Homework 9, Morally Due Tue May 5, 2020, 3:30PM

COURSE WEBSITE: `http://www.cs.umd.edu/~gasarch/858/S18.html`

THIS HW IS ONE PAGE LONG!!!!!!!!!!!!

1. (0 points) What is your name? Write it clearly.

2. (50 points) In this problem you may assume that, for all c, there exists $N = N(c)$ such that for all c-colorings of $[N] \times [N]$ there exists a monochromatic square.

   Show that there exists M such that, for all 2-colorings of $[M] \times [M]$, there exists five points that are the same color of the following form:

   (x, y)

   $(x + d, y)$

   $(x, y + d)$

   $(x + d, y + d)$

   $(x + 2d, y + d)$

   (This is called a *Little Dipper*.)

   You can (and should) prove this by making drawings and pointing to stuff.

3. (50 points) Assume that you know that, for all c, $W(100, c)$ exists. Prove that $W(101, 2)$ exists. You can draw diagrams; however, your proof should be completely rigorous.