Course Description

Object-Oriented Programming

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

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

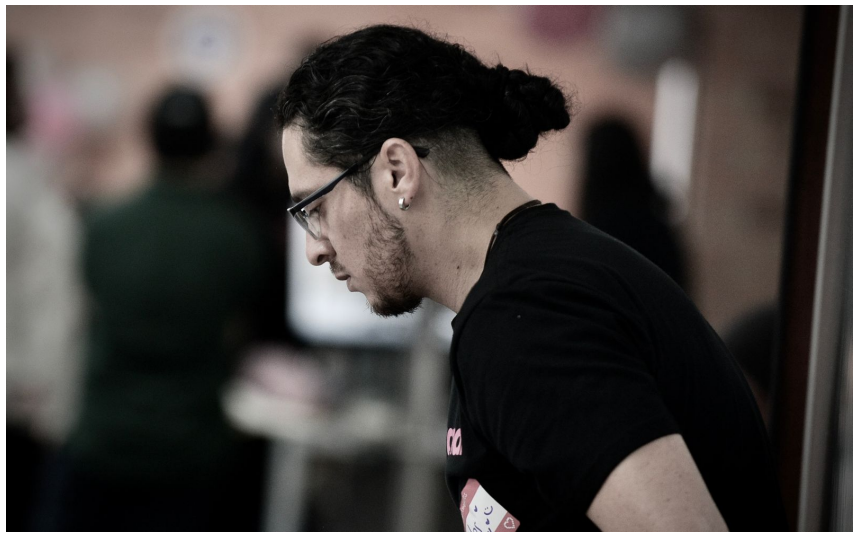
UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

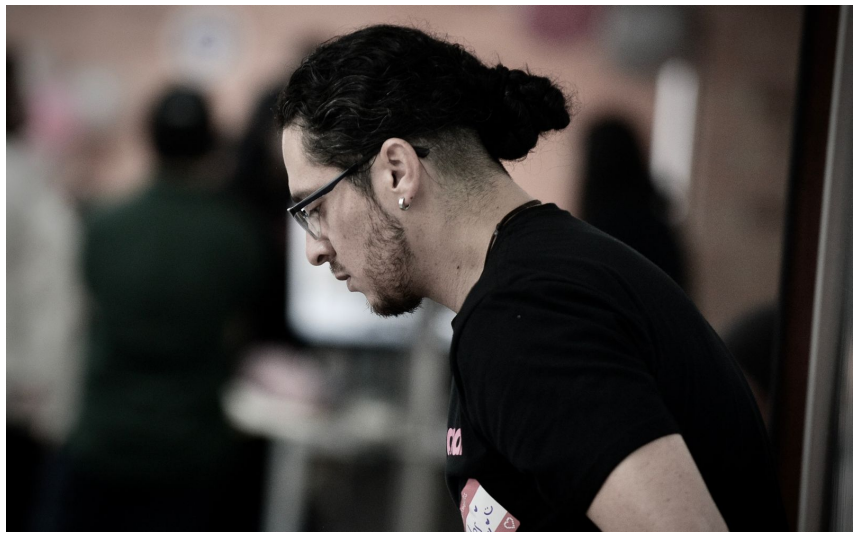
Academic Experience

- **Computer Engineer**, **MSc.** in Computer Engineering, and *researcher* for the last 15 years.
- 7 years as **full-time professor** at colleges, for Computer Engineering programs.
- 3 years as **lecturer professor** for both colleges and goverment STEM programs.
- **Speaker** in Colombia, Brasil, Bolivia, at IEEE events and colleges.



