



University
of Windsor

School of Computer Science
<https://cs.uwindsor.ca>

Master of Applied Computing

COMP-8117

Advanced Software Engineering Topics

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Office Hours : Thursday & Friday (9.00am – 12.00pm EST)

Lab 2 : UML and Design (1%)

Goal

In this lab, you'll learn how to create high-level and low-level design from specifications. You'll also learn to use different UML diagrams for design purpose.

- Week 1 : Training (Non-Evaluated)
- Week 2 : Mandatory Part

Preparatory work

In this part, you're required to do research about the GoF Design Patterns.

For each GoF Design Patterns, make some research about it. For each of them, summarize the problem they solve, the solution they provide, advantages and drawbacks.

Training (Week 1 – Not evaluated)

In this part, we require you to take the specifications of one other student/group of your mentoring group or section. From these specifications, answers the following questions.

1. In your opinion, what kind of computational problems (representations, computations, structures, algorithms, ...), do you have to solve when you read these specifications ?
What details are not expressed in these specifications ?
2. Rewrite the specifications from the computational point of view in an informal way.
3. Represents these new specifications using Class Diagrams and Sequence Diagrams.
What do you notice ?
4. Implement with the language of your choice these diagrams without assuming more than the informations represented in your diagrams. What do you notice ?

Mandatory Part (Week 2)

The department of Biology of the University of Windsor wants to create a simulator of butterflies (Lepidoptera). In this simulation, these would like to see the biological evolution and behaviour of a lepidoptera from egg to adult. Adult moths have three couples of paws, and two pairs of wings covered by multicolor scales (<https://en.wikipedia.org/wiki/Lepidoptera>). These wings are used to avoid predators. The biological cycles of this insect is described as followed : Adult lepidopteras lay eggs on plants. These eggs give birth to caterpillars which become chrysalis. At the end, a butterfly emerge from this chrysalis (imago).

1. Translate the user domain expressed in this need to specifications using UML diagrams of your choice.
2. Choose an architecture to implement the simulator and create a high-level design using UML Class Diagrams. Your diagram must highlight the architecture.
3. Choose a programming language and a framework to create your simulator. Create low-level diagrams representing your simulator.
4. Implement a prototype of simulator using the diagrams, programming language and framework you decided in question 3. Evaluate the percentage of work overload (how many details were not present in the diagram and that you had to add during the implementation).

Optional Part (1% extra credit)

1. Prepare a small video / presentation (3 to 5 minutes) in which you'll present the difference between specifications and design to new MAC students. Assume these students have no knowledge in these two activities.