OOA&UML with Java: Fundamentals

Description

The goal of this course is to teach the student the fundamentals of modeling using Object Oriented approach, using UML for modeling and Java for practical examples.

The expected outcomes for the student is mainly the ability to design a solution using the UML tools and to implement the beginning of this solution using the Java Programming Language. That objective is reached progressively by addressing several small examples through the lectures, the student is finally assigned to an end to end project to realize with Java.

Course content is available at any time here :

https://thomas-broussard.fr/work/java/courses/index.xhtml

Learning Objectives and Outcomes

- Know the UML diagrams for designing and communicating solutions to a problem
- Know the Java OOP concepts to be able to produce a solution to a given problem
- Know how to handle a product development from modeling to programming
- Know the Java Basics in terms of input/output

Course Schedule and Contents

Session 1	**OO Concepts 1 : OO approach and UML** During this lecture, you will learn the Object-Oriented approach to design your applications **Skills** OO Concepts, UML
Session 2	**Java programming 1: OO Concepts in Java** This lecture presents the UML Class Diagramming, and especially how to represent objects, and relationships between those objects **Skills** UML Class Diagrams, Object Relationships
Session 3	**Java programming 1 (continuation): OO Concepts in Java**

During this lecture, we will see how to use Eclipse and to write our first Java program, and will begin to see the numerical data in java

Skills
UML Class Diagrams, Object Relationships

Session 4

Java programming 2 : Java environment, compilation, execution

What is the Java Virtual Machine? How does it work? How the written code is executed in Java? These questions will be answered in that lecture

Skills
Java Environment, Java Core

Session 5

Java programming 3: Java control and repetition statements

How to control the execution flow (if-else, switch) ? How to repeat instructions in Java? We will practice through Numerical data manipulation

Skills
Java Environment, Java Core, UML Activity Diagrams

Session 6

Java programming 4 : Instantiation, Inheritance, Abstraction

How to create and use objects efficiently in Java? How to use inheritance? What is an Interface? This lecture will teach you how to organize your code into an efficient Object-Oriented approach

Skills
Inheritance, Abstraction (abstract/interface)

Session 7

Java programming 5 : Java Data Manipulations

How to make your own `Logger` class? The realization of this feature will help the student to improve her/his skills manipulating Date, String and File Objects.

Skills

`Date`, `String`, `Files`, Logging

Session 8

Java programming 6 : Java Data Structures

What are the different built-in data structures in Java? We will see how to handle sets of data through examples

Skills

`List`, `Set`, `Map`, `Stack`, `Queue`

Session 9

Java and Files

How to make a DAO using Java and Files?

Skills

`DAO`, `Files`

Session 10

Java and XML

How to Handle XML through the Java Programming language?

Skills

`XML`, `DOM`, `XPath`, `Breadth/Depth algorithms`

Session 11

Java and Databases

How to connect to a Data Base through Java?

Skills

`Databases`, `JDBC`, `DAO pattern`

Grading

Quiz	25%
Practical Work:	40%
Course Project:	35%

Policies

- I expect you to turn-in your reports on time to receive proper credit/grade.
- Any work submitted must be your own.
- I expect everyone to contribute equally to group assignments
- Attendance in every class is expected and class participation and discussion is strongly encouraged.
- Late work will not be accepted unless prior arrangements have been made directly with me.
- Cases will be decided on an individual basis.

Good Luck!