

## Text from Truchet Tiles

David A. Reimann  
 Department of Mathematics and Computer Science  
 Albion College  
 Albion, Michigan, 49224, USA  
 E-mail: dreimann@albion.edu

### Abstract

A way to create text with Truchet tiles is presented where each letter is represented by a particular grouping of Truchet tiles. The resulting text is rendered in a surprisingly and visually appealing manner within a tiled region.

### 1 Introduction

In 1704, Truchet investigated the patterns obtainable from a single square tile that was bisected along a diagonal into two uniquely colored isosceles right triangles [5]. In 1987, Smith [4] published an article containing a translation of Truchet’s original paper with some commentary and new ideas including the use of a random tiling rather than a structured pattern. Smith also included a variant of the Truchet tile that replaced the triangular segmentation with two quarter-circle arcs, resulting in a tiling that is comprised of an aesthetically pleasing, meandering set of mostly closed curves. These tiles are illustrated in Figure 1. Pickover [3] proposed using randomly placed Truchet tiles as a way to visually detect patterns in binary data, noting “the eye perceives no particular trends in the design.” However, he does note small features such as circles and dumbbells. Esperet and Girou [2] discuss a variant where the plane is randomly tiled using two tile types, each bicolored as shown in Figure 1. They note the tile’s type can be selected using a parity process ( $\text{row} + \text{column} \bmod 2$ ) to create filled regions, regardless of the tile orientation. Browne [1] describes how to generate a closed path (a Truchet contour) using a spanning tree. Browne also gives the simple formula for computing the perimeter and enclosed area of a contour.



**Figure 1:** *Truchet tile examples. From left to right: Truchet’s original tile, tile with arcs, and the two bicolored versions of tiles with arcs.*

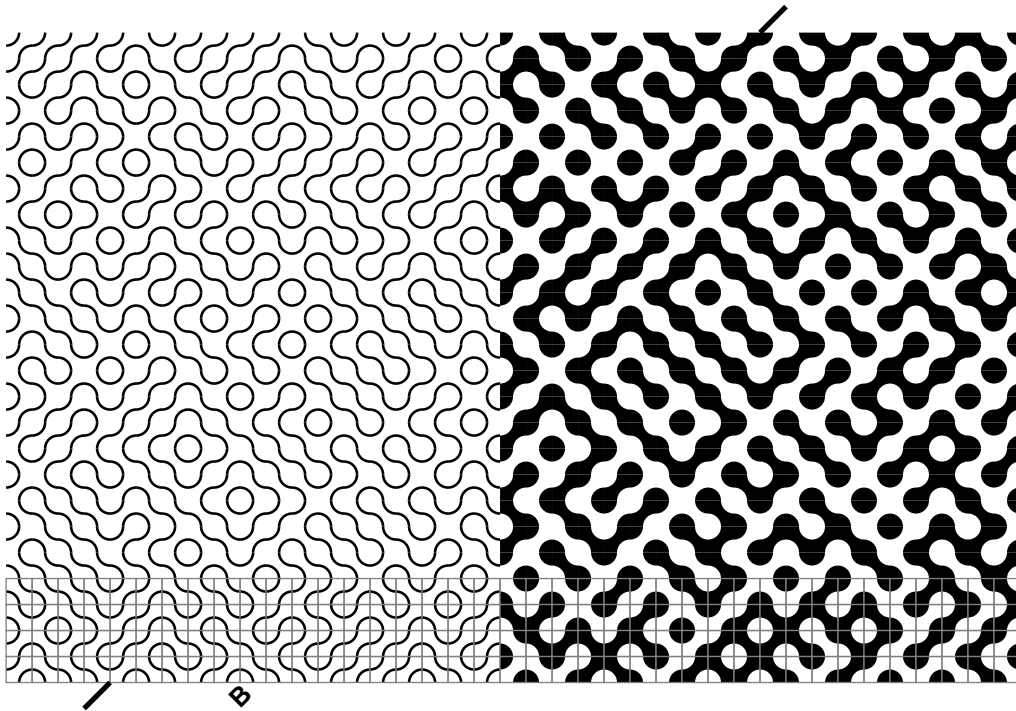
### 2 Creating Text from Truchet Tiles

One interesting application of Truchet tiling is to intersperse structured sections among a generally random field. More specifically, one can represent each symbol in a font with a simple Truchet contour. An example tiling containing the text “Bridges 2009” is shown in Figure 2. Because of the nature of the connections in the tiling, the baseline of each letter is oriented 45 degrees from the horizontal. While the tiling can be performed relatively easily, one must be careful of a few details. When using colored tiles, parity should

be preserved by selecting an appropriate spacing between letters, words, and baselines. Also, the tile size should be large enough for the curvature of the Truchet contours to be visible, yet small enough to allow rendering of all of the letters required for the text.

As Browne notes, the perimeters and enclosed areas of each Truchet contour are easy to compute. This suggests an interesting exercise for children in which they create their initials or a word and then compute its perimeter and enclosed area. Other applications include quilt making and architecture, where the designer might choose to include a name or other text as a subtle message in an otherwise random field.

The subtle nature of the text’s appearance enhances the pleasure in discovering a message in the tiling. While not shown here, visibility of the text can be greatly enhanced by using a contrasting color for the contours or the interior regions of the letters.



**Figure 2:** Examples of a Truchet tiling containing the words “Bridges” and “2009” using uncolored arcs (on left) and colored tiles (on right). The tiling grid is shown in the last four rows. The baseline of the word “Bridges” is along the line defined by the two line segments outside the grid. The start of the word along the baseline is indicated by the “B” at the bottom of the grid.

## References

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