Title: Planar Graph

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Project Description: Build a planar graph and be able to traverse it by next, pervious, swing, unswing, and z corners. Be able to add new edges and vertices as well as add vertices on already existing edges. Be able to delete vertices, and edges. Keep all corners pointing towards the correct next, swing, etc corners as the additions and deletions happen. Show loops for each face on the graph as well as area for each loop. Be able to determine what face is clicked and output the face id and area of it.

User Manual:

- There are three modes. Add, delete, and view/traverse corners. Add is accessed by clicking "a." Delete is accessed by clicking "d." View/traverse is accessed by clicking "c."
- In Add mode, drag on graph to make new edges and vertices. Single click on an already existing edge to split it in 2 and add a new vertex.
- In delete mode, click on vertices or edges to delete them.
- In view mode, click on a corner to view corner positions of next, swing, and current corner.
    - In view mode you can traverse edges by using the following key bindings:
        - "n" – move to next corner
        - "s" – move to swing corner
        - "u" – move to unswing corner
        - "p" – move to previous corner
        - "z" – move to z corner;
    - If you click inside of a face instead, it will highlight the face and tell you the area.
- To view faces press "f."

Method used:

We are using the process discussed in class where we are doing traversal on corners. We are storing it in 4 different arrays: G for Vertices on the graph, V represents our corners and contains an index to G for the actual vertex, N that represents the next vertex for the given index, and S that represents the swing for the given index.

By implementing and utilizing these arrays, we were able to implement the variety of situations represented in the graph. The add and deletes are set up to work for all implementations discussed in class. For more information about the exact implementation, please reference the included notes from the class that go into more detail about the subject.