In subdivision surface modeling a simple mesh is used as the control cage for an interpolated surface. In Blender the resulting surface is always a polygonal mesh, but in other software it is possible to calculate the limit state to obtain a smooth surface similar to a NURBS model. The advantage of a subdivision surface (sometimes known as a subdiv) is that one part flows smoothly into another with no seams or breaks. Subdivs are easily editable and animatable. The disadvantage is that it is not possible to produce a specified curvature or location at any point on the surface; the location of each one is influenced by the others. For this reason subdivs are not currently used for product design or engineering. NURBS (non-uniform rational B-splines) by contrast produce precise surfaces which are independent of the rest of the model.

Guerilla CG has two useful introductory videos on subdivision surfaces at https://youtu.be/ckOTl2GcS-E?list=PL6A7DF3D7866EB076 and https://youtu.be/k_S1InEmdI?list=PL6A7DF3D7866EB076

Blender includes two subdivision types: Catmull-Clark and Simple. Simple subdivision adds geometry to the existing mesh without changing it and is effectively no different to using Subdivide in the left fly-in (except that, being a modifier, it’s editable, animatable, and easily removable). The default Catmull-Clark, however, progressively smooths the mesh. Fine control over the surface is achieved with edgeloops as well as adding non-zero Crease weights to edges. Jonathan Williamson shows three ways to create sharp edges in subdivision surfaces at https://youtu.be/nBkwodrQq_4. I have a fourteen minute video on making a simple character using subdivision at https://youtu.be/KtHD3NRFVs4.

For those who want more background there is a sixteen minute video about the development of subdivs in Pixar at https://youtu.be/mX0NB9lyYpU.

To add a Catmull-Clark subdiv modifier easily, hit Control_2 for two degrees of subdivision. The shortcuts Control_0 through Control_5 work in this way in both Object and Edit modes.

Chris Yonge – 20170809