VCU Discrete Mathematics Seminar
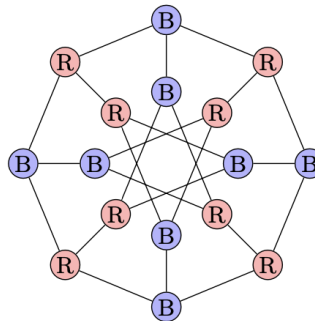
Coloring vertices to achieve balance

Prof Ann Trenk
(Wellesley College)

Wednesday, April 2
1:00-1:50 EDT

In person! in 4145 Harris Hall. And on Zoom:

`https://vcu.zoom.us/j/92975799914`
`password=graphs2357`

We assign a color (red or blue) to each vertex of a graph, called a red-blue coloring, and it is permissible for adjacent vertices to get the same color. A graph is called a *closed neighborhood balanced graph* (CNBC) if it has a red-blue coloring in which for each vertex v there are an equal number of red and blue vertices in v's closed neighborhood. Analogously when open neighborhoods are considered the resulting graphs are called *neighborhood balanced graphs* (NBC). Both NBC and CNBC graphs can model situations where it is desirable to distribute two types of resources to vertices in a graph so that each vertex has a balance of resources among its neighbors.

In this talk we discuss a variety of examples and results about CNBC and NBC graphs. We show that the classes of NBC and CNBC graphs are not hereditary, and in fact, every graph is an induced subgraph of an NBC graph and of a CNBC graph. While red-blue colorings of NBC and CNBC graphs are locally balanced, we show that globally they may contain arbitrarily more red than blue vertices. We also consider trees and characterize those trees that are CNBC graphs.

For the DM seminar schedule, see:

`https://go.vcu.edu/discrete`