1. Prove that if we 2-color the edges of K_n then either (i) there is a vertex of Red degree at least $\frac{n}{2} - 1$ or (ii) there is a Blue triangle. Show also that it is posible to have a 2-coloring in which the maximum Red degree is $\frac{n}{2} - 1$ and in which there is no Blue triangle.

2. Prove that if we 2-color the edges of K_6 then there are least *two* mono-chromatic triangles.

3. Prove that if $n \geq R(2k, 2k)$ and if we 2-color the edges of $K_{n,n}$ then there is a mono-chromatic copy of $K_{k,k}$.