

Math 55 Quiz 14
November 30, 2016

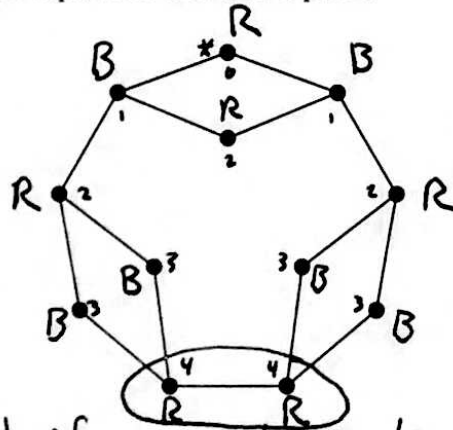
This quiz will be graded out of 15 points; the True/False question is worth 3 points, and the exercise is worth 12 points. Please read the instructions carefully, and explain your work.

True or False. Mark the following statements as either true or false, or leave a blank if you don't know. A correct answer is worth +1 point, a blank is worth 0 points, and an incorrect answer is worth -1 points, so be smart about guessing!

- a. F A simple graph may have loops.
- b. T The sum of degrees of the vertices of a finite undirected graph is equal to twice the number of edges of the graph.
- c. T The graph K_n has $\binom{n}{2}$ edges.



Exercise. Is the following graph bipartite? Provide a proof.



We have seen that if a graph is bipartite, a greedy algorithm of picking an initial vertex, assigning it a color, and then consecutively coloring neighbors with opposite colors will give a 2-coloring representing the bipartition of the graph. In particular, if this greedy algorithm produces a coloring with adjacent vertices of the same color, then the graph is not bipartite. In the above graph, we end with two vertices of the same color adjacent, so the graph is not bipartite.