A cube of wood is divided into 27 identical mini-cubes (similar to a “Rubik’s Cube”). Alfred, a wood-eating bug, is in the center of the cube and can travel from the center of any mini-cube to the center of a face-adjacent mini-cube. Can Alfred travel from the center and visit the center of each mini-cube exactly once? If he can describe his path. If he cannot explain why.

Solution: Alfred cannot make such a trip (note: a few people correctly pointed out that Alfred could make such a trip if we remove the requirement that he start at the center).

Here is one way to see such a path is not possible. Color the cubes black and white, like a 3-D checker board, say with the center cube black. Then a quick count gives 13 total black cubes and 14 white ones. The conditions on how Alfred moves means any path alternates black and white blocks. However this is impossible as Alfred begins in a black cube and there are 13 black cubes, versus 14 white ones.