1. (10 points) Enumerate the unlabeled directed graphs on 4 vertices with no loops, by considering the action of $S_4$ or ordered pairs of (distinct) vertices.

2. (10 points) Enumerate the colorings of the faces of a regular tetrahedron with $m$ colors by considering the action of the rotation group on the faces. What is this group? Special cases: (a) $m = 3$; (b) what is the total number of colorings with $m$ colors?