

UML AND CLASS DIAGRAMS

Advanced Programming I

Author: Eng. Carlos Andrés Sierra, M.Sc.
carlos.andres.sierra.v@gmail.com

Computer Engineer
Lecturer
Universidad Distrital Francisco José de Caldas

2024-I



Outline

1 Unified Modeling Language (UML)

2 UML Diagrams

3 UML Class Diagrams



Outline

1 Unified Modeling Language (UML)

2 UML Diagrams

3 UML Class Diagrams



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.



Basics of UML



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



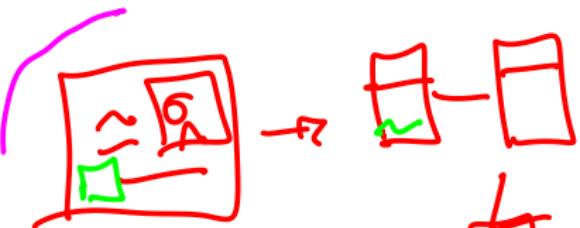
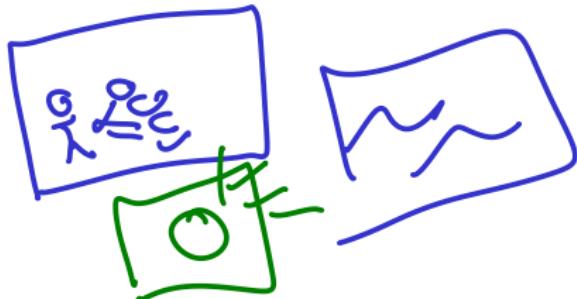
- The **Unified Modeling Language (UML)** is a **general-purpose, developmental, modeling language** in the field of **software engineering**, that is intended to provide a **standard way** to visualize the **design** of a system.
- The UML represents a **collection of best engineering practices** that have proven successful in the modeling of large and complex systems.



Importance of UML

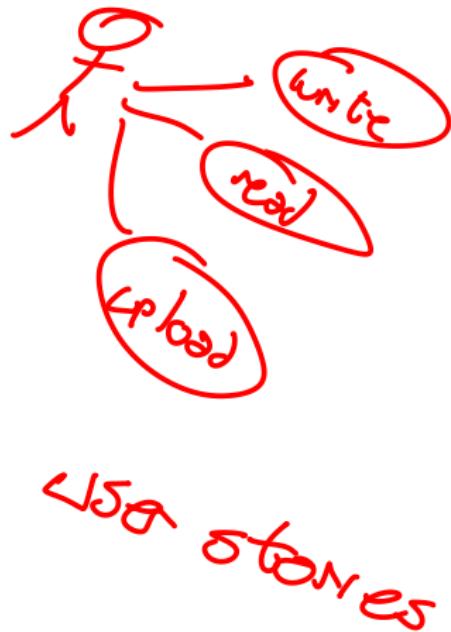
- The UML is a ~~standard language for specifying, visualizing, constructing, and documenting the artifacts of software systems.~~

- It is a ~~powerful and flexible language that is used to model systems in an object-oriented~~
startups



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** language that is used to **model** systems in an **object-oriented** way.



