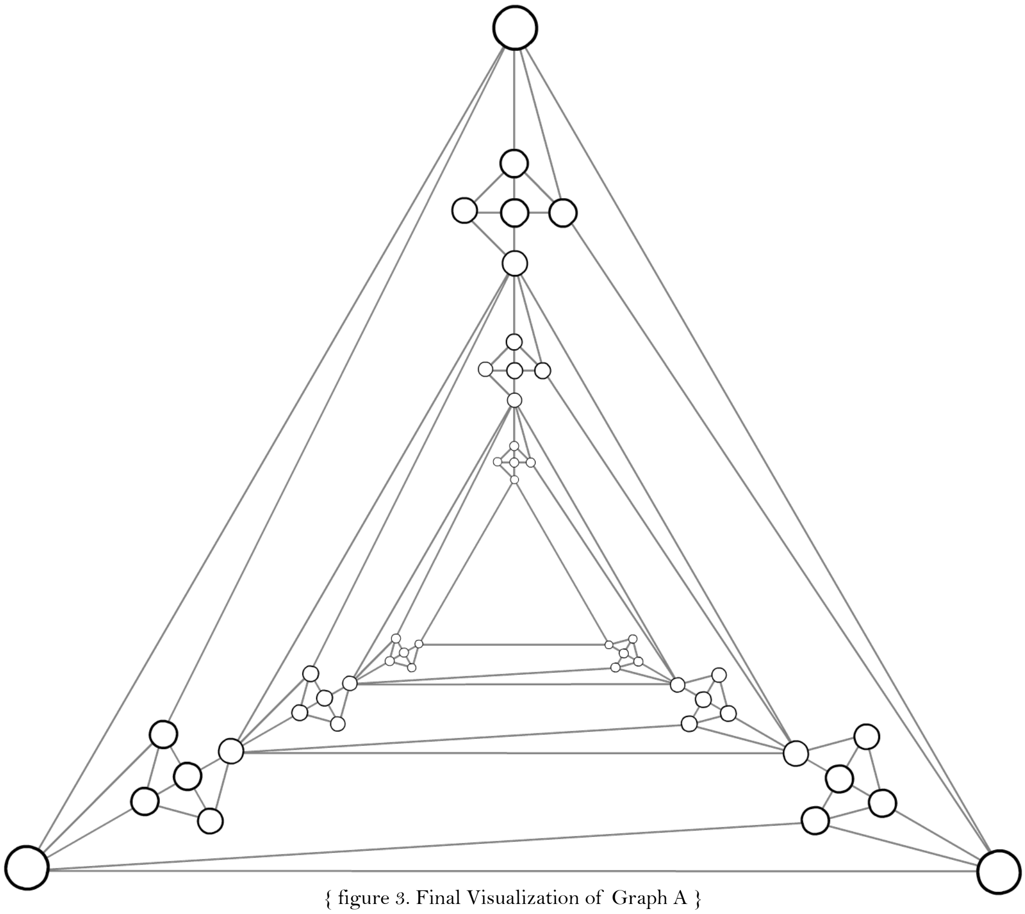
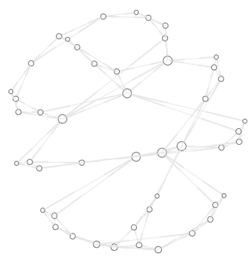
Hanley Weng - hanleyweng@gmail.com
GD Contest Submission 2011

ANGULAR RESOLUTION CATEGORY A GRAPH

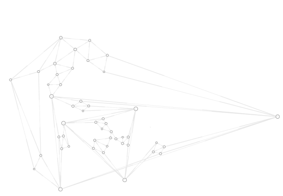


{ figure 3. Final Visualization of Graph A }

METHODOLOGY



{ figure 1. Initial visualization of Graph A with a variation of Hooke's law. }



{ figure 2. Graph A following some user manipulation via a custom program }

The potential graph formed by the data was assumed to be abstract, with it's initial visualization (figure 1) achieved via a variation of Hooke's law (whereby Springs were applied along edges, but instead of repulsive forces being used on non-neighbouring nodes, longer springs were implemented). Three visually similar structures emerged from this.

After the implementation of basic, mouse-based node movement. Manual manipulation appeared quite effective in revealing patterns, hence, user enabled data manipulation was extended into functions such as 'selection, rotation, mirroring, showing or hiding nodes and saving or loading node locations. The decision to represent node-size by their local centrality (degree) was also essential in facilitating the logical placement of nodes.

(Coding was done in Java, with Processing.)

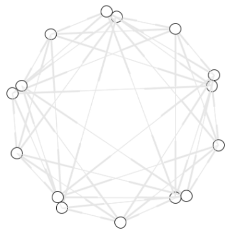
Following a few manual manipulations of the graph (figure 2), its' recursive, triangular pattern was realised.

