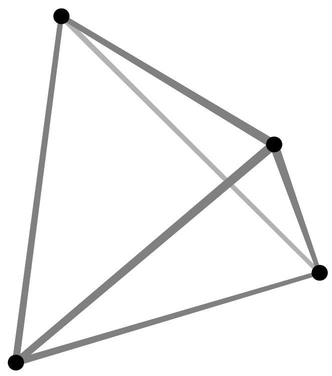
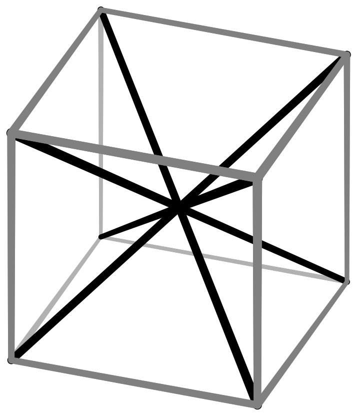
The Symmetry Groups of the Platonic Solids

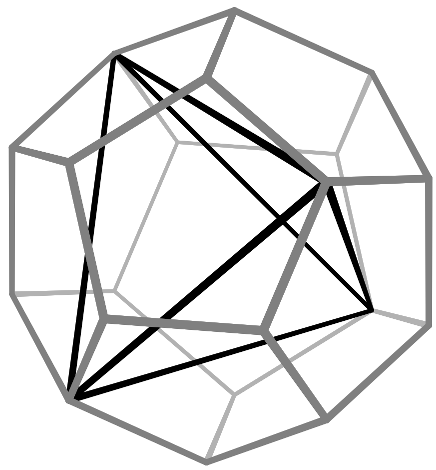
The symmetry group of the tetrahedron is isomorphic to A_4 via its action on the 4 vertices.





The symmetry group of the cube is isomorphic to S_4 via its action on the 4 long diagonals (all shown).

The symmetry group of the dodecahedron is isomorphic to A_5 via its action on 5 embedded tetrahedra (one shown).



The symmetry groups of the octahedron and the icosahedron are the same as those of their duals, the cube and the dodecahedron.