Master in High Performance Computing

Theory and Practice of Finite Element Methods

Setting up a “best practice” FEM development environment

Luca Heltai <luca.heltai@sissa.it>

International School for Advanced Studies (www.sissa.it)
Mathematical Analysis, Modeling, and Applications (math.sissa.it)
Master in High Performance Computing (www.mhpc.it)
SISSA mathLab (mathlab.sissa.it)

sissa mathLab innovating with mathematics

The Abdus Salam International Centre for Theoretical Physics

SISSA

Roadmap

- Version control system (git)
- Modern IDE (VSCode)
- Cross platform build systems (cmake)
- Automatic formatting (clang-format)
- Test driven development (google test, deal.II testing framework)
- Inline documentation (doxygen)

sissa mathLab innovating with mathematics

The Abdus Salam International Centre for Theoretical Physics

SISSA

Version control systems

- We'll use GitHub classrooms:
  - Understand how GitHub classrooms work
    https://github.com/jfiksel/github-classroom-for-students
    (the guide shows how to install R-Studio. We won't need that)
    After setting up git…
  - Accept the first assignment:
    https://classroom.github.com/a/SxO9Wq2M
  - Follow the tutorial at
    http://learngitbranching.js.org/
    to learn how to use git.

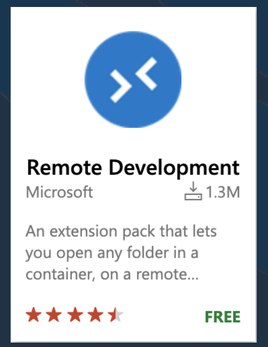
sissa mathLab innovating with mathematics

The Abdus Salam International Centre for Theoretical Physics

SISSA

Setting up VSCode

- Download and install **Docker**: https://www.docker.com/products/docker-desktop
  - Read some doc: https://www.docker.com/get-started
- Download and install: https://code.visualstudio.com/download
  - Read some doc: https://code.visualstudio.com/docs
  - Install the following extension:



Open the assignment repo

- Open the directory containing the assignment. The directory contains a hidden folder, called “.**devcontainer**”
- VSCode should ask you if you want to run the folder in the container. Say yes.
- VSCode will now download a docker image. The first time around, this will take some time.

sissa mathLab innovating with mathematics

The Abdus Salam International Centre for Theoretical Physics

SISSA