Outline

1 Unified Modeling Language (UML)

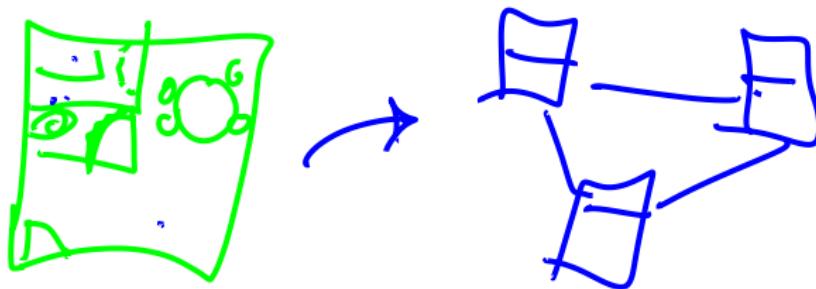
2 UML Diagrams

3 UML Class Diagrams



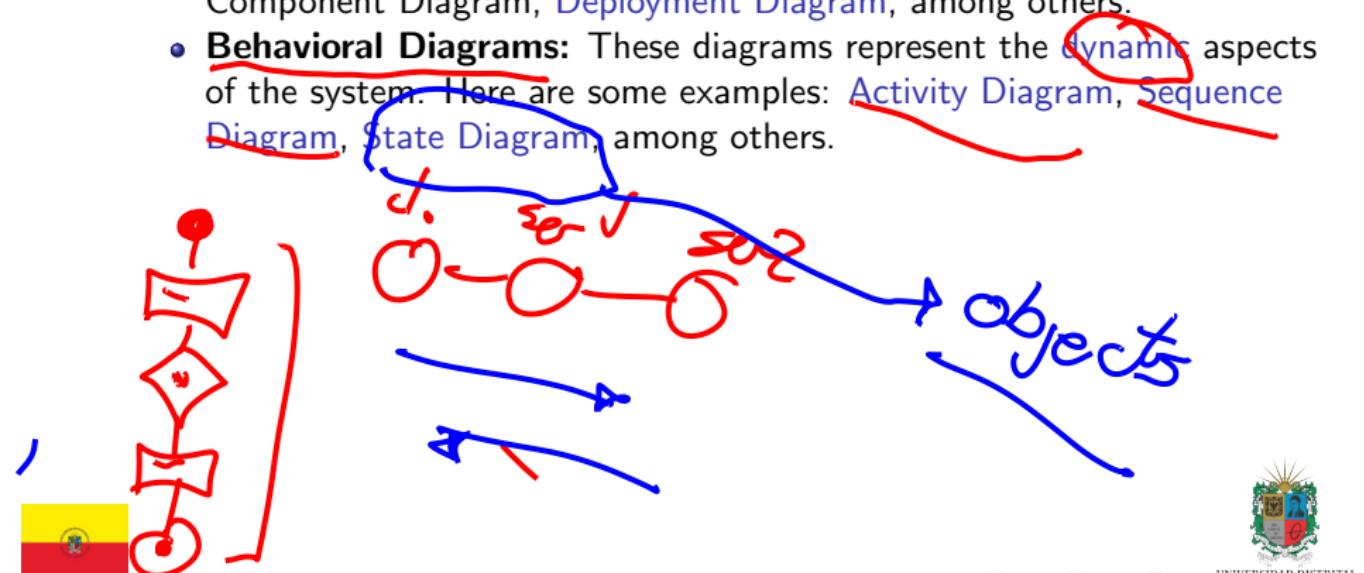
List of UML Diagrams

- 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.



