

Homework 11

Morally Due Tue April 26 at 3:30PM. Dead Cat April 28 at 3:30

WARNING: THE HW IS TWO PAGES LONG

1. (0 points) What is your name? Write it clearly. When is the take-home final due?
2. (50 points) Find a value of $m < 50$ such that the following holds, and prove it. Prove it from first principles— that is, your proof should not refer to the slides or any other source.

For all 3-colorings of the $4 \times m$ grid, there exists a mono rectangle.

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3. (50 points) For this problem we can assume the following is known:

For all $c \geq 1$ there exists $L = L(c)$ such that

for all c -colorings of the $L(c) \times L(c)$ grid

there exists a mono L .

(RECALL from the slides that a mono L is really a mono Isocles right triangle.)

Let a big-base- L be the same shape as the following four points:

$(0, 0)$, $(d, 0)$, $(2d, 0)$, and $(0, d)$.

And NOW for our problem:

Show that there exists LL such that,

for all 2-colorings of the $LL \times LL$ grid

there exists a monochromatic big-base- L .

Feel free to use PICTURES in your proof.