Math 250A: Reading and Concepts for Week 2

*General reading note:* To refresh your comfort with permutation groups and simple groups, it might help also to look over George Bergman’s notes on the proof that $A_n$ is simple for $n \geq 5$ (posted on the course website).

The lectures this week will be planned roughly as follows (it may very well take longer to cover than planned):

- Composition series, proving Jordan-Hölder theorem. You should be comfortable with the isomorphism theorems covered last week, and should convince yourself of the following: If $G_1, H_1$ are normal subgroups of $G$, then $G_1H_1$ is a normal subgroup of $G$. Also, if $H$ is a normal subgroup of $G$ and $K$ is a normal subgroup of $G$ contained in $H$, then $H/K$ is a normal subgroup of $G/K$. Finally, the intersection of normal subgroups is normal.
- Abelian, cyclic series, solvable groups. Same suggestions on what you should know and be comfortable with as lecture 4, plus I assume you know what simple, abelian, and cyclic groups are.
- Solvable groups continued. Same suggestions as last time. Review the notion of a commutator subgroup from last time.