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.



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.

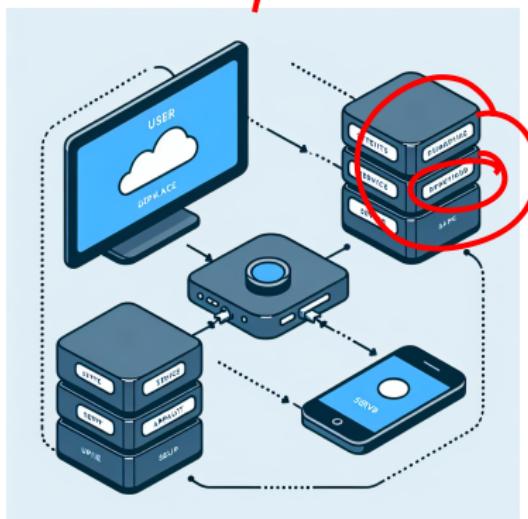
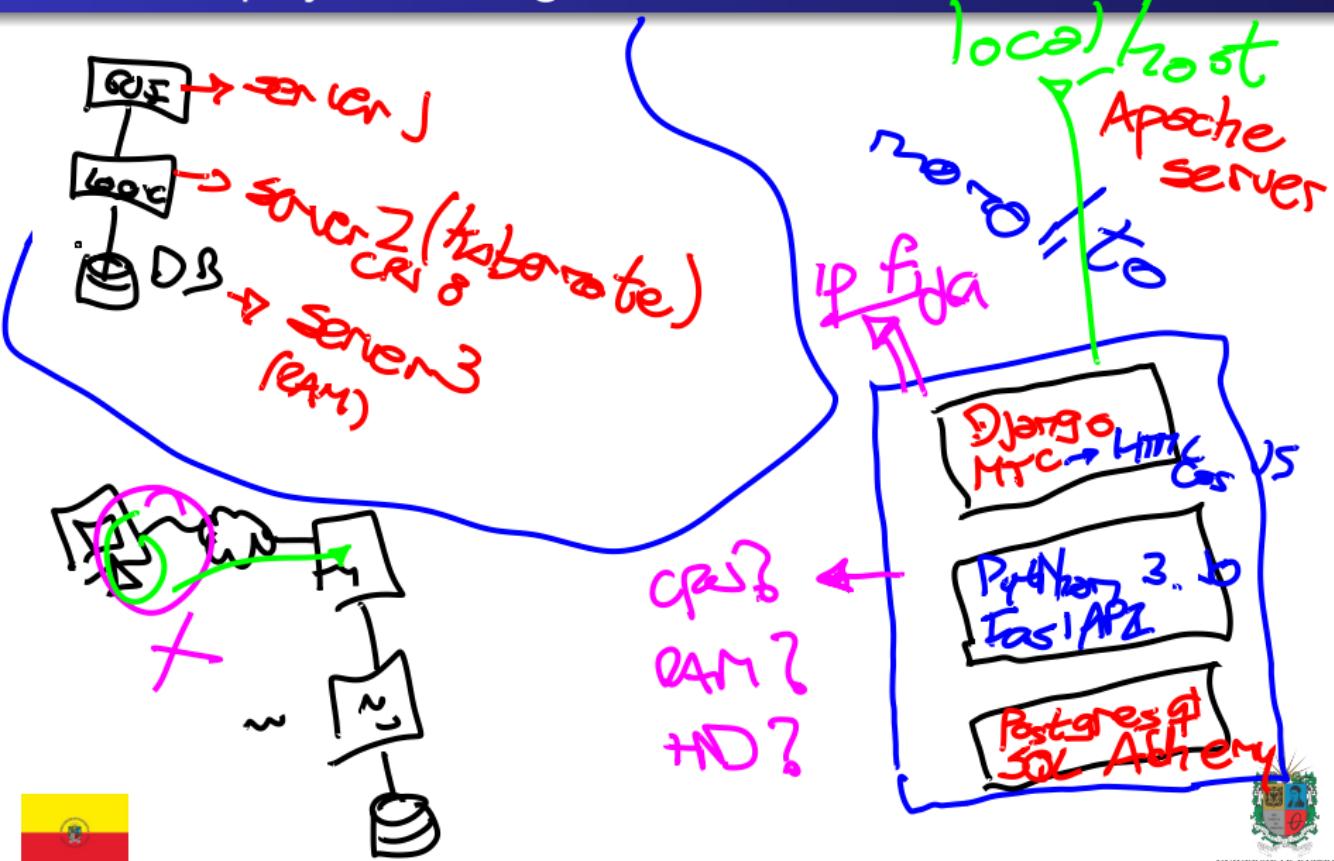


