VG101 — Introduction to Computer and Programming

Worksheet (chapter 10)

Manuel — UM-JI (Fall 2018)

Worksheet concept

- Simple exercises based on the slides
- Optional personal work
- No submission, no grading
- Only refer to websites in English

Ex. 1 — *Slide questions*

Ensure you can answer all the questions appearing in chapter 10.

Ex. 2 — *Writing*

Using your own words write a few sentences to clearly and concisely explain what a class is, and what methods and attributes are. When writing think of someone you know and who has no background on computer science. Illustrate your ideas with simple examples.

Ex. 3 — *Simple class definition and instantiation*

Write a simple class to handle complex numbers. Implement at least the addition and multiplication methods. Define the class in a file, its implementation in another one, and instantiate it. Use a constructor to simplify the initialisation.

Ex. 4 — *Attributes and methods*

Define and classify the attributes and methods for a car. Write the corresponding class.

Ex. 5 — *Writing*

Using your own words write a few sentences to clearly and concisely explain what are inheritance and polymorphism. When writing think of someone you know and who has no background on computer science. Illustrate your ideas with simple examples.

Ex. 6 — *Class visibility*

Use the `car` class from the previous worksheet and define a `suv` class that inherits from `car`.

1. Define some attributes and methods in `car` as public, private, or protected. Try to access them from (i) `suv`, and from (ii) the `main` function.
2. Use public, and private inheritance for `suv`, then access the various attributes and methods from the `main` function.

Hint: test all the possibilities summarised in the tables on slide 14.30.

Ex. 7 — *Inheritance and polymorphism*

Define an abstract base class called vehicle. Draw at least three different diagrams showing how various vehicles can be organised (e.g. two-wheelers vs. four-wheelers, size, on-road vs. off road, etc.).

Whenever a diamond problem is encountered, think of a simple solution that would not alter the design much while resolving the issue.

Hint: to help in the vehicle classification, think of as many types of vehicles as possible (e.g. car, motorbike, mono-wheel, boat, truck, spaceship, etc.), and find various ways to organise them.