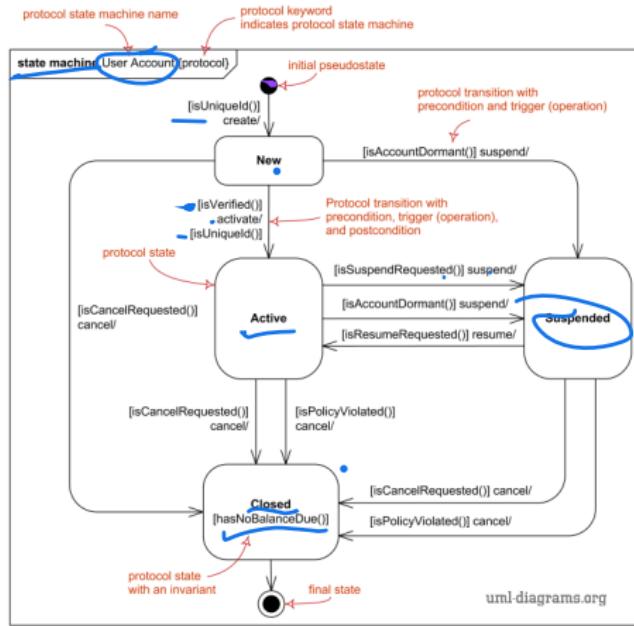
→ objects → relations



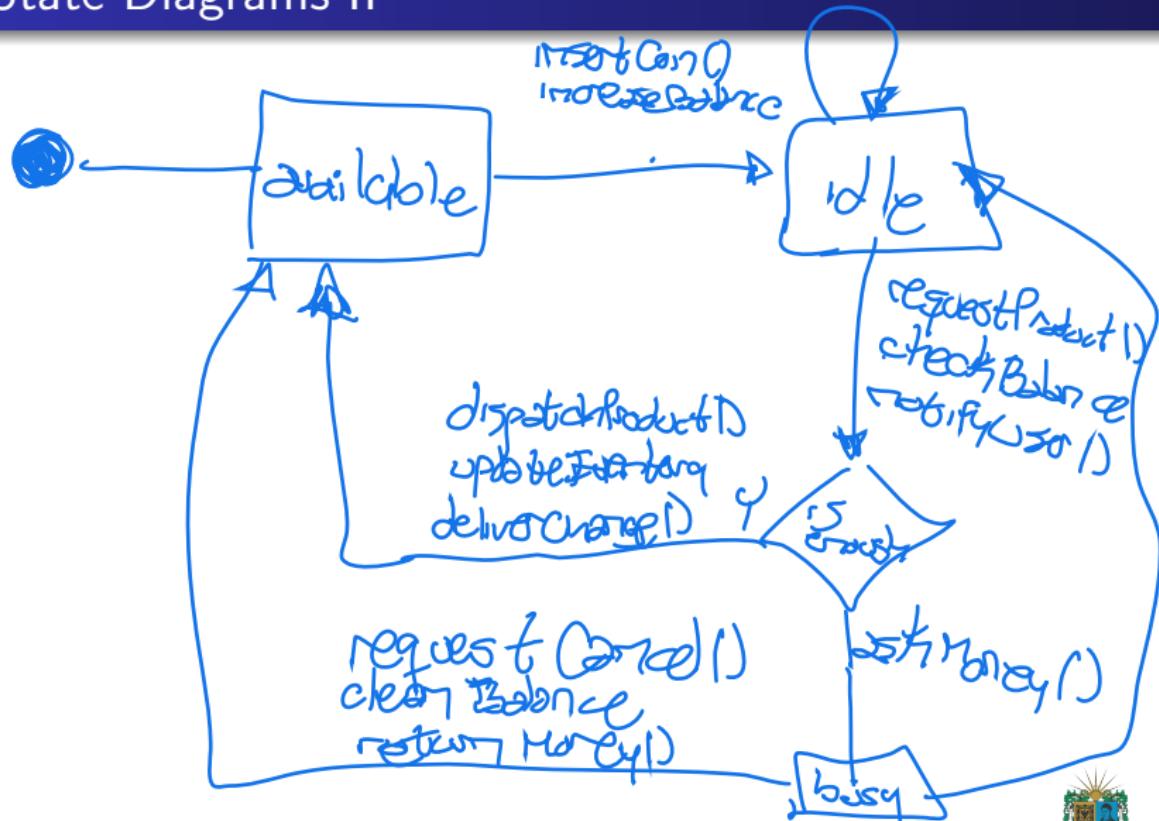
UML State Diagrams I

irr fó → atributos

State diagrams are used to model the **dynamic behavior** of an object in a system.

