21-301 Combinatorics Homework 6 Due: Monday, October 24

- 1. Let P_1, P_2 be two paths of maximum length in a connected graph G. Prove that P_1, P_2 share a common vertex.
- 2. Show that if G = (V, E) is not connected then its complement $\overline{G} = (V, \overline{E})$ is connected. $(\overline{E} = \{(x, y) : x, y \in V \text{ and } (x, y) \notin E\}).$
- 3. Let T be an arbitrary tree on k+1 vertices. Show that if $\delta(G) \ge k$ then G has a subgraph isomorphic to T.