CS 70 Discrete Mathematics and Probability Theory Spring 2023 Satish Rao and Babak Ayazifar

DIS 2B

1 Trees and Components

Note 5

(a) Bob removed a degree 3 node from an *n*-vertex tree. How many connected components are there in the resulting graph? Please provide an explanation.

(b) Given an *n*-vertex tree, Bob added 10 edges to it and then Alice removed 5 edges. If the resulting graph has 3 connected components, how many edges must be removed in order to remove all cycles from the resulting graph? Please provide an explanation.

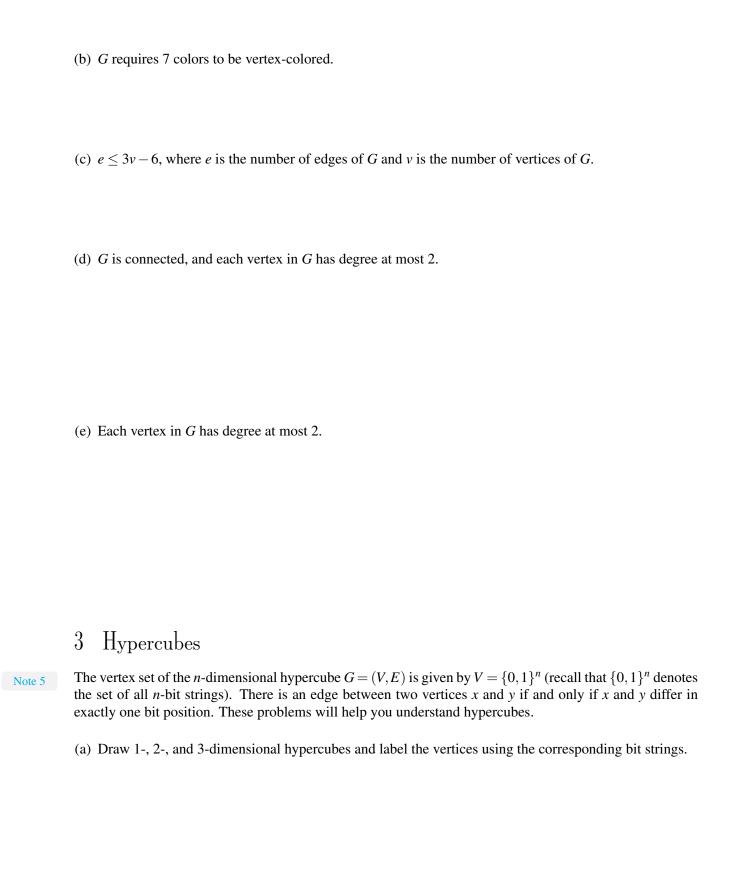
2 Always, Sometimes, or Never

Note 5

In each part below, you are given some information about a graph G. Using only the information in the current part, say whether G will always be planar, always be non-planar, or could be either. If you think it is always planar or always non-planar, prove it. If you think it could be either, give a planar example and a non-planar example.

(a) G can be vertex-colored with 4 colors.

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