Two research projects in graph theory

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Abstract: Graphs are very versatile; they can be used to model pretty much anything discrete, from the internet to how combinatorial games evolve in time. This talk will be on two undergraduate research projects that Fresno State students will be tackling, under my supervision, starting in August.
We will learn how to set the objects we care about, and what is known about them. Possible venues for future research will also be discussed.

Project 1. Given a graph, we can color its vertices in many different ways. These colorings can differ wildly, but also they could fairly alike. Using this, we can construct a graph using graph colorings as vertices and by connecting colorings by edges if they are 'almost the same'.

Project 2. Given a group G, non-abelian to make things interesting, we construct a graph using (most) of the elements in G as vertices and connecting elements using edges only if they commute. The graph created is called the commuting graph of G... and not much is known about them.