Meshes and subdivision
Due date: Tuesday, March 29

In this assignment you will implement a simple system for mesh modification and refinement.

1 What your program should do

Your program should load a mesh from an OBJ file (all fields other than vertex and face definitions can be ignored).

Implement the half-edge mesh data structure for arbitrary polygonal meshes. You can assume that the input mesh is a manifold mesh (but faces are not necessarily triangles); you do not have to verify this.

Display the mesh with lighting enabled, using at least two lights. The user should be able to rotate the mesh using the trackball interface (an implementation is provided on the web site).

Implement the following operations:

- On loading the mesh, compute vertex normals: first, compute the normal for each triangle, then average the normals for all triangles at a vertex.

- Select a mesh polygon; (the selected polygon is highlighted)

- remove the polygon, if the user presses"D" correctly adjusting the mesh data structures.

- If the user presses "T" all polygons are converted to triangles, by choosing an arbitrary vertex and connecting it to all vertices not adjacent to it.

- If the user presses "S" the Loop subdivision algorithm is applied to the mesh once. The details of Loop subdivision implementation will be discussed at the lecture.

2 What to turn in

Just the source code and a working executable of your program.