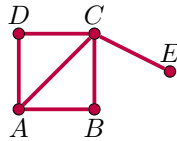


Math 1015: Homework #9

Question 1. Consider this graph:

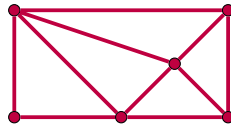


- Does this graph have an Euler circuit? Either demonstrate an Euler circuit (draw it), or say why none exists.
- Does this graph have an Euler path? Either demonstrate an Euler path, or say why none exists.
- Use this graph as a specific example to demonstrate Euler's sum-of-degrees theorem.

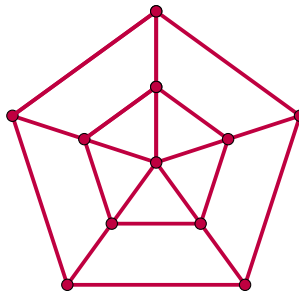
Question 2. Imagine I have 5 friends, and some of them are friends with each other too. My friends are Tony, Erin, Chuck, Patty, and Shawn. (Yes these are real people.) Tony is friends with 3 of these 5 people, Erin is friends with 2 of them, Chuck is friends with 1 of them, and Patty is friends with 3 of them. Shawn is not friends with any of them. Explain using Euler's sum-of-degrees theorem why this is impossible.

Question 3. For each of these graphs, say whether or not it has an Euler circuit, and whether or not it has an Euler path. If it has either one, draw it in. (Make sure the path you draw is legible— when you draw these graphs you should probably make them a lot bigger on your paper.)

a)

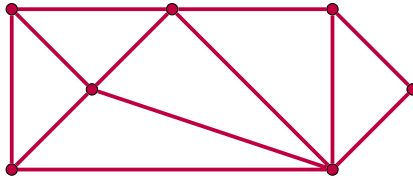


b)

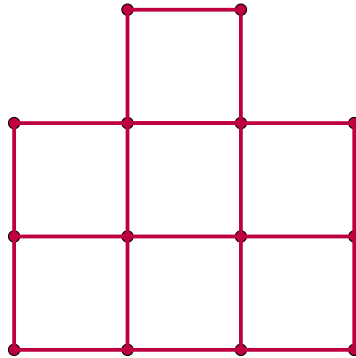


Question 6. For each part find a minimum duplication circuit, and a minimum duplication path:

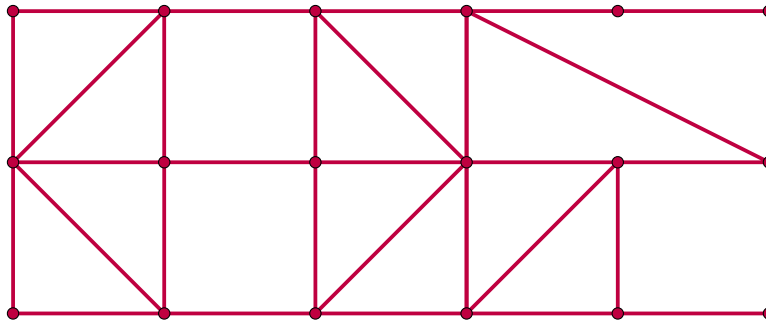
a)



b)



Question 7. Both parts are about this graph:



a) Please explain why there is an Euler path.

b) Please show which edges you would duplicate in order to form a minimum duplication circuit.

c) Please explain why it's not very interesting to find a minimum duplication path, given what you've already done.