Figure: Prompt: Draw an UML deployment diagram for a simple system.



UML Deployment Diagrams II



UML Activity Diagrams I

Activity diagrams are used to model workflow and business processes.

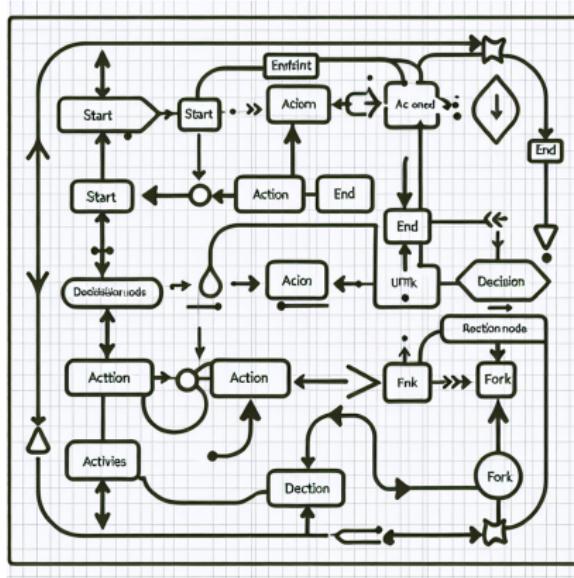
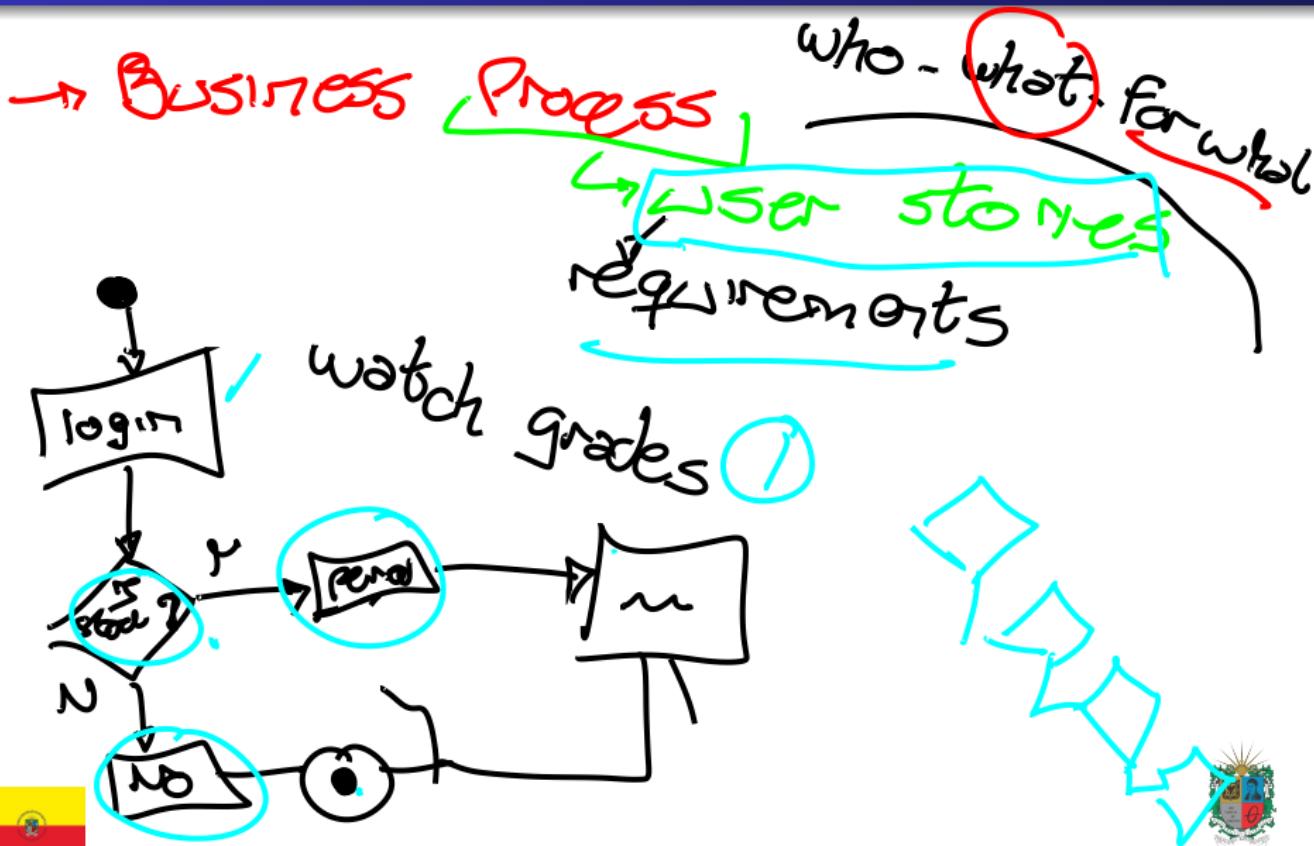


Figure: Prompt: Draw an UML activity diagram for a simple process.