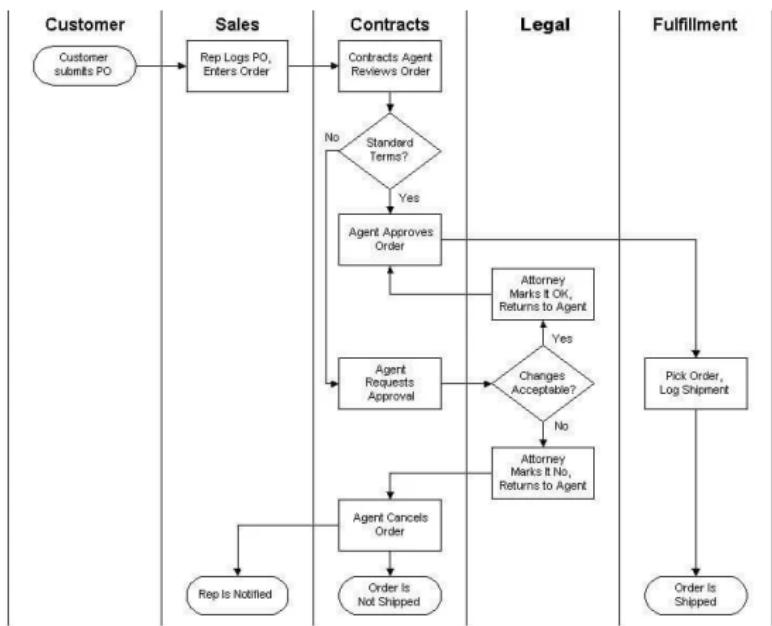


UML State Diagrams II

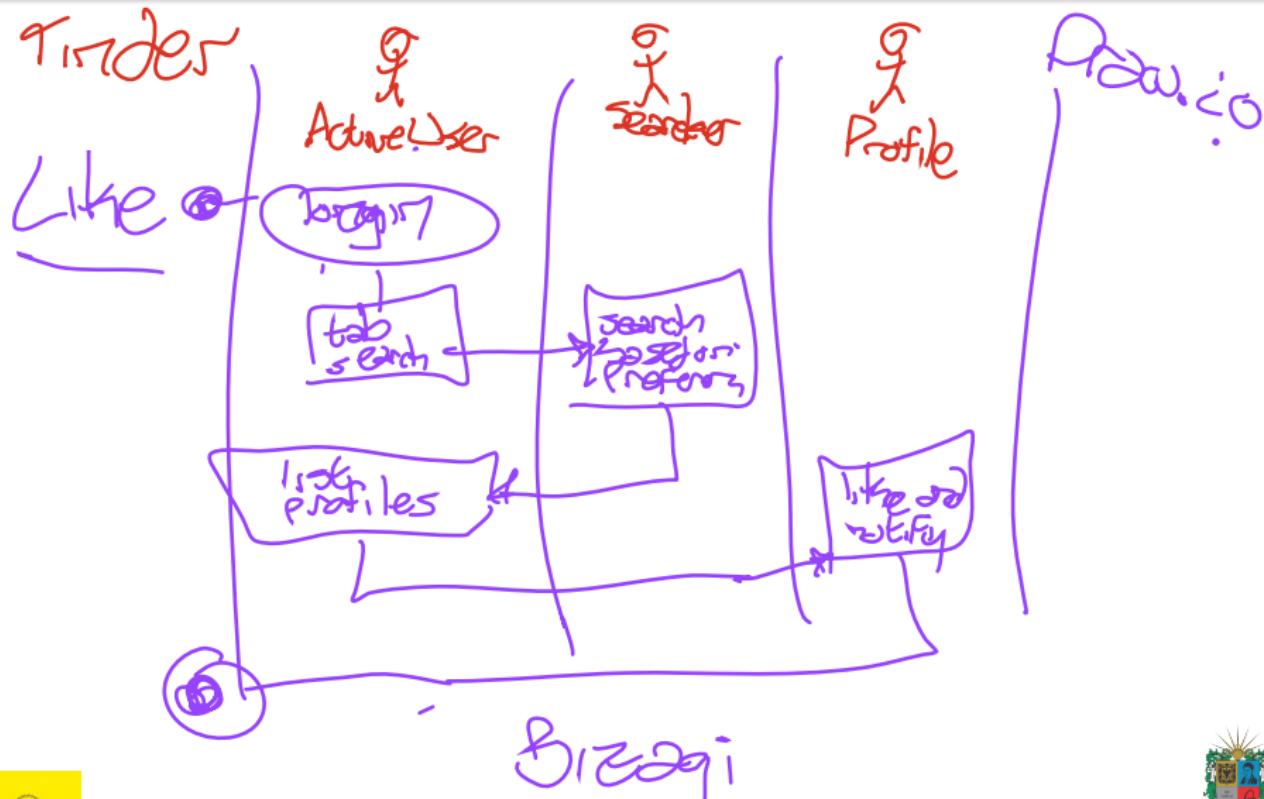


Business Process Diagrams I

Business process diagrams are used to model the workflow and business processes of an organization.



Business Process Diagrams II



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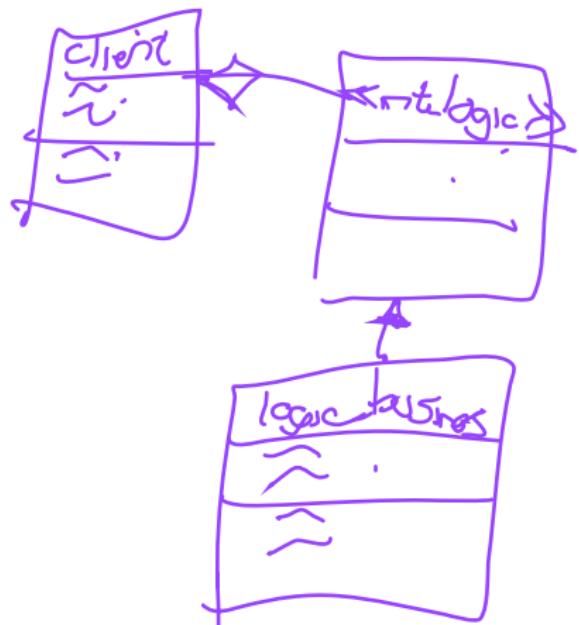
Basic Concepts of UML Class Diagrams

- A **class diagram** is a type of static structure diagram that describes the structure of a system by showing the system's **classes**, their **attributes**, **operations**, and the **relationships** among the classes.