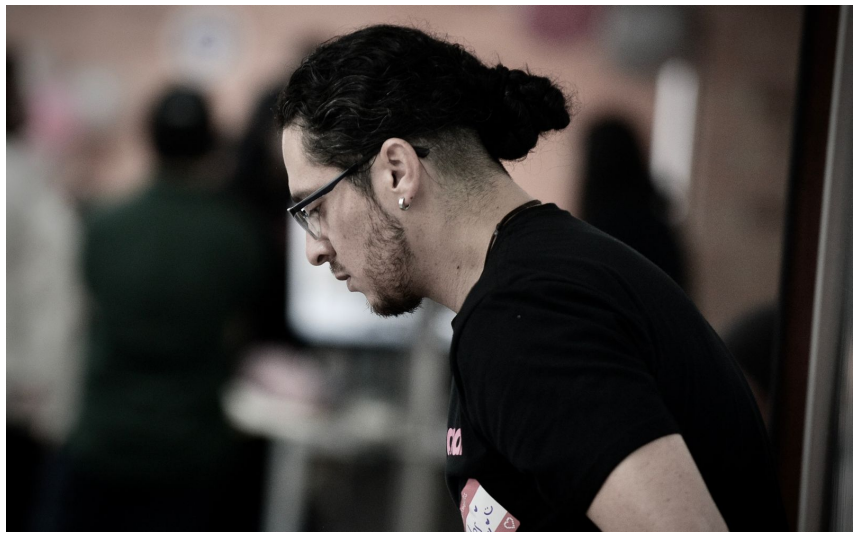
Academic Experience

- **Computer Engineer**, **MSc.** in Computer Engineering, and *researcher* for the last 15 years.
- 7 years as **full-time professor** at colleges, for Computer Engineering programs.
- 3 years as **lecturer professor** for both colleges and goverment STEM programs.
- **Speaker** in Colombia, Brasil, Bolivia, at IEEE events and colleges.



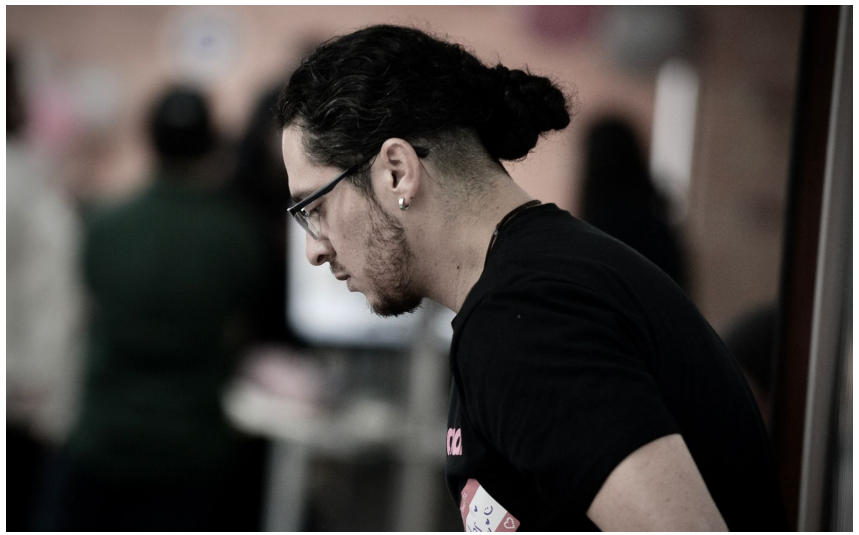
Academic Experience

- **Computer Engineer**, **MSc.** in Computer Engineering, and *researcher* for the last 15 years.
- 7 years as **full-time professor** at colleges, for Computer Engineering programs.
- 3 years as **lecturer professor** for both colleges and goverment STEM programs.
- **Speaker** in Colombia, Brasil, Bolivia, at IEEE events and colleges.