UML Activity Diagrams II



UML Sequence Diagrams I

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

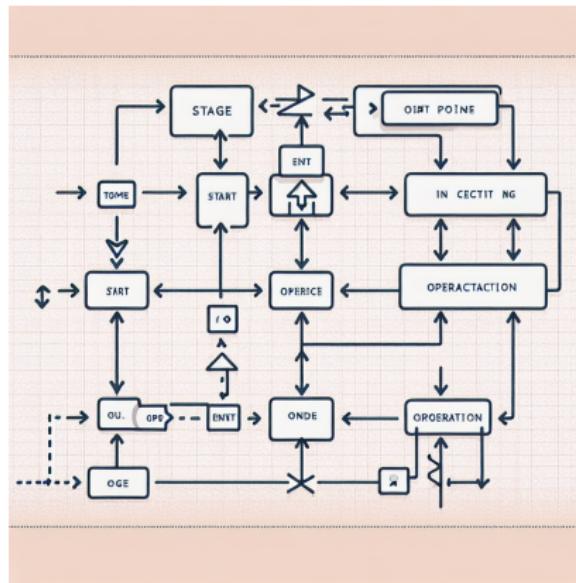
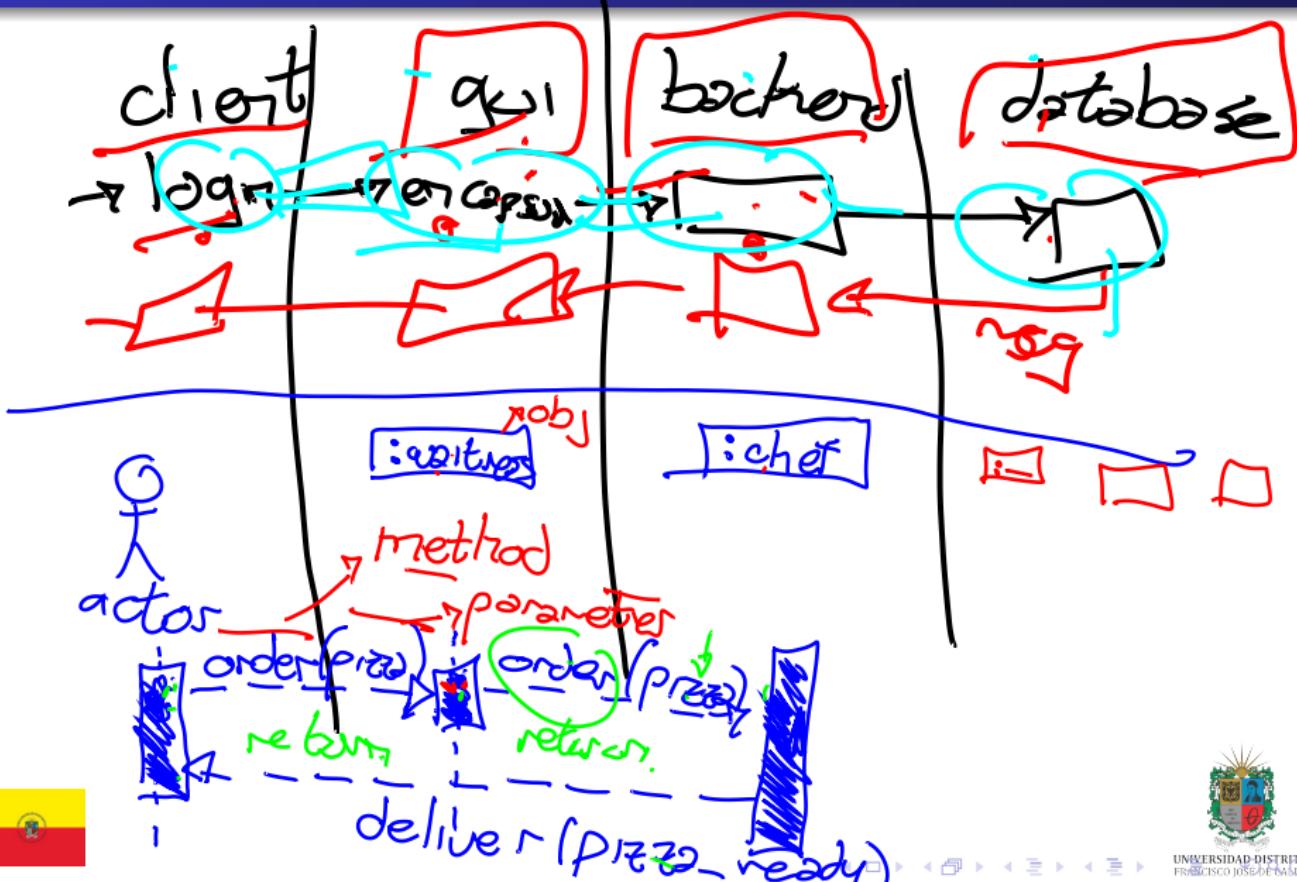


Figure: Prompt: Draw an UML sequence diagram for a simple system.



