MATH 634, Spring 2014

HOMEWORK 5

due 5:00PM on Wednesday, February 19.

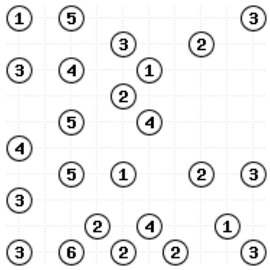
*Background reading: Pearls in Graph Theory*, Section 1.3 and 2.1.

Follow the posted homework guidelines when completing this assignment.

Problems **5D**, **5E**, and **5P** should be typed (or written up) and handed in as class starts on Wednesday 2/19:

**5D.**
- (vertex) coloring of a graph
- proper (vertex) coloring of a graph
- chromatic number of a graph
- critical graph
- clique number of a graph

**5E.** Sudoku is sooo last decade! Solve this Hashi puzzle.



**Instructions:** Draw in lines to connect the circles such that:

- Lines must be either perfectly vertical or horizontal.
- Up to two lines may be drawn connecting the same circles.
- The lines may not cross.
- The degree of each vertex is the enclosed number.
- The entire graph must be connected.

For many more Hashi puzzles and other fun games, visit
http://www.menneske.no/hashi/eng/ & http://www.puzzle-bridges.com/.

**5P.** Consider a tree $T$ that has only vertices of degree 1, 2, and 3. Suppose that $T$ has exactly 10 vertices of degree 3. Find and prove how many leaves $T$ has.
[*Important: Prove your answer for* **any** *tree $T$ satisfying these conditions.*]