MATH N55 HOMEWORK 1
DUE FRIDAY, JUNE 28TH

Do the following problems in Rosen:

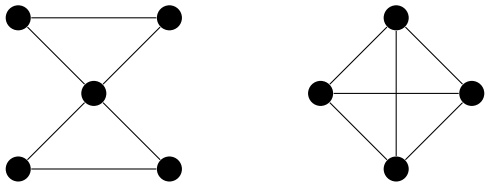
Section 1.1: 12, 17, 34
Section 1.3: 25, 29, 36
Section 1.4: 14, 23
Section 1.5: 10, 23

When finished, upload your solutions as a PDF to Gradescope.

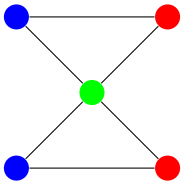
Challenge

The following problem is optional. Do not turn it in with the rest of your homework. Instead, you are encouraged to discuss your solutions in office hours or on Piazza. (Please refrain from posting full solutions on Piazza before the due date.)

Arrangements of circles and lines like the ones below are called *graphs*:



A graph is called *3-colorable* if it is possible to color each circle red, green, or blue in such a way that there is no line between circles of the same color. For example, the first graph above can be 3-colored (below), but the second one cannot.



Describe how to encode the problem of determining if a graph is 3-colorable as a satisfiability problem. That is, describe a systematic way to turn a graph G into a compound proposition ϕ, such that G is 3-colorable if and only if ϕ is satisfiable.