- A **class diagram** is a collection of **classes** and **interfaces** that are used to model the objects in a system.

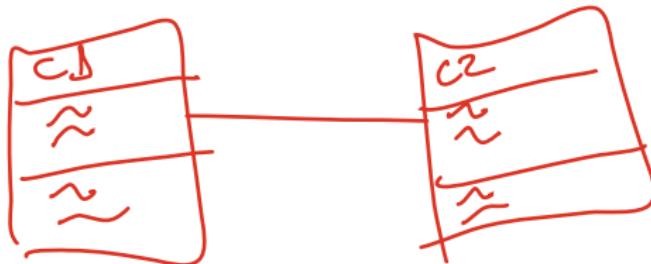


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Types of Objects Relations



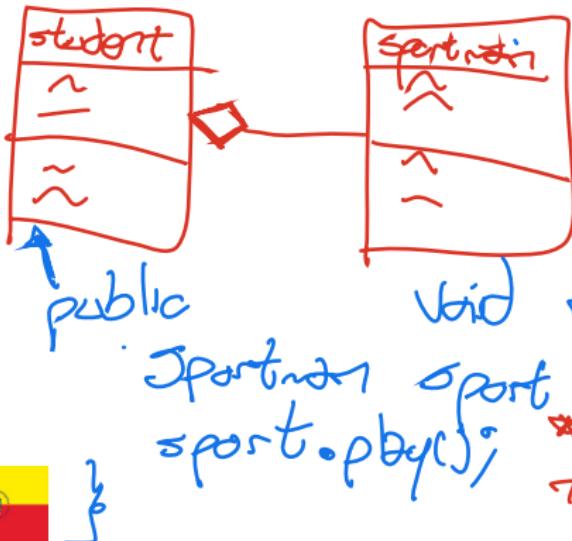
- **Association:** A **relationship** between two classes that is used to represent a **connection** between the classes.
- **Aggregation:** A **relationship** between two classes that is used to represent a **part-whole** relationship between the classes.
- **Composition:** A **relationship** between two classes that is used to represent a **stronger part-whole** relationship between the classes.



