

Monday, April 16

Follow the separate general guidelines for Parts A,B,C. Be sure to include and label *all four* standard parts (a), (b), (c), (d) of Part A in what you hand in.

**Graphs, trees, and forests**

Introduction to Chapter 5, and Section 5.1 (pp. 255–260)

**A: Reading questions.** Due by 3pm, Wed., 18 Apr.

1. The introductory material to Chapter 5 (pp. 255–257) introduces many definitions (all the words and phrases in *italics*). To get acquainted (or re-acquainted) with these definitions, do the following: Draw two or three different graphs, each with about 5-10 vertices. Use these graphs to illustrate each definition. (For instance: To illustrate the idea of a *walk*, you would identify a walk in each of your graphs. Do your best to pick examples that will help illustrate the definition (for instance, a walk consisting of only a single edge fits the definition, but doesn't do a good job illustrating the idea). If you need more than two or three graphs to illustrate all the definitions, feel free to draw more graphs.
2. With each of your example graphs in the previous reading question, illustrate the result of Proposition 5.1. (This will be similar to Example 5.2.)
3. What does it mean for a graph to be **minimally connected**? Draw an example on a graph with 5-10 vertices, and show why it satisfies the definition of minimally connected. Does your graph have any cycles? How many vertices and edges does your graph have? Can you add a single edge, and make your graph no longer minimally connected? Can you remove a single edge, and make your graph no longer minimally connected?
4. What is the difference between a tree and a forest? Can you have a tree that is not a forest? Can you have a forest that is not a tree? Can a graph be both a forest and a tree? Can a graph be neither a forest nor a tree? Justify your answers with examples (for things that **are** possible, give an example) or proofs (for things that are **not** possible, explain why not).
5. Can you have a tree with no leaves? Justify your answer.

**B: Warmup exercises.** For you to present in class. Due by the end of class Thu., 19 Apr.

1. **5.12 Supplementary Exercise: 2.**