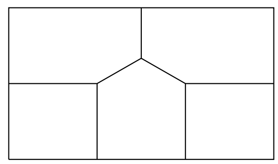
MATH 113: DISCRETE STRUCTURES
HOMEWORK 16

Due: Friday, March 6 at 10pm.

Problem 1. Consider the following floor plan for a building:



We would like to know if it is possible to cross each interior wall in the building exactly once (without teleporting).

(a) Turn this into graph theory problem. (Draw the corresponding graph.)
(b) Either find such a walk, or prove that no such walk exists.
(c) What if we want to pass through the exterior walls exactly once as well?

Problem 2. If G is a graph and e is an edge of G, define $G - e$ to be the graph obtained from G by removal of e (but not the endpoints of e). Recall that to say a graph is *connected* means that every pair of its vertices can be connected by a path.

(a) Give an example of a connected graph G with an edge e such that $G - e$ is not connected.
(b) Suppose G is a connected graph and e is an edge of G that is part of a cycle. Prove that removal of e does not disconnect the graph. Your proof is required to start with the line: "Let u and v be vertices of G." It should then show there must be a path in $G - e$ connecting u and v.