UML Sequence Diagrams II



UML State Diagrams I

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

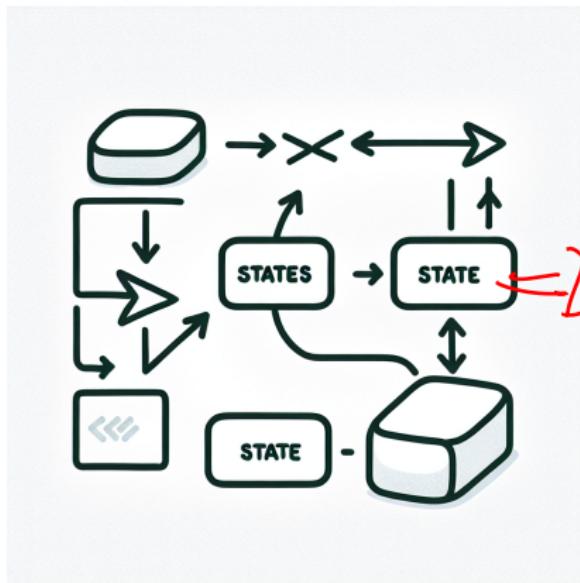
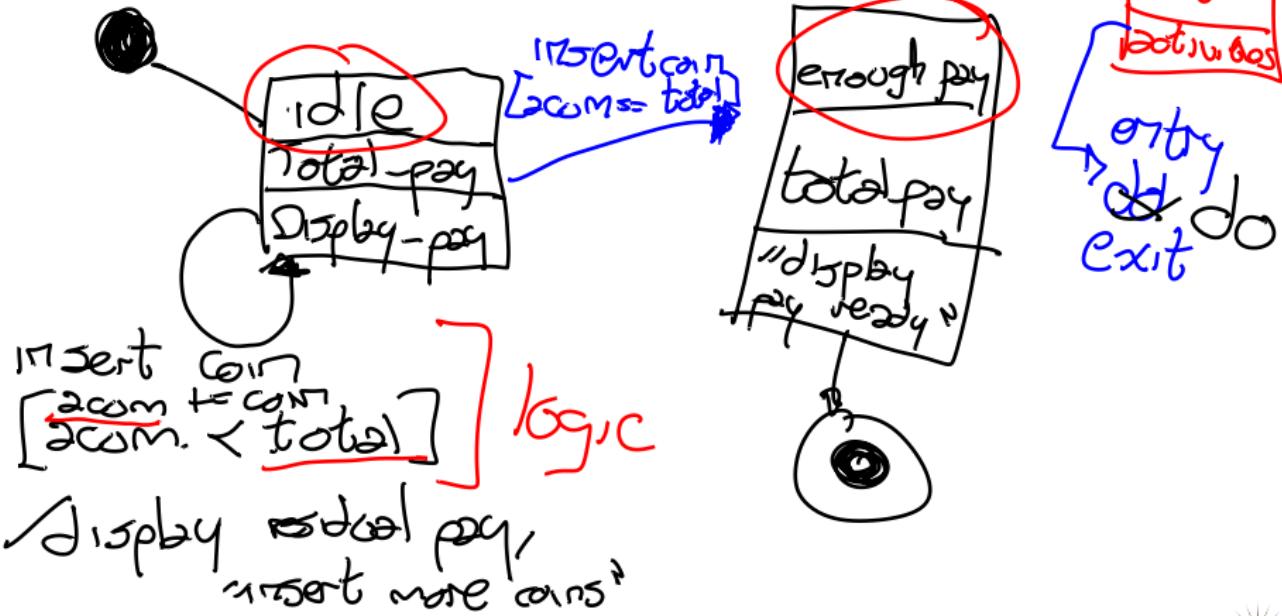


Figure: Prompt: Draw an UML state diagram for a simple system.



