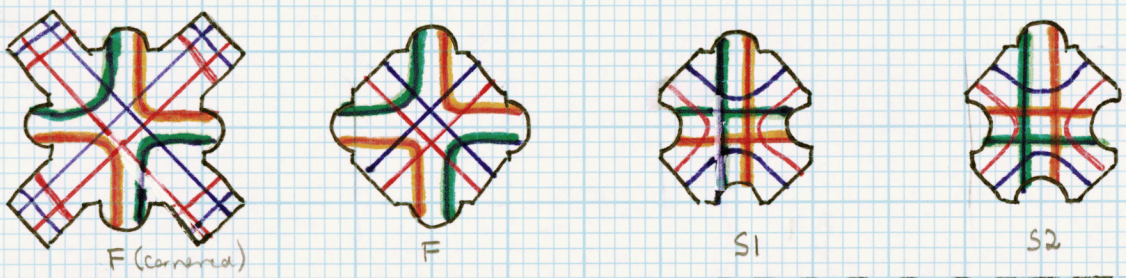
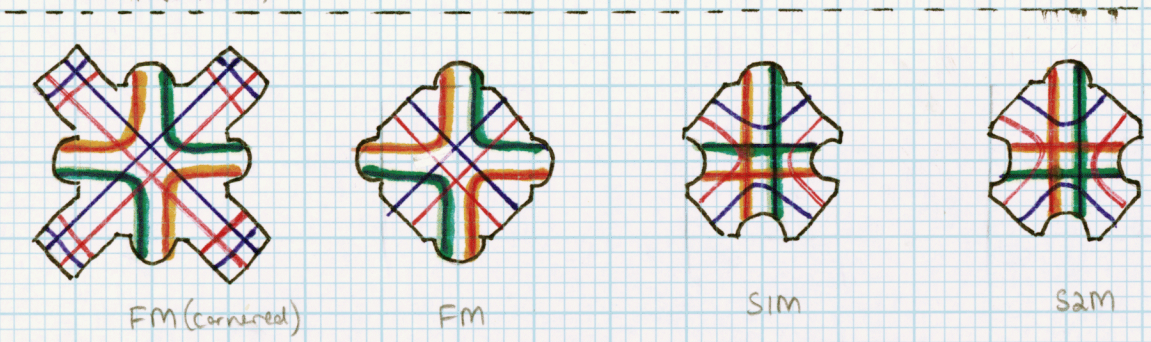
13 July, 2006

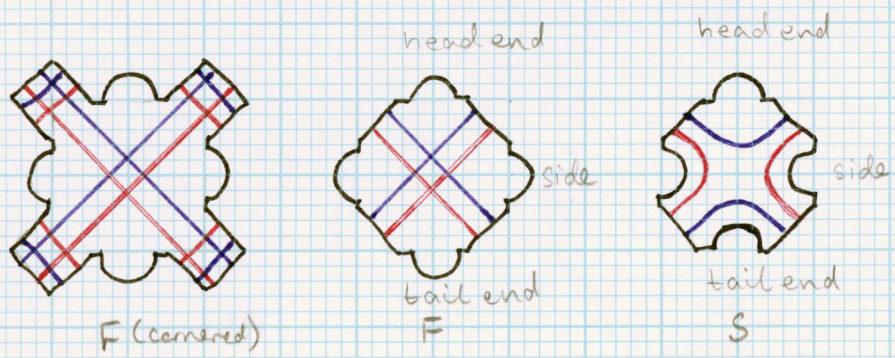
It will here be described two protetile sets translations, rotations and ~~mirror images~~ reflections of which, including subsets, will tile the plane only non-periodically using only local matching rules. Both protetile sets are composed of basically square tiles, the first set of 3 tiles, the second of 2 tiles. In both cases the tiles are marked with ~~twin~~ compound stripes (composed of two stripes side by side) across vertices, amongst other markings. ~~If~~ matching rules ~~are seen~~ Seeing as logical impositions on tiles ~~these are~~ ~~may be confused to~~ allows these stripes to be considered one-dimensional even though they must have a right-hand and left-hand component stripe. Should it be desired that the matching rules have ~~physical~~ spatial substance then the same tilings may be expressed using one extra tile in each case. The extra tile is equipped with corner extensions which carry the stripes along 2-dimensional paths. The first set of tiles may be reduced to the second set by removing one ~~set~~ layer of stripes (those which run from side to side). This does not lead to any periodicity but does permit a single, infinite fault line to develop in a tiling. Below are depicted the protetile sets using the extra tiles with corner tabs. The sets with one fewer tiles are obtained by removing the tile with corner tabs, ~~extending~~ making all other tiles ~~to become~~ squares and imagining that the ~~tempound~~ stripes are one-dimensional across vertices.



First protetile set.



Reflections (rotated) of the first protetile set.



Second protetile set. Reflections are not distinct.

Can be given an two tiles and key-tile (as corner tab).  See bottom page 3 for another style key tile

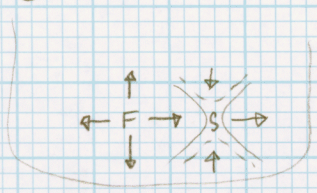
Notational shorthand one-dimensional
Dashed line for red
Solid line for blue

semicircular bumps & dents depicted as arrows. Cornered tiles not used and diagonal stripes considered

Whatever is denied the second set by its matching rules, is also denied the first set.

0. Cannot tile without both F and S tiles because of arrows.

1. The F tile must have S tiles on each side (by IN & OUT arrows) and all the S tiles are side on or tail in (by corner stripes of S tile matching across vertices). Thus each F tile is closely enclosed by a red or blue loop. (Similar arguments disclose that an S tile may have S tiles on all sides and so be closely enclosed in a blue loop, but not a red one.)



2. An F tile in a blue loop has F tiles in red loops on each side of the blue loop

Only an F tile can fit at A (2 OUT arrows) and it must be surrounded by S tiles side on (by 1.)