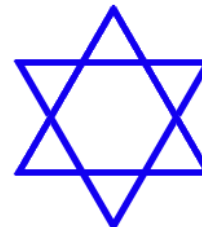


Homework # 2; due Wednesday, Feb. 16

Reading: Chapter 5 of Atkins and Friedman's *Molecular Quantum Mechanics* (Group Theory)

4. Find all the *symmetry operations* and *symmetry elements* of a planar Star of David (Magen David) shown in the figure.



5. Using the decision flowchart given in Chapter 5 of Atkins and Friedman (and reproduced in class notes), find the proper point group for the NV center in diamond.
6. Show that the speed of sound in a uniform solid is $(E/\rho)^{1/2}$, where E is the Young's modulus, and ρ is the density. Calculate the speed of sound for diamond. (This problem is, obviously, not about group theory, and may require you to read up on things. Lately, Wikipedia has become my favorite first source. For this problem, I would particularly welcome an elegant derivation, for example, using a model of a solid as a network of masses and springs, or something like this...)