

Homework 6, Morally Due Tue April 14, 2020, 3:30PM
COURSE WEBSITE: <http://www.cs.umd.edu/~gasarch/858/S18.html>

1. (0 points) What is your name? Write it clearly.
2. (50 points) In the March 31 recording I gave three proofs of the following theorem:

Theorem: For all k there exists n such that, for any n points in the plane no three colinear, there exists k points that form a convex k -gon. One proof used 5-ary Ramsey.

One proof used 3-ary Ramsey and the coloring

$COL(x, y, z)$ is RED if the number of points inside the x - y - z triangle is RED is even, BLUE if its odd.

One proof used 3-ary Ramsey and the following coloring: let p_1, \dots, p_n be the points (the ordering does not correspond to anything geometric, but we need SOME way to order the points).

$COL(p_i, p_j, p_k)$ with $i < j < k$ is RED if p_i, p_j, p_k is clockwise and BLUE if its counterclockwise.

I did not finish that proof. So the problem is to finish part of the proof: Finish the case where the homog set is RED. You may draw pictures and reason from them.

3. (50 points) Read the notes with link *One Probe Search Algorithms*. Write up a description of the cell probe algorithm that takes only one probe for when $U = 2n - 2$. You DO NOT have to proof that it works. And your description should be clear enough that (1) I could give it out to the class next time I teach this course, (2) someone who reads it could EASILY code it up.