

# Geometric Preprocessor for CFD Simulations

In computational fluid dynamics (CFD) simulations, the geometric description of the computational domain is a tedious and time consuming work. On the other hand, a detailed description of the geometry is of utmost importance for obtaining reasonable results.

A fast, easy, and extendable pre-processor for defining the geometry of obstacles and boundaries as well as different boundary conditions is a comfortable way of generating the desired input for a CFD simulation.

The aim of this Software Lab is to write a modular geometric pre-processor in C++ based on OpenGL [1] as visualisation interface. OpenGL is a platform-independent programming interface available on nearly all platforms making the designed code portable to nearly all systems.

The pre-processor should be able to

- import a given geometry file or construct a computational domain manually and handle it internally in a data structure
- import a previously generated pre-processed file from the pre-processor
- display it using OpenGL
- represent all common user interaction abilities such as rotating the geometry, panning, zooming, etc.
- set different boundary conditions by clicking on the respective obstacles or boundaries
- export the processed geometry with boundary conditions to a file for later usage in a CFD simulation

Prerequisite knowledge in OpenGL API programming is not required but should be adopted within the first weeks of the project. Programming in C++ is mandatory for this project.

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## References

- [1] <http://www.opengl.org>