Assignment 4: Individual Project Proposal

The second part of the course will consist of an individual project with 2 checkpoints (assignments 4 and 5). Make sure you are registered on the course webpage where the submissions of the project checkpoints will take place. Please read the information regarding the submission provided in the submission site.

The application you will develop for your individual project will load multiple mesh files (minimum of 2), each with a distinct associated material. An orbiting camera will allow you to interactively inspect the scene from any angle and distance. The camera should always point to the loaded geometry. Fig.1 depicts an example scene.
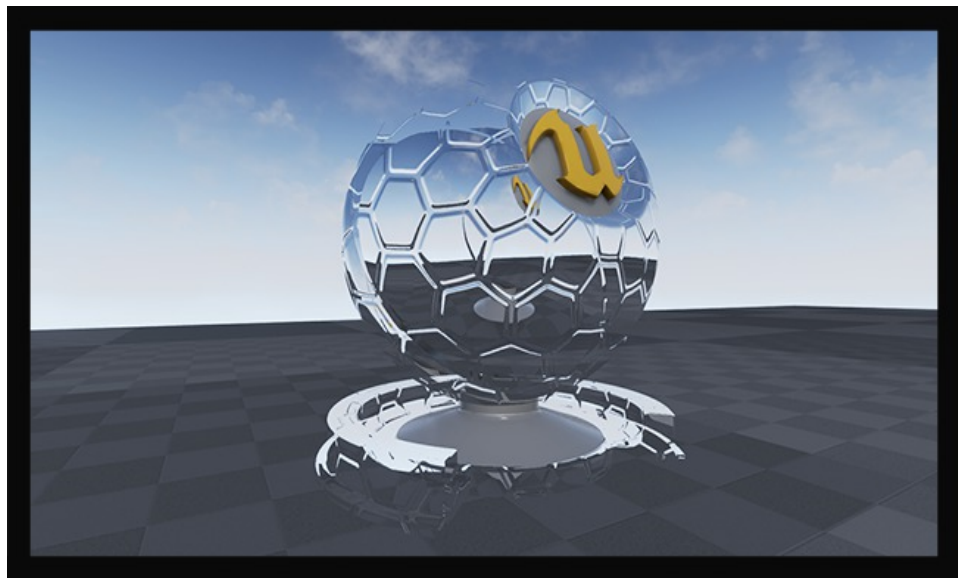

Fig.1 - Example scene depicting an object constituted by two parts; a spherical part made of a glass-like material and a letter-shaped part made of a yellow plastic-like matte material.

Your first step (assignment 4) will be to decide what materials will be developed and which technical challenges will be addressed during development. To that end, you will write a small document (4 pages maximum) in which you present the objects and materials that will be developed. The document should contain enough visual references to clearly define what you are trying to achieve visually. The document should also include a brief development plan stating the main milestones of your project during the months of December and January.

The project proposal should be submitted on Fenix by December 14, 2023 (23:59).

Each project will address multiple technical challenges during development. Each challenge has an associated credit rating and each project will have to include a minimum of 10 credits. We provide a list of technical challenges that have or will be covered during the course's lectures, but you are welcome to propose your own. Just make sure you talk with your lab assistant before submitting your proposal to get the suggestion approved as well as the credit value associated with the new challenge(s).

Here are the proposed technical challenges, with their maximum credit rating:

- ☐ [1.0]
  Generic scene graph (automatically handling matrices, shaders, textures, callbacks, etc.)
- ☐ [2.0]
  Real-time manipulation of objects with mouse and keyboard.
- ☐ [2.0]
  Format for saving to and loading from file all required scene information.
- ☐ [2.0]
  Non-photorealistic lighting / shading model with silhouette, e.g. Cel, Gooch shading.
- ☐ [2.0]
  Non physically-based "photorealistic" lighting model, e.g. Phong, Blinn-Phong models.
- ☐ [3.0]
  Realistic or stylised solid material using procedural noise, e.g. wood, stone, marble.
- ☐ [4.0]
  Realistic or stylised material with transparencies, e.g. glass, crystal.
- ☐ [3.0]
  Buffer based special effects, e.g. reflections using the stencil buffer.
- ☐ [3.0]
  Shader based special effects, e.g. normal or displacement mapping.
- ☐ [4.0]
  Scene post processing through render targets, using multiple passes.

Once again, if you want to develop a technical aspect not listed here, please propose it for consideration. Please be aware that your proposed topic will probably not be covered during the lectures. Here is an example.

- ☐ [5.0]
  Particle system based on instanced rendering using geometry shaders. [not covered in lectures, the credit rating is provided only as an example]

Finally, unless conflicting with the development of your technical challenges, you are free to use external libraries.