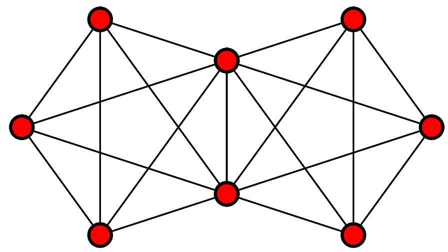
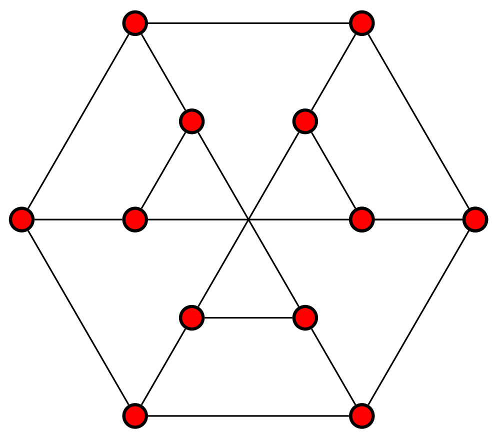
Due at 2:40pm Thursday, April 26, 2018.

1. Show that every bipartite graph on n vertices is $(\lceil \log_2 n \rceil + 1)$-choosable. (Hint: apply randomization on the *colors*, not vertices or edges.)

2. Find an embedding of the following graph in the torus:



3. Without using Kuratowski's theorem, show that the following graph is nonplanar (Hint: count the number of short cycles):



4. ~~Recall that $K_n - C_n$ is the graph formed by taking the complete graph K_n and deleting a Hamiltonian cycle. Using the Map Color Theorem, show that for sufficiently large n, the genus of $K_n - C_n$ is *strictly* increasing.~~

   Let O_n denote the "generalized" octahedral graph[1] formed by taking K_n and deleting a maximum matching of $\lfloor n/2 \rfloor$ edges. Using the Map Color Theorem [i.e., the genus of the complete graphs] show that for sufficiently large n, the genus of O_n is ***strictly*** increasing.

[1]Previously, we've seen it defined for even n.