Mesh and Computational Geometry
Master 2 Informatique ID3D + Centrale – 2022-23
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TP1 – Getting started with C++
Data Structures for Meshes

Open and run a C++ example file

Open the file `LaClasseCentrale.cpp` and try to predict its behavior.
Compilation with the command

```
g++ -std=c++17 -Wall LaClasseCentrale.cpp -ovasy
```

Run the execution file `vasy` and understand the differences with what you planned.

Open and visualize a mesh stored in a off file

Install the 3D model viewer meshlab.
Visualize the mesh queen.off.

Create a mesh data-structure in C++

1) Write the code of the triangulated mesh data structure with geometry and connectivity information.
- First, you model a mesh by a vector of its vertices and a vector of its faces. In this first model, the faces are not attached together. They are simply represented by the indexes of their 3 vertices.
- Then you write the data structure corresponding to the topological model based on vertices and faces that we saw in class. In this model, the faces are attached together.

2) Construction of elementary meshes to test your data structures.
- A tetrahedron (be careful when attaching the faces together)
- A pyramid with a square base
- A 2D bounding box (composed of 2 triangles) whose edges are connected to an artificial “infinite” vertex at the back.

3) Write a routine to read and load, in your mesh data structure, a triangulated mesh written in an OFF format :
- Number of vertices s
- Number of faces c
- Description of the faces (sequence of the indices of the vertices of the face, preceded by its number of vertices).