6.885: Geometric Folding Algorithms

Fall 2007 — Prof. Erik Demaine

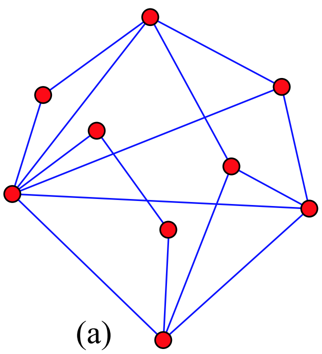
# Problem Set 1

*Due: Friday, September 28, 2007*

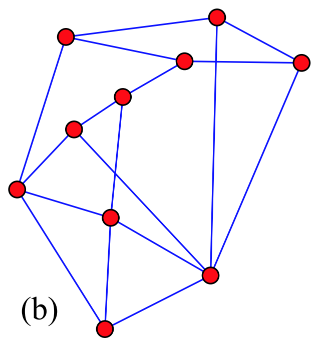
**Problem 1.** Kempe's Multiplicator gadget uses two important properties of a contraparallelogram: that opposite angles are equal, and that knowing one angle pair determines the other angle pair. But parallelograms have the same two properties. Is it possible to build an angle doubler simply by combining parallelograms along common edges? Prove your answer.

(In this problem, you should assume that the parallelograms have been suitably braced to avoid transforming into contraparallelograms.)

**Problem 2.** Which of the following graphs are generically flexible, minimally generically rigid, or nonminimally generically rigid? Prove your answer.



(a)



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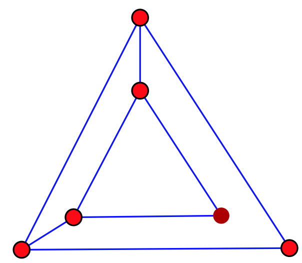

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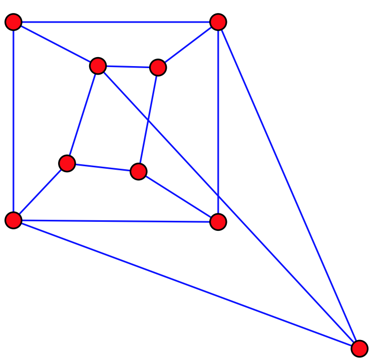

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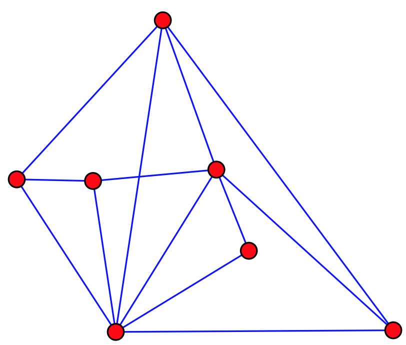
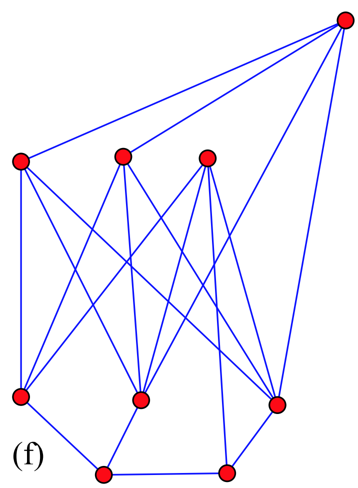


(e)



(f)