In the final production of the graph visualization (figure 3), the recursive, symmetrical structure of the graph was emphasized. This depiction utilized the graph's isomporhism to alleviate cognitive load through small and simple affine transformations between similar structures of the graph. The resulting image has three axis of rotational symmetry. Iteratively decreasing node sizes were also used to deliver a faux sense of depth, enforcing the recurring structure of the graph.

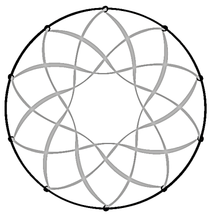
Hanley Weng - hanleyweng@gmail.com

ANGULAR RESOLUTION CATEGORY B GRAPH

METHODOLOGY



{ figure 4. Initial visual analysis of Graph B with a variation of Hooke's }



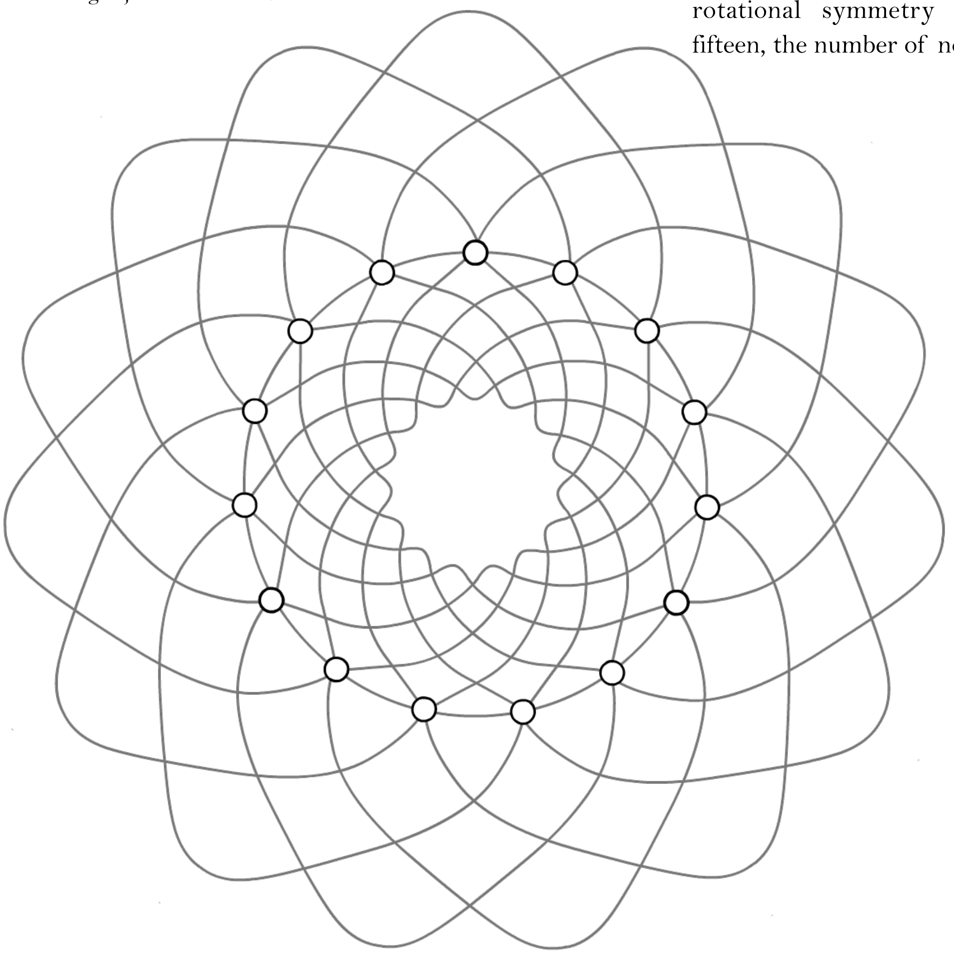
{ figure 5. Sketch of a subset of Graph B with triple-bend edges }

Initial Analysis (figure 4) revealed that all nodes were connected by equal degrees, each node containing the same structural pattern. As such, analysis of the graph could be easily approached by the iterative analysis of a set number of nodes and neighbors.

Analyzing the first two nodes any node was connected to, revealed that the nodes could be mapped to a circle. Expanding this to the first four nodes revealed that each node was connected to two symmetrically structured nodes. This subset of data was then graphed by digitally sketching onto a layer that repeated itself ten times, rotating evenly across one revolution. Manual sketches revealed an effective three-bend edge for connecting nodes and collectively minimizing angular resolution (figure 5).

(Digital sketching was done in a multilayer-enabled drawing software, Adobe Flash in this instance.)

In considering the entire data-set, an additional pair of symmetrically structured nodes were observed. The approach to their visualization was similar to the relaxed subset (above), but the space outside the initial circle was also utilized to minimize edge crossings. This produced the resulting image (figure 6). The angular resolution between edge crossings has been increased by sacrificially increasing the number of bends (with up to three per edge). High quantities of bends are aided with curved bends. The visualization exploits the graph's repetitive nature, representing it with n degrees of rotational symmetry (where n is fifteen, the number of nodes).



{ figure 6. Final Visualization of Graph B }