# Programming Assignment #8 (Optional)

In this assignment you will implement one Subdivision Surface among the following ones: Doo-Sabin, Catmull-Clark, Loop, or Butterfly. Please refer to the lecture slides for more information about these methods.
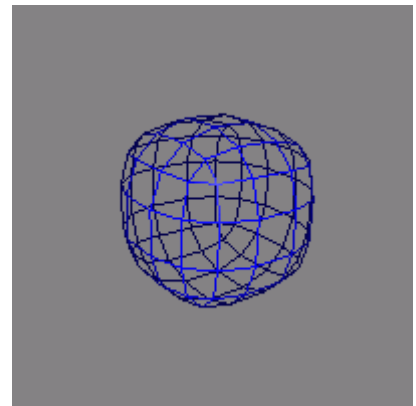
You will start from a simple polyhedron as control mesh. For example, you can use a cube as shown in the example below, or any other initial coarse object. Then, after each subdivision step, one higher resolution version of your surface is obtained:
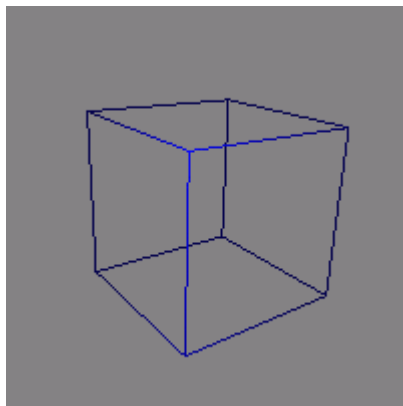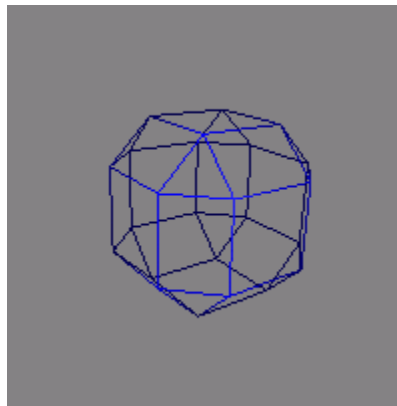
| **Resolution 0** | **Resolution 1** | **Resolution 2   …** |

Requirements:

Requirement 1 (60%) – Subdivision: Implement the desired subdivision surface in order to correctly refine an initial control mesh up to any desired resolution. Use the following keys:

> **q** – apply the subdivision scheme one time, increasing the resolution by 1 step
> **a** – reset the model to the initial control mesh

Requirement 2 (40%) – Visualization: You will need to display your object in different modes, using the following keys:

> **z** – flat shading (10%)
> **x** – smooth shading (30%)

The appearance of the smooth shading has to be correct, which means correct normal vectors have to be generated. The way to proceed is to generate the normal vectors per vertex during the subdivision of the model.

Submission:

Please follow the instructions in parules.txt (uploaded to CatCourses). In particular: please do not include any third-party support code and do not forget to Clean Solution before preparing your project for submission! Also, check for hidden folders (such as .vs) which can sometimes balloon to hundreds of megabytes!

Deadline lab for presentation and submission: your last lab.