UML State Diagrams II

Object: food dispenser machine



Business Process Diagrams I

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

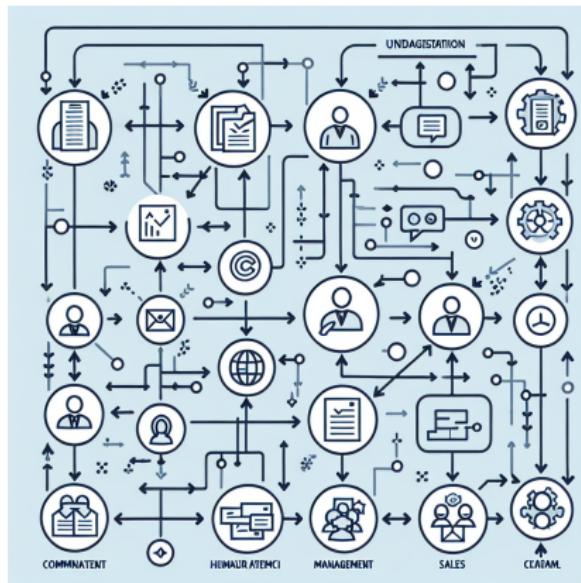
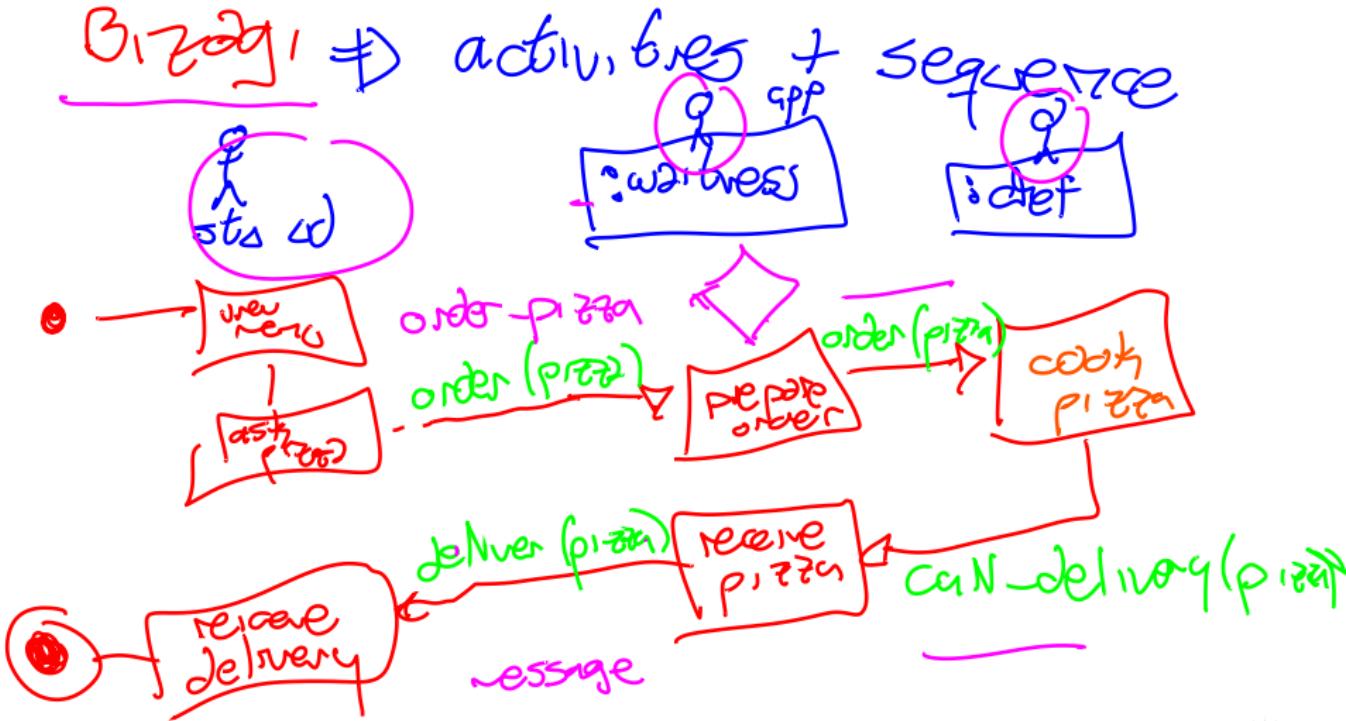


