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Douglas Dunham* (ddunham@d.umn.edu), Department of Computer Science 320 HH, 1114 Kirby Drive, Duluth, MN 55812-3036. *Hyperbolic Truchet Tilings: First Steps*. Preliminary report.

Truchet tilings have been studied for over 300 years, beginning with Sebastien Truchet himself. The original tile was a square divided into a black and white triangles by a diagonal, which thus has four orientations depending on which corner is completely black in an upright square. Copies of this tile are arranged on a square grid, in a pattern or with random orientations. One modification of the Truchet tile is a square decorated with two quarter arcs of circles that connect midpoints of adjacent sides, one arc on each side of a diagonal. Such a tile has two orientations in an upright square. The modification can also be applied to a regular hexagon tile, giving patterns based on the regular hexagon tessellation. Both the original Truchet tile and the modified versions can be generalized to regular p -sided polygons in the hyperbolic plane, and thus be used to create Truchet-like patterns based on the regular tessellations $\{p,q\}$ of p -sided polygons meeting q at each vertex ($(p-2)(q-2)$ must be greater than 4 for the tessellation to be hyperbolic). We will show such patterns and indicate mathematical challenges that arise from them. (Received September 12, 2010)