Homework 12
Morally Due Tue May 3 at 3:30PM. Dead Cat May 5 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) Let $VDW(k, c)$ be the statement

There exists $W = W(k, c)$ such that for all $\text{COL}: [W] \rightarrow [c]$ there exists $a, d \geq 1$ such that

$$a, a + d, \ldots, a + (k - 1)d \text{ are the same color}.$$ 

Let $W(k, c)$ be as in the statement.

AND NOW FOR THE PROBLEM

Assume $(\forall c)[VDW(9, c)]$. Prove $VDW(10, 2)$. Your proof should give an upper bound on $W(10, 2)$ as a function of $W(9, c)$. 

GO TO NEXT PAGE

1
3. (50 points) In this problem you will do PART of the proof of
$(\forall k)[PVDW(x, x^2, x^2 + x, \ldots, x^2 + kx)].$

(a) (20 points) State carefully the LEMMA that will imply
$(\forall k)[PVDW(x^2, x^2 + x, \ldots, x^2 + kx)].$

(b) (30 points) Prove carefully the BASE CASE of that lemma.

(c) (0 points, but good for your enlightenment) Prove the Induction
Step of the lemma.