43075-01 Shape modelling and analysis

Lecturers
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Introduction	21. March 2023
Discussion	7. March 2023

In this first exercise, you will set up the software environment you need for this course on your computer and familiarize yourself with Scala and Scalismo.

1. Scala

1.1. What is Scala?

We will use Scalismo extensively in this course, which is written in the programming language Scala. To get an understanding of the ideas and philosophy behind Scala, research the following questions:

- What is Scala?
- Where was it developed?
- What is the main promise of Scala and in which application domain is it mostly used?
- What programming paradigms does it support?
- What is the main difference in syntax between Scala 2 and Scala 3, and which style do you prefer?

1.2. Reading Scala

Get an overview of how Scala looks by browsing through the Scala tour:
`https://docs.scala-lang.org/tour/tour-of-scala.html`.

The goal is not to understand how things work or to be able to write your own Scala programs, but rather to get an impression of what Scala offers in terms of concepts and how the syntax looks. We will introduce the main concepts we will use in the course in the next class.

1.3. Installing a Scala-Environment

We will write our Scala Programs using the Editor VS-Code and run them using Scala-cli. IDE Support is provided by the Metals plugin for Visual Studio code. Install VSCode and Scala-CLI by following the guides on the respective webpage:

VSCode `https://code.visualstudio.com/`

Metals `https://scalameta.org/metals/`

scala-cli `https://scala-cli.virtuslab.org/`

1.4. Hello world

Write a "Hello, World!" program in Scala using VS-Code. Compile it and run it using Scala-cli.

2. Scalismo

2.1. What is Scalismo

For all our shape modelling work, we will use Scalismo. Visit the Scalismo Webpage (`https://scalismo.org/`) and research the following questions:

- What are the goals of scalismo?
- Where can I find documentation?
- Where is the source code located?
- What is Scalismo-ui?
- Under which open source license is Scalismo published? Can it be used for commercial applications?

2.2. Running a first Scalismo program

To practice using Scalismo, read through Tutorial 01 (Hello Scalismo) on the Scalismo website: `https://scalismo.org/docs/Tutorials/tutorial01`.
Then, download the program and try to run it using Scala-CLI. You can download the necessary data using the link provided on the documentation page: `https://scalismo.org/docs`.

If you have successfully set up everything, you should see Scalismo-UI popping up, with meshes and images appearing. Note that the window will automatically close at the end. (How can you modify the program to change this behaviour?)

Please note that there is currently no version of Scalismo that runs natively on the M1 or M2 chip. If you have one of these devices, you'll need to use the Intel JDK. A new version of Scalismo that natively supports M1 should be available after Fasnacht.

3. Theory

To prepare for the next in-class meeting, please work through week 1 of the online course: `shapemodelling.cs.unibas.ch/ssm-course/`.