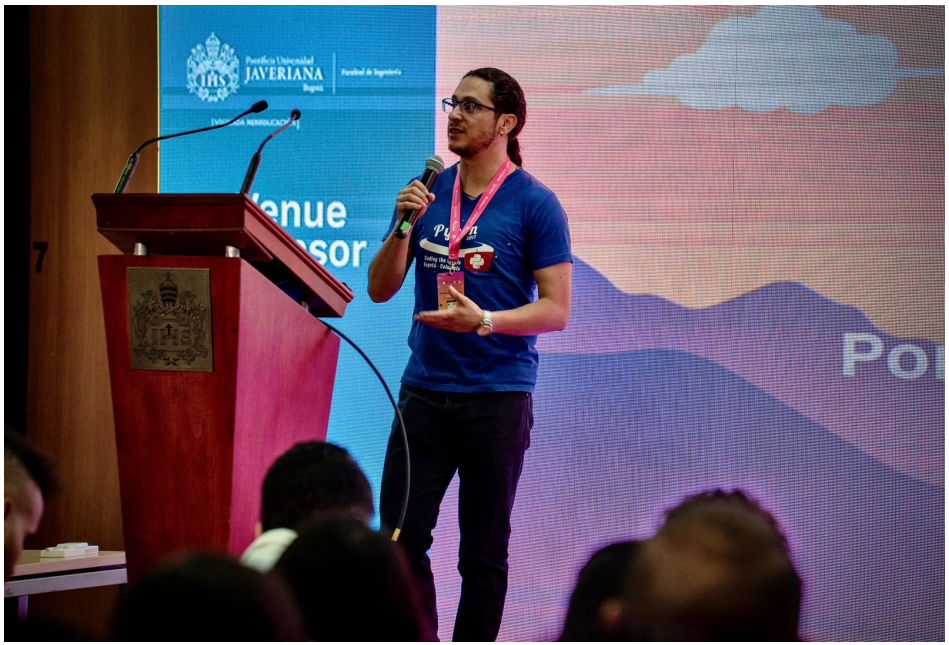
Academic Experience

- **Computer Engineer**, **MSc.** in Computer Engineering, and *researcher* for the last 15 years.
- 7 years as **full-time professor** at colleges, for Computer Engineering programs.
- 3 years as **lecturer professor** for both colleges and goverment STEM programs.
- **Speaker** in Colombia, Brasil, Bolivia, at IEEE events and colleges.



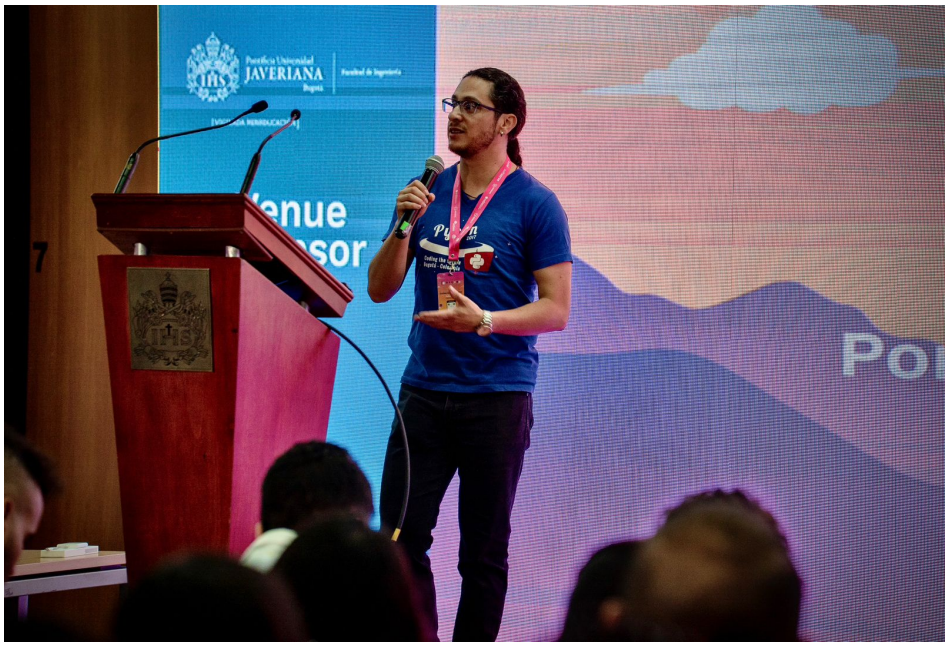
UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Non-academic Experience



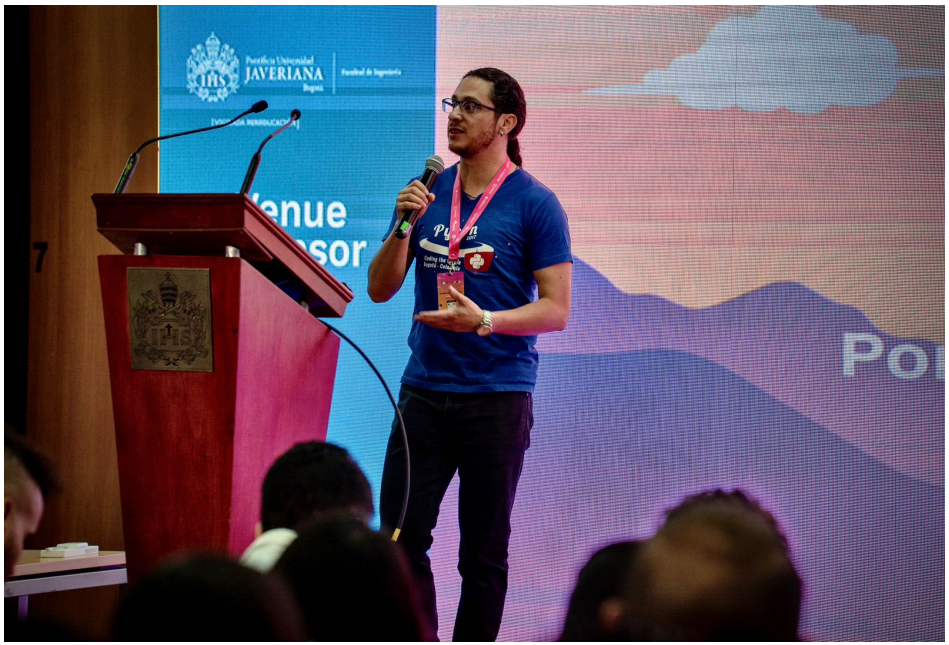
- PyCon Colombia and Python Bogotá **co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- +3 years performed as **Software Engineer** for several tech companies in Colombia.
- 3 years performed as **Technical Leader** of Machine Learning and Data Science in an USA startup.
- +1 year performed as **MLOps Senior Engineer** for a Fintech in LATAM.

Non-academic Experience



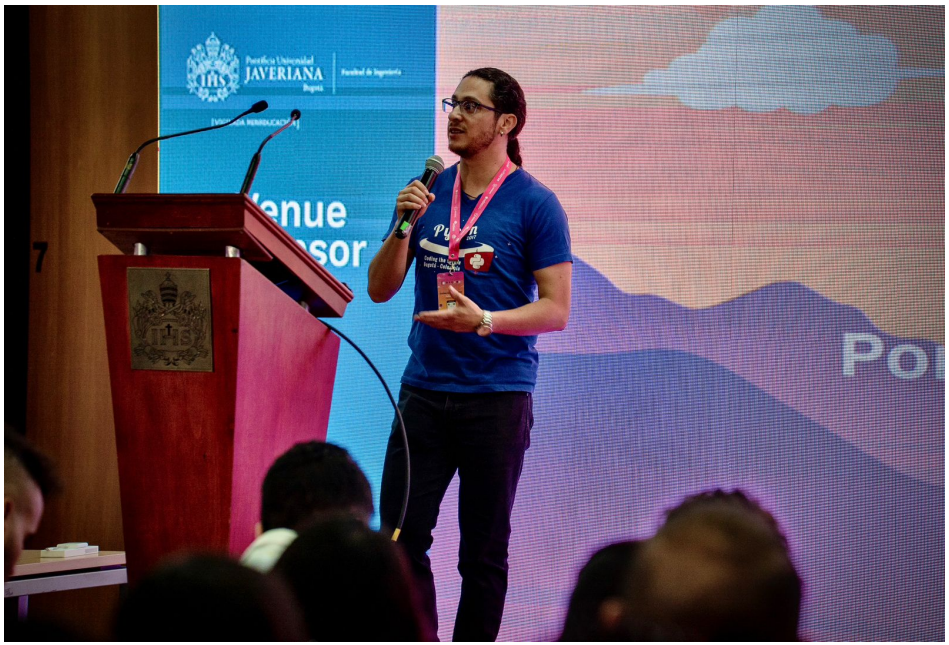
- PyCon Colombia and Python Bogotá **co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- +3 years performed as **Software Engineer** for several tech companies in Colombia.
- 3 years performed as **Technical Leader** of Machine Learning and Data Science in an USA startup.
- +1 year performed as **MLOps Senior Engineer** for a Fintech in LATAM.

Non-academic Experience



- PyCon Colombia and Python Bogotá **co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- +3 years performed as **Software Engineer** for several tech companies in Colombia.
- 3 years performed as **Technical Leader** of Machine Learning and Data Science in an USA startup.
- +1 year performed as **MLOps Senior Engineer** for a Fintech in LATAM.

Non-academic Experience



- PyCon Colombia and Python Bogotá **co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- +3 years performed as **Software Engineer** for several tech companies in Colombia.
- 3 years performed as **Technical Leader** of Machine Learning and Data Science in an USA startup.
- +1 year performed as **MLOps Senior Engineer** for a Fintech in LATAM.

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Overview

This course is designed to introduce undergraduate students to the **object-oriented design** as part of the foundation for becoming an experienced both *software developer* and *software architect*.

The course starts with a brief introduction to **object-oriented thinking**, **quality atteibutes**, and **software modeling**. Then, it transitions into **object-oriented analysis and design**, including design principles. Finally, we will focus in **object-oriented programming**, **good practices**, and basic **UML Diagrams** and **Documentation**.

Classes will consist of lectures, **discussions**, and practical examples. Also, you must take some readings from *software engineering*. In addition, there will be a **semester-long project**, as well one **course final test**, four **workshops**, and ten additional **assignmens**.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Overview

This course is designed to introduce undergraduate students to the **object-oriented design** as part of the foundation for becoming an experienced both *software developer* and *software architect*.

The course starts with a brief introduction to **object-oriented thinking**, **quality atteibutes**, and **software modeling**. Then, it transitions into **object-oriented analysis and design**, including design principles. Finally, we will focus in **object-oriented programming**, **good practices**, and basic **UML Diagrams** and **Documentation**.

Classes will consist of lectures, **discussions**, and practical examples. Also, you must take some readings from *software engineering*. In addition, there will be a **semester-long project**, as well one **course final test**, four **workshops**, and ten additional **assignmens**.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Overview

This course is designed to introduce undergraduate students to the **object-oriented design** as part of the foundation for becoming an experienced both *software developer* and *software architect*.

The course starts with a brief introduction to **object-oriented thinking**, **quality atteibutes**, and **software modeling**. Then, it transitions into **object-oriented analysis and design**, including design principles. Finally, we will focus in **object-oriented programming**, **good practices**, and basic **UML Diagrams** and **Documentation**.

Classes will consist of lectures, **discussions**, and practical examples. Also, you must take some readings from *software engineering*. In addition, there will be a **semester-long project**, as well one **course final test**, four **workshops**, and ten additional **assignmens**.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Goals

The main goal of this course is to provide you with different **concepts**, **tips**, **models** and **tools** for solving software problems using **object-oriented paradigm**.

At the end of this course you should be able to **create** a full-software **monolitich project solution** with a good level of **quality**. Also, you should be able to **design** robust software systems based on object-oriented paradigm in an **agnostic** way.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Goals

The main goal of this course is to provide you with different **concepts**, **tips**, **models** and **tools** for solving software problems using **object-oriented paradigm**.

At the end of this course you should be able to **create** a full-software **monolitich project solution** with a good level of **quality**. Also, you should be able to **design** robust software systems based on object-oriented paradigm in an **agnostic** way.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Pre-Requisites

This is a basic course, so you must have some knowledge in:

- **Programming** in Java, Python, or C++.

Also, it is desireble that you have some knowledge in:

- **Git** basic usage, and **GitHub** basic usage.
- Use of **IDEs** like VS Code, Eclipse, or PyCharm.

Pre-Requisites

This is a basic course, so you must have some knowledge in:

- **Programming** in Java, Python, or C++.

Also, it is desireble that you have some knowledge in:

- **Git** basic usage, and **GitHub** basic usage.
- Use of **IDEs** like VS Code, Eclipse, or PyCharm.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Syllabus I

Period	Topic	Time
Period I	Object-Oriented Analysis & Design	5 sesions
	Object-Oriented Modeling	6 sessions
	Workshop on Object-Oriented Design	1 session
	OOP — Inheritance and Polymorphism	10 sessions
	Workshop on OOP Implementation	1 session
	Course Project Catch-Up	1 session

Table: Schedule for Period I

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Syllabus II

Period	Topic	Time
Period II	Object-Oriented Principles	11 sesions
	Workshop on OOP Principles	1 session
	Layer Architectures	8 sessions
	Concurrency	2 sessions
	Workshop on Layer Architectures	1 session
	Final Test	1 session
Period III	Projects Dissertation	2 session

Table: Schedule for Period II & III

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Grades Percentages

Period	Item	Percentage
Period I	Assignments	5%
	Workshops	20%
	Project Catch-Up	10%
Period II	Assignments	5%
	Workshops	20%
	Test	10%
Period III	Paper + Poster	5%
	Project Implementation	15%
	Technical Report	10%

