LDTS 2022/2023

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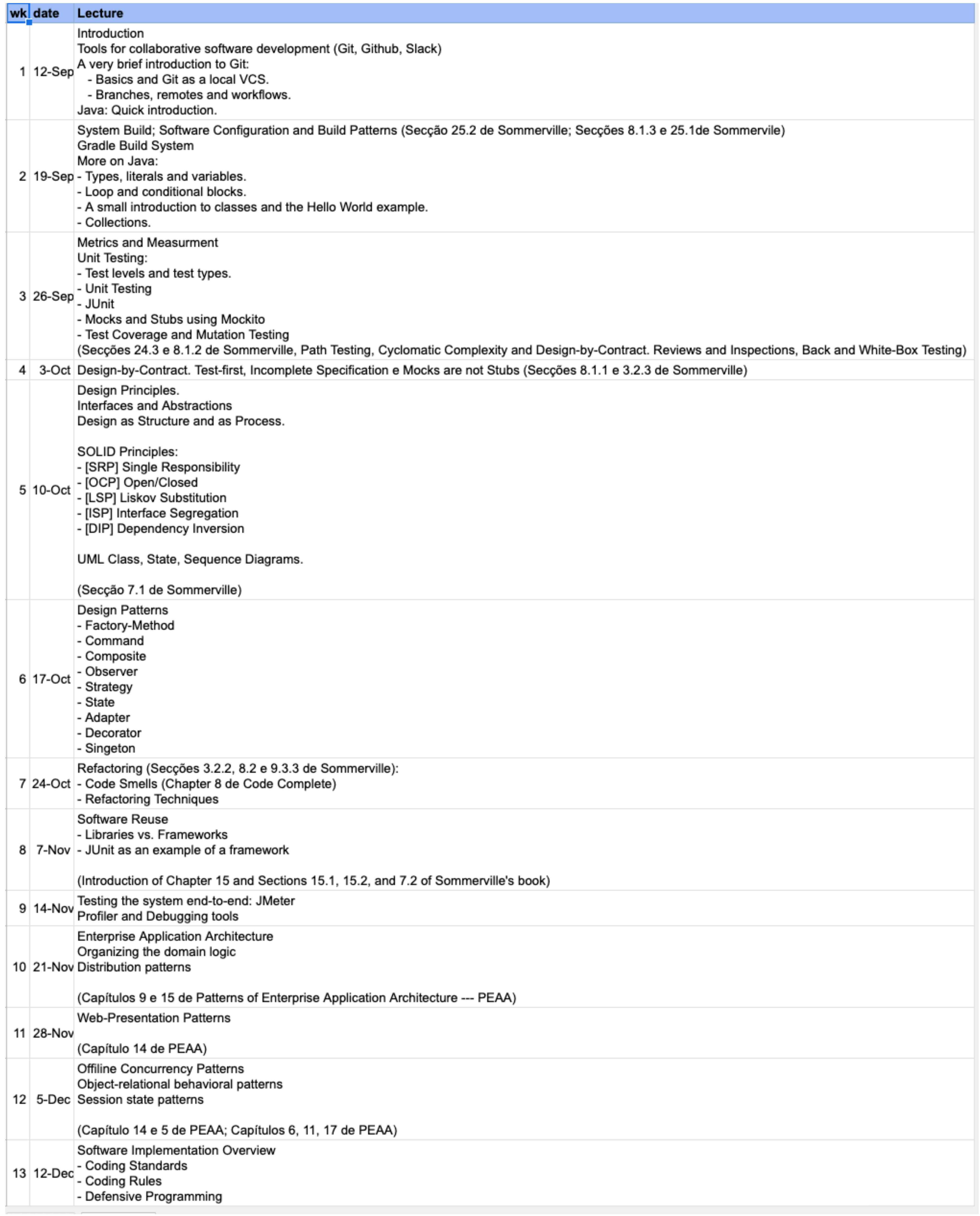
Course Content

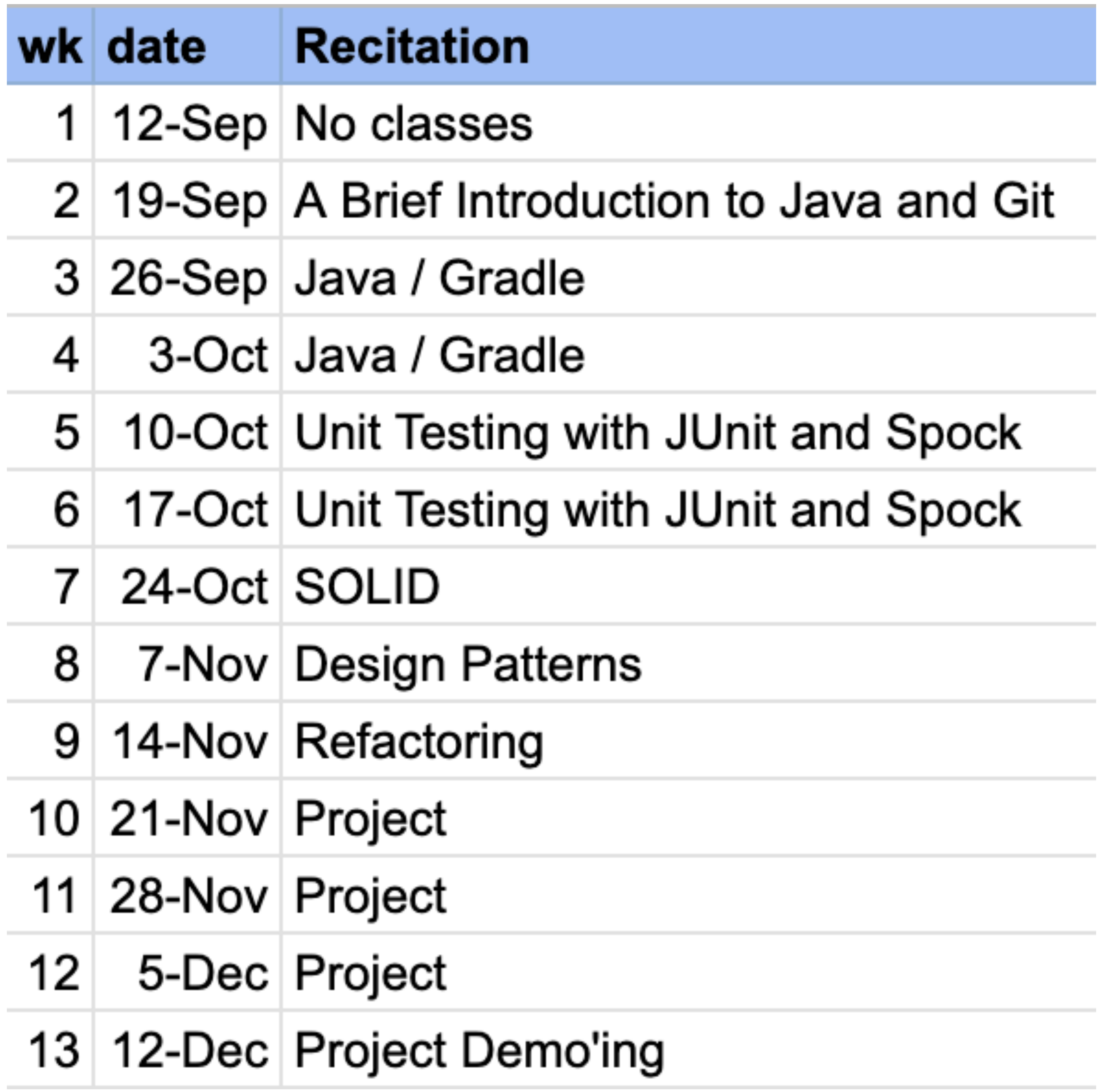
- Git / Java / Gradle
- Unit Testing / Test Driven Development
- SOLID Principles
- UML: Class and Sequence Diagrams
- Design Patterns
- Refactoring and Code Smells

Master Plan —Theoretical Classes



wk	date	Lecture
1	12-Sep	Introduction Tools for collaborative software development (Git, Github, Slack) A very brief introduction to Git: - Basics and Git as a local VCS. - Branches, remotes and workflows. Java: Quick introduction.
2	19-Sep	System Build; Software Configuration and Build Patterns (Secção 25.2 de Sommerville; Secções 8.1.3 e 25.1de Sommervile) Gradle Build System More on Java: - Types, literals and variables. - Loop and conditional blocks. - A small introduction to classes and the Hello World example. - Collections.
3	26-Sep	Metrics and Measurment Unit Testing: - Test levels and test types. - Unit Testing - JUnit - Mocks and Stubs using Mockito - Test Coverage and Mutation Testing (Secções 24.3 e 8.1.2 de Sommerville, Path Testing, Cyclomatic Complexity and Design-by-Contract. Reviews and Inspections, Back and White-Box Testing)
4	3-Oct	Design-by-Contract. Test-first, Incomplete Specification e Mocks are not Stubs (Secções 8.1.1 e 3.2.3 de Sommerville)
5	10-Oct	Design Principles. Interfaces and Abstractions Design as Structure and as Process. SOLID Principles: - [SRP] Single Responsibility - [OCP] Open/Closed - [LSP] Liskov Substitution - [ISP] Interface Segregation - [DIP] Dependency Inversion UML Class, State, Sequence Diagrams. (Secção 7.1 de Sommerville)
6	17-Oct	Design Patterns - Factory-Method - Command - Composite - Observer - Strategy - State - Adapter - Decorator - Singeton
7	24-Oct	Refactoring (Secções 3.2.2, 8.2 e 9.3.3 de Sommerville): - Code Smells (Chapter 8 de Code Complete) - Refactoring Techniques
8	7-Nov	Software Reuse - Libraries vs. Frameworks - JUnit as an example of a framework (Introduction of Chapter 15 and Sections 15.1, 15.2, and 7.2 of Sommerville's book)
9	14-Nov	Testing the system end-to-end: JMeter Profiler and Debugging tools
10	21-Nov	Enterprise Application Architecture Organizing the domain logic Distribution patterns (Capítulos 9 e 15 de Patterns of Enterprise Application Architecture --- PEAA)
11	28-Nov	Web-Presentation Patterns (Capítulo 14 de PEAA)
12	5-Dec	Offiline Concurrency Patterns Object-relational behavioral patterns Session state patterns (Capítulo 14 e 5 de PEAA; Capítulos 6, 11, 17 de PEAA)
13	12-Dec	Software Implementation Overview - Coding Standards - Coding Rules - Defensive Programming

Master Plan - Practical Classes



wk	date	Recitation
1	12-Sep	No classes
2	19-Sep	A Brief Introduction to Java and Git
3	26-Sep	Java / Gradle
4	3-Oct	Java / Gradle
5	10-Oct	Unit Testing with JUnit and Spock
6	17-Oct	Unit Testing with JUnit and Spock
7	24-Oct	SOLID
8	7-Nov	Design Patterns
9	14-Nov	Refactoring
10	21-Nov	Project
11	28-Nov	Project
12	5-Dec	Project
13	12-Dec	Project Demo'ing

- Labs: Create your own project on GitHub and share with the teacher of your lab.
  - You will have feedback on the lab on the week after you do it, in class
- Project: We will be using GitHub Education: you will receive an invitation to the workspace soon enough.

Main Bibliography

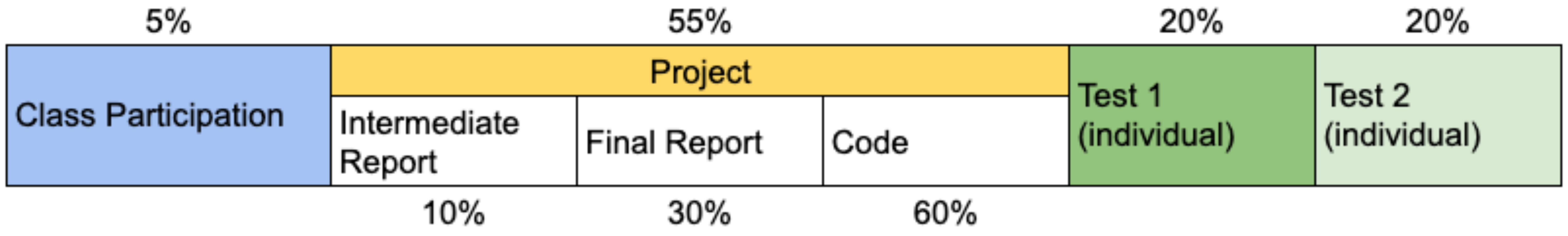
- Bruce Eckel; Thinking in Java. ISBN: 0-13-027363-5 (4th edition)
- Russ Miles and Kim Hamilton; Learning UML 2.0. ISBN: 978-0-596-00982-3
- Kent Beck; Test-driven development. ISBN: 978-0-32-114653-3
- Erich Gamma... [et al.]; **Design Patterns**. ISBN: 0-201-63361-2
- Martin Fowler: with contributions by Kent Beck... [et al.]; **Refactoring**. ISBN: 0-201-48567-2
- Mauricio Aniche: Effective Software Testing; ISBN-13. 978-1633439931

Evaluation

- To obtain frequency, students may not exceed the maximum number allowed of missed classes. Attendance will be registered in practice sessions.

- You must obtain a minimum of **40%** in all evaluation components.

- Final grade will be calculated as follows:



5%	55%			20%	20%
Class Participation	Project			Test 1 (individual)	Test 2 (individual)
	Intermediate Report	Final Report	Code		
	10%	30%	60%		

Communication

https://feup-ldts.slack.com

https://join.slack.com/t/feup-ldts/shared_invite/zt-1g3094g83-3mPwZa6zxno70nVjCPI0GQ

Contents will be shared on Moodle:
https://moodle.up.pt/course/view.php?id=1518