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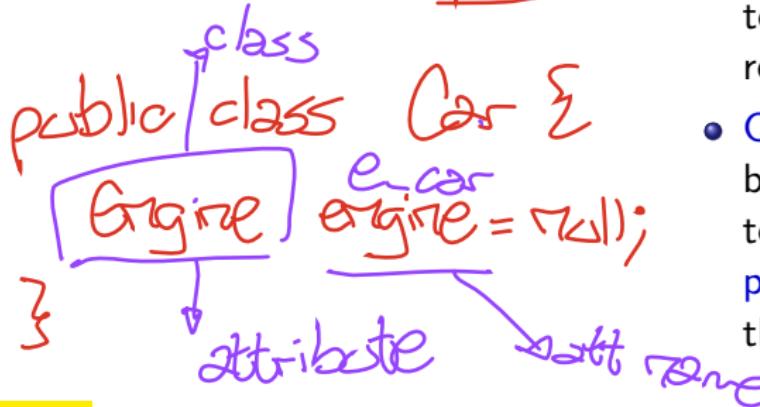
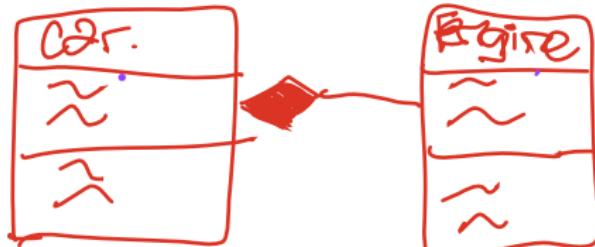
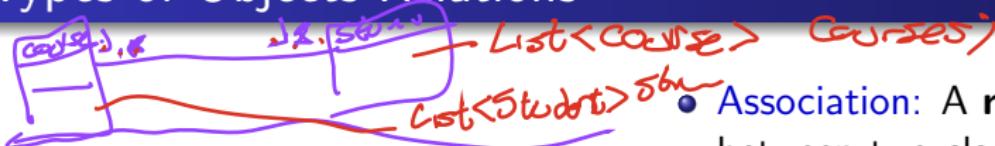
HEAP_SIZE



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- Composition: A **relationship** between two classes that is used to represent a stronger part-whole relationship between the classes.



Types of Objects Relations



Good practices in UML Class Diagrams

- Use singular nouns for class names.
- Use Camel Case for class names.
- Use singular nouns for attributes.
- Use some case for attributes.
- Use verbs for operations as methods.
- Use some cases for operations.

studentbox student
 myVariable CamelCase
 myNewVariable

student | List<St> students;

depends on programming language

stroke
Python

myVariable
myNewVariable



Class Diagram Example

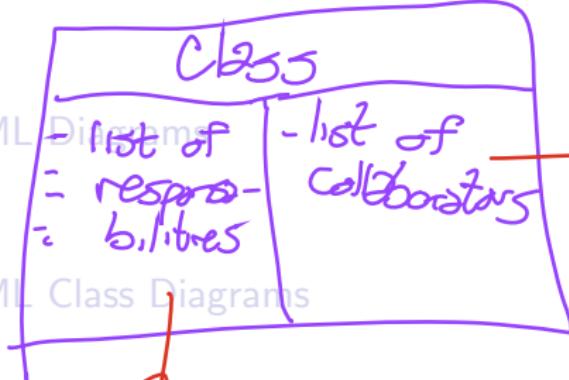


Outline

CRC

- Class - Responsibility - Collaborators

① Unified Modeling Language (UML)



② UML Diagrams

another classes with clear relationship

③ UML Class Diagrams

if so big maybe it is better to split the class



Thanks!

Questions?



Repo:

 github.com/engandres/ud-public/courses/advanced-programming

