HW8 Jinyang Li

1.Proof:

1. To proof 3-coloring a planar graph is NP-complete, we would trivial all vertexes and test it which means the process is in polynomial time.
2. As hint indicated, to prove NP-hardness is needed to proof NP-completeness.

Consider the graphs in lecture, we need to prove the input graph Gt is a planner graph.

When we replace every edge crossing in Gt.

1) The graph is consisted of isolates triangles.

2) The graph is consisted of parallelograms.

3) The graph is consisted of isolates triangles and the opposite corners have same color.

4) The graph is consisted of trigness or squares but coloring of the corners are the 3-coloring.

If an edge in Gt is crossed by multiple edges, it is time to replace all cross points by our graph, and obviously it would run in polynomial time. 这句我根本看不懂

To color the professor’s graph, we must make:

1- The linked squares or triangles have no same color at all.

2- The perfect centroymentry the vertex of every edge add to the graph has different color with connector. 这句我也看不懂

2.Proof:

1. To proof we would trivial all vertexes and test it like Q1, to wether it is a NP-Complete graph.
2. When we proof that planner 3 coloring graph is NP-hardness, it could to say it is a NP-Complete graph. 这句我也不是很懂 求改。。
3. Consider that a Graph(V, E).

If we trivial vertex with 4 degree, this vertex must has 4 edges linked. If we do operation below:

Replace the vertex like graph shows:

Replace vetext by 这句得改

The brides can be colored with polynomial time and at the same time, graph changed to planer graph. Thus, 3-color problem can be centered to be planar 3 color in polemical time. Which proofs that planar 3 color is NP-Hardness.

Thus, planar 3 color is NP-complete.

可能要改一改。。谢谢！！