VCU Graph Theory
Computational Discovery Lab
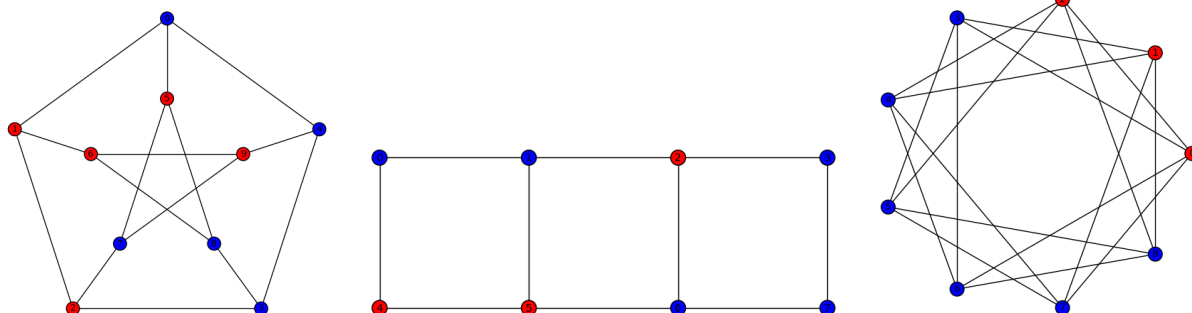
Balanced Colorings of Graphs

Summer 2025

2106 Harris Hall
May 12—May 16
MTWThF, 10:00-12:30, 1:00-3:00

Color the vertices of a graph red and blue . We call a vertex "balanced" if exactly half of it and its neighbors are colored red (and half are colored blue).

What are the graphs where *there is* a red-blue coloring where *every* vertex is balanced? If a graph doesn't admit a balanced red-blue coloring, what is the best we can do? How can we quantify and investigate this question?

There are many things we can do together. Literature search and review can be useful. Using a computer to make conjectures can be useful. Drawing graphs at the board and talking about our ideas together can be useful. We will start with no pre-existing knowledge—and **explore**! **All are welcome, at all levels of knowledge and ability**. **Enthusiasm is necessary**. We will use Sage and an automated conjecturing program as part of this research.

Mostly we'll have one week of an **intensive fun research experience**. Please **contact** us if you have any questions. We also need a headcount. Send an email that says: I'lm interested!

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VCU Mathematics