FIRST BIG PROBLEM

DISCRETE STRUCTURES II FALL 2020

For this Big Problem, you will analyze graphs from real life.

(1) Pick a communication method you use often (e.g. phone, text, chat, email, social messaging).

(2) Look at the ten most recent conversations you have had using that method. Draw a graph with a vertex for each of the people involved in those conversations, *except yourself*. Label the vertices so you know which one is which (you may use nicknames or anonymize as a, b, etc.).

(3) Draw an edge between any two people that communicate directly. For example, if you recently called your sister, your mother, and a pizza place, you should draw an edge between your sister and your mother (because they talk to each other) but not your sister and the pizza place (unless she also orders pizza from there).

(4) Draw this same graph in a few different ways; each drawing will be isomorphic to the others. Which drawing do you think is the most clear, and why?

(5) Which vertex has the highest degree, and what does that tell you about the person?

(6) Which vertex has the lowest degree, and what does that tell you about the person?

(7) What is the longest path between two people in this graph, and what does that tell you about those two people?

(8) Share your clearest drawing (the one from step 4) with the other people in your breakout group, with the labels removed.

(9) Look at the graphs your group members sent you in step 8. What do your graphs have in common? What is different?

(10) Make a conjecture about the people in one of your group members' graphs and explain why you think it might be true.