

Problem Set 4

Due: Thursday, October 1, 2020

Problem 4.1 [Tube Folding]. Ben Boxdiddle wants to fold a $1 \times 1 \times n$ box (Figure 1) from a square piece of paper. Ben can fold only along horizontal, vertical, and 45° diagonal lines (an ancient tradition of the Boxdiddle family). He is considering several different approaches:

- (a) Use the cube extrusion method from Lecture 6.
- (b) Fold the paper into a width-1 rectangular strip and wrap it around the polycube.
- (c) Do something else? Find the best method you can think of.

For each of these approaches, do the following:

- calculate the exact size of the smallest square that Ben needs; and
- estimate the number of edges on the crease pattern (an answer like $\Theta(n^3)$ is sufficient).

Which approach should Ben use?

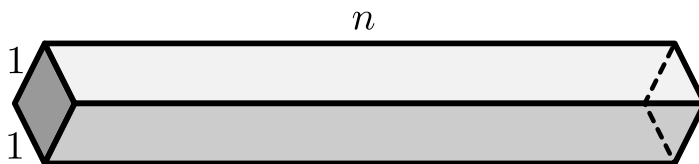


Figure 1: $1 \times 1 \times n$ box

Problem 4.2 [Maze Folding]. Design a maze with at least two (nontrivial) vertices in the Origami Maze Designer¹ and fold it. Submit a link to the view of your design and a photograph of the folded model.

¹<http://erikdemaine.org/fonts/maze/>