Figure: Prompt: Draw a business process diagram for a simple organization

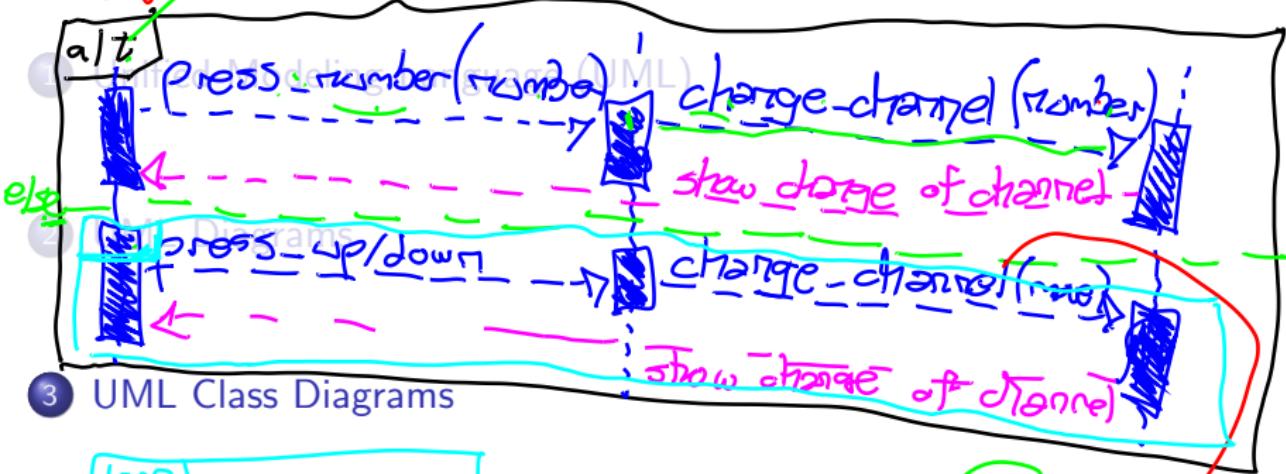


Business Process Diagrams II



Outline

View
Sequence II : Controller
User alternative : Remote : Television
Mode



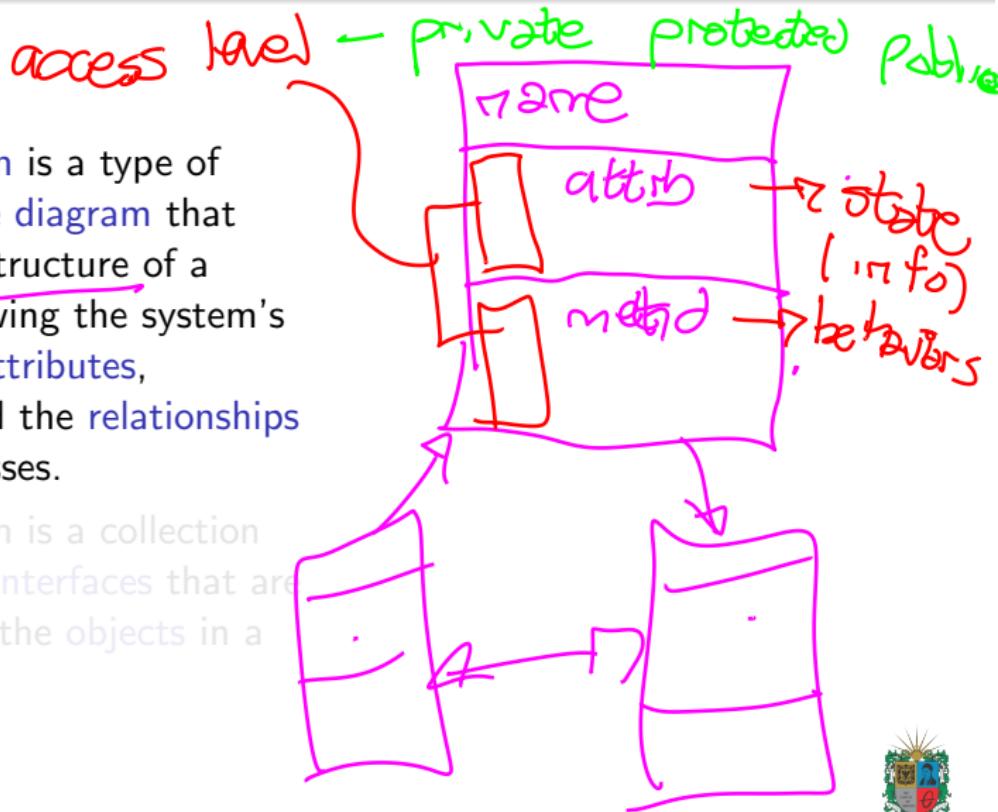
3

UML Class Diagrams



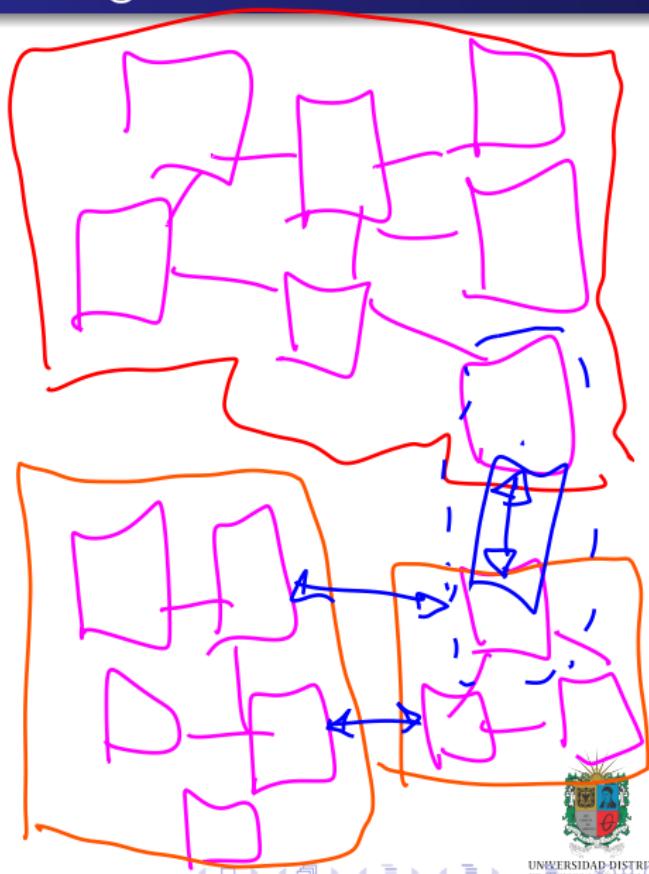
Basic Concepts of UML Class Diagrams

- 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.



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.



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.



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.



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.



Good practices in UML Class Diagrams

- Use singular nouns for class names.
- Use CamelCase for class names.
- Use singular nouns for attributes.
- Use camelCase for attributes.
- Use verbs for operations as methods.
- Use camelCase for operations.



Class Diagram Example



Outline

1 Unified Modeling Language (UML)

2 UML Diagrams

3 UML Class Diagrams



Thanks!

Questions?



Repo:

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



UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS