Project 2, MORALLY Due April 28, 3:30

COURSE WEBSITE: `http://www.cs.umd.edu/~gasarch/COURSES/858/S20`

The following theorem is true:

For all k, there exists a number $n = \mathrm{CLR}_1(k)$ such that for all colorings (any number of colors) of $\{k, k+1, k+2, \ldots, n\}$, one of the following holds:

- *there exists a large homogeneous set*
- *there exists a large rainbow set*

And now for the project:

1. Prove the above theorem using the Large Ramsey Theorem. Specifically, show that $\mathrm{CLR}_1(k) \leq \mathrm{LR}_2(k)$.
2. Give an exact formula for $\mathrm{CLR}_1(k)$. Realize this entails finding both colorings for lower bounds and a proof for upper bounds. (You should not need to use the Large Ramsey Theorem at all)