Expanding Structures

In the same style as assignment two, the intent of assignment three is to explore expanding structures according to the mechanisms outlined in lecture three. Use one or a subset of the following avenues to explore and demonstrate your understanding of the above topic to the class. We *highly* recommend you work in a group this week.

Revised Submission Details: You are responsible for the following deliverables:

> 1) Documentation Slides: slides must be submitted in **PowerPoint** (*.ppt* or *.pptx*) format to the TA (andy@csail.mit.edu) by 12:00 pm on March 4th. This is a firm deadline. Submitting past this point will mean you are unable to present. PowerPoint is freely available to students through MIT: http://ist.mit.edu/powerpoint. Submit all linked video files in addition to your PowerPoint file (this includes all embedded videos from websites). Slides should be used to document and explain what you did. Slides should contain forms of documentation appropriate to your submission type, i.e. videos, a series of photos, animations, proofs, a link to an executable and/or some other appropriate digital presence. Depending on the format of your submission, brief accompanying text may be a good idea (i.e. descriptive captions, a readme, etc.).
>
> 2) In addition to documentation slides, if you are choosing to work on a physical mechanism you should demonstrate a physical prototype to the class. Likewise, if you are developing a software tool please demo the tool (if this is native to your computer, have it ready to go *after* your slides) and submit the executable or capture, in your documentation, the software's functionality.

Physical Mechanism - Build a tangible expanding structure that you can demonstrate to the class.

Interactive Software Tool - Create a tool to facilitate creative exploration of expanding structures and demonstrate user interaction capabilities to the class. Feel free to build features into/grow your software tool from assignment two.

Virtual Design - Create a design utilizing expanding structures that incorporates some of these features: simulation of kinematic behavior, aggregation of multiple expanding polygons or integration with other systems, and/or engineering detail (interferences, tolerances, three-dimensionality). All designs, at minimum, should show movement as an animation or a sequence of positions.

Mathematical – Possibilities include: characterize when an array of expanding polygons can be joined and actuated together, either in 2D or as a polyhedral surface in 3D; develop an algorithm for layer assignment that avoids collisions in at least some (well-defined) scenarios.