Table: Software Modeling Grades Distribution

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Don't hate the player, hate the game

- All asignments must be submitted hand-written on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own both ideas and solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smart-anything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Don't hate the player, hate the game

- All asignments must be submitted hand-written on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own both ideas and solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smart-anything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Don't hate the player, hate the game

- All asignments must be submitted hand-written on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own both ideas and solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smart-anything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Don't hate the player, hate the game

- All asignments must be submitted hand-written on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own both ideas and solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smart-anything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Don't hate the player, hate the game

- All asignments must be submitted hand-written on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own both ideas and solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smart-anything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Code of Conduct

- Always be **respectful** to your classmates and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is no a better programming language, tool, or technology. There are only **better** or **worse** solutions.
- You must be **honest** with your work. If you don't know something, just **ask** me. I will be glad to help you.
- You must be **responsible** with your work. If you don't submit **on time**, please don't cry.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will ask you to **leave** the classroom.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Code of Conduct

- Always be **respectful** to your classmates and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is no a better programming language, tool, or technology. There are only **better** or **worse** solutions.
- You must be **honest** with your work. If you don't know something, just **ask** me. I will be glad to help you.
- You must be **responsible** with your work. If you don't submit **on time**, please don't cry.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will ask you to **leave** the classroom.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Code of Conduct

- Always be **respectful** to your classmates and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is no a better programming language, tool, or technology. There are only **better** or **worse** solutions.
- You must be **honest** with your work. If you don't know something, just **ask** me. I will be glad to help you.
- You must be **responsible** with your work. If you don't submit **on time**, please don't cry.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will ask you to **leave** the classroom.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Code of Conduct

- Always be **respectful** to your classmates and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is no a better programming language, tool, or technology. There are only **better** or **worse** solutions.
- You must be **honest** with your work. If you don't know something, just **ask** me. I will be glad to help you.
- You must be **responsible** with your work. If you don't submit **on time**, please don't cry.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will ask you to **leave** the classroom.

Code of Conduct

- Always be **respectful** to your classmates and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is no a better programming language, tool, or technology. There are only **better** or **worse** solutions.
- You must be **honest** with your work. If you don't know something, just **ask** me. I will be glad to help you.
- You must be **responsible** with your work. If you don't submit **on time**, please don't cry.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will ask you to **leave** the classroom.

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Bibliography

Recommended bibliography:

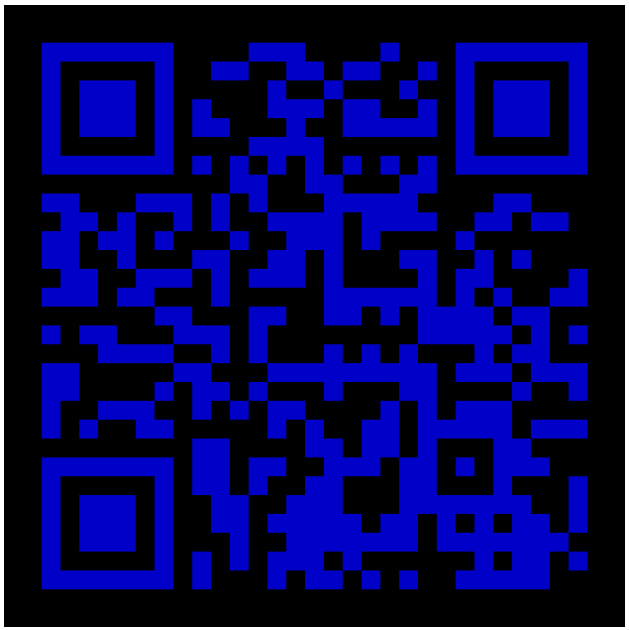
- **Construcción de Software Orientado a Objetos**, by Bertrand Meyer.
- **Thinking Java**, by Bruce Eckel.
- **Java2: How To Program**, by Deitel & Deitel.
- **Object-Oriented Analysis and Design**, by Grady Booch.
- **Design Patterns: Elements of Reusable Object-Oriented Software**, by Erich Gamma, Richard Helm, Ralph Johnson, & John Vlissides.

Outline

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Thanks!

Questions?



My Profile: *www.linkedin.com/in/casierrav*

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS