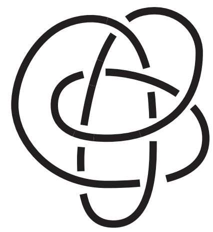
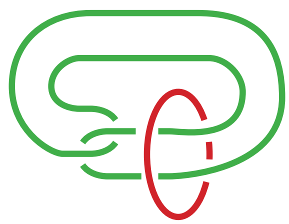
Math 978 Homework # 2

6. Compute the Wirtinger presentations for the fundamental groups of the complements of the knots 7_3 and 6_2 pictured below.

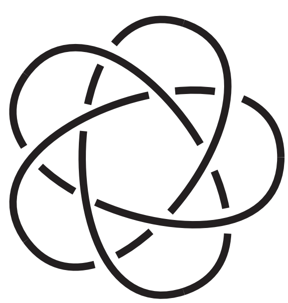
7. Show that there is an isotopy of the Whitehead link (shown below) to itself which interchanges the two components of the link.

   (Hint: find an isotopy to a projection with 180° rotational symmetry.)



8. Determine the *prime* values of n for which the knots 7_3 and 6_2 admit a mod n coloring.

9. Show that the knot pictured below (the (3,5) torus knot) admits a mod n coloring for no n.



10. Show that, for any knot K, any *surjective* homomorphism $\varphi : \pi_1(X(K) \to D_{2n}$, n odd, must send a generator (hence <u>all</u> of the generators) of (any) Wirtinger presentation to an element of order 2. Conclude that (for n prime) a knot has a mod n coloring if and only if the knot group admits such a surjective homomorphism.

    (Hint: for n odd, the elements of order 2 are precisely the orientation reversing symmetries, i.e., the non-rotations.)