








Theorem: A ray *must* begin at one of the following four types of tile configurations: A *bidimer* configuration, a *vortex* configuration, a *loner* configuration, or a *vee* configuration.

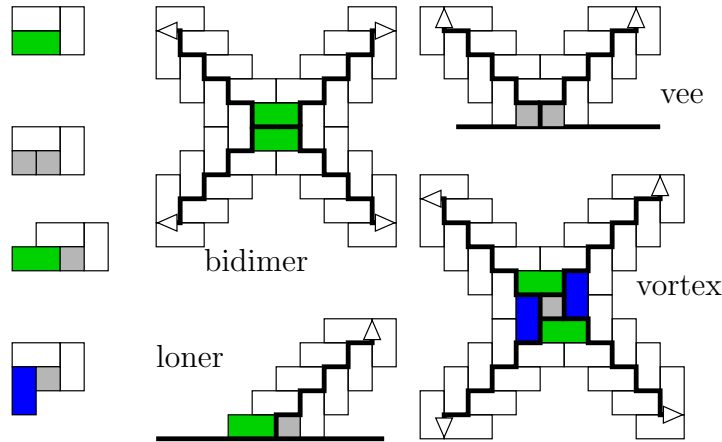
Proof: Consider the different tiles that can cover the grid square at the “beginning” of a ray: 

If it is this blue tile , we are not dealing with the beginning of the ray, so it cannot be the blue tile.

We itemize the four possible cases below, and afterwards, draw a diagram representing all of the tiles whose placement is “forced” by the four configurations.

- **Case 1: *Bidimer***, two dominoes share a long edge: .
- **Case 2:** If there is a monomino at beginning , then we need to consider how the square beside it is covered (the pink circle).
 - **Case 2(a): *vortex***: .
 - **Case 2(b): *loner***: . This must occur on the boundary.
 - **Case 2(c): *vee***: . This must occur on the boundary.

Each of these tile configurations forces the placement of more tiles. This is shown below.



q.e.d. (from the latin phrase quod erat demonstrandum, meaning “which had to be proven”)

This is a big piece of the puzzle that describes the whole structure of tatami coverings, which is essentially that every monomino-domino tatami covering is completely determined by its bidimers, vortices, loners, and vees, and additionally, the rays emanating from these cannot cross.

