21-301 Combinatorics
Homework 7
Due: Friday, November 6

1. Use the pigeon-hole principle to show that for every integer $k \geq 1$ there exists a power of 3 that ends with $000\cdots0001$ (k 0's).

2. Show that if the edges of K_{m+n} are colored red and blue then either (i) there is a red path with m edges or (ii) a vertex of blue degree at least n.

3. Show that if $n = 2m$ is even and the edges of K_n are colored red or blue then either (i) there is a red triangle or (ii) there is a vertex of blue degree at least $m - 1$.