Unit Technologies Summary

Team Shujuku Hackers

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1 Data Structure

1. External Libraries
   - STL file parsing/saving: Relevant lecture code base.
   - Math implementation: Eigen (http://eigen.tuxfamily.org/)
2. Class Design
   - PolygonalMesh class
     - From lecture code: Unordered map of polygon classes, with each polygon class containing vectors of the corresponding vertices.
     - Keeps track of the geometry
   - Proxy class
     - Length-k array of structs, with each structs containing parameters of the corresponding proxy.
     - Used as fitted planes for clustering and Lloyds Clustering Algorithm.
   - Priority queue for generating initial partitions
     - Heap
     - Used in flooding initialization.

2 Algorithm

1. Parse input STL file into a PolygonalMesh class
2. Generate initial partitions using distortion-minimizing flooding (Priority queue)
3. Fit initial proxies to the partitions
4. Iterate through Lloyds Clustering Algorithm:
   - Use current proxies to partition the surface
   - Fit new local proxies

5. Combine local proxies to form new mesh
    - Anchor vertices
    - Edge extraction
    - Triangulation
6. Output and visualie the resulting mesh

3 Task Assignment

Initial task list (Split between 4 group members):

1. Implement the Proxy Class (Austin and Calvin)
2. Initial partition algorithm on the polygonal mesh class (Tatum)
3. Lloyds Clustering Algorithm using the polygonal mesh class and proxies class (Austin and Calvin)
4. Convert resulting proxies class to output mesh (Chris)