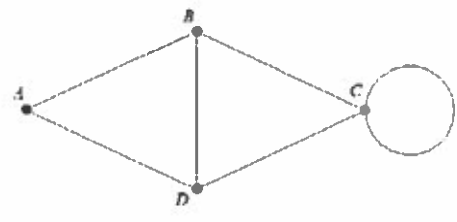


Key

Chapter 5 Test Review – Part A
Discrete Math

1. For the graph shown below, what is the edge set \mathcal{E} ?

Answer: AD, AB, BC, BD, CC, CD



2. Consider the graph from problem 1: what is the vertex set \mathcal{V} ?

Answer: A, B, C, D

3. Consider the graph from problem 1: how many paths are there from A to B?

Answer: 4

4. Consider the graph with vertex set $\mathcal{V} = \{A, B, C, D, E, F\}$ and edge set $\mathcal{E} = \{AB, AB, AC, AE, AF, BD, BF, CD, CE, DF, EE, EF\}$. What is the degree of vertex E?

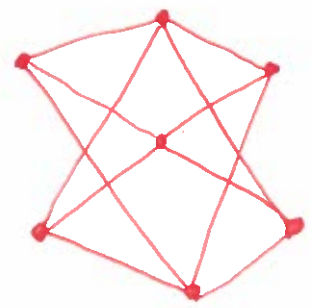
Answer: 5

5. Consider the graph with vertex set $\mathcal{V} = \{A, B, C, D, E, F\}$ and edge set $\mathcal{E} = \{AB, AB, AC, AE, AF, BD, BF, CD, CE, DF, EE, EF\}$. List all edges adjacent to edge DF.

Answer: BD, CD, AF, BF, EF

6. Three distinguished faculty members meet four honors students at a local pub. Each faculty member shakes hands with each student once and only once. Using people as vertices and handshakes as edges, construct a graph which models this situation.

Answer:



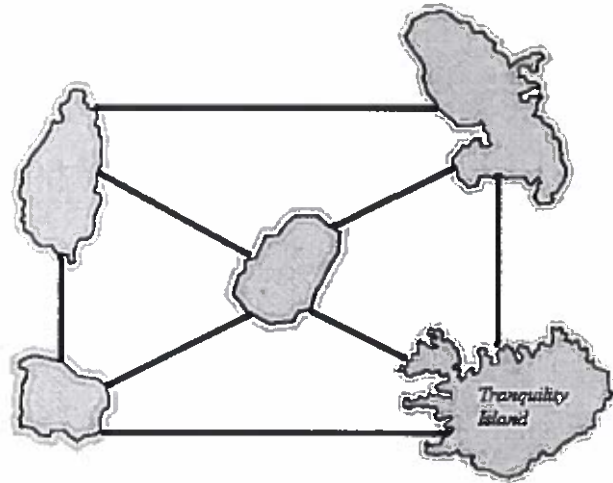
(one possibility)

9. Your university has installed a new *Meditation Garden* which consists of several island gardens connected by bridges. A layout of the garden is shown below. You are enrolled in a Buddhism class and your instructor assigns you the following assignment.

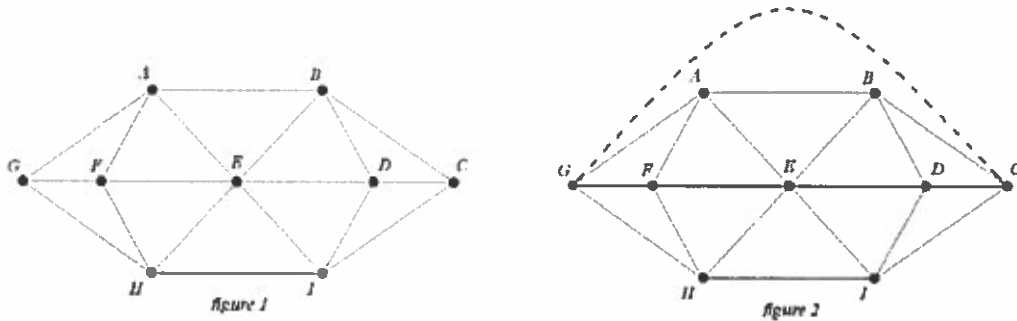
Start at the *Tranquility Station* and walk through the *Meditation Gardens*. Every time that you cross a bridge you must recite a Buddhist verse. Continue walking through the gardens until you have crossed each and every bridge. End your journey at the *Tranquility Station*.

What is the fewest number of verses that you would need to recite in order to complete the assignment?

Answer: 10



10. Explain why the graph in *figure 2* is not an Eulerization of the graph in *figure 1*.

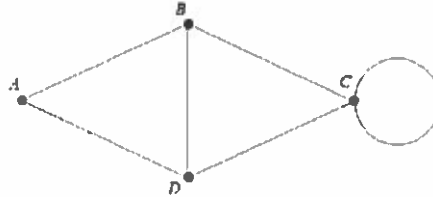


Answer: There is no single edge connecting vertex C to vertex G.
When Eulerizing a graph, edges can only be "added" where
edges already exist.

Chapter 5 Test Review – Part B
Discrete Math

1. For the graph shown below, what is the degree of vertex C ?

Answer: 4



2. Consider the graph from problem 1: which edges, if any, are adjacent to edge BC ?

Answer: AB, BD, CC, CD

3. Consider the graph from problem 1: how many circuits are there which start and end at A ?

Answer: 3

4. Consider the graph with vertex set $V = \{A, B, C, X, Y, Z\}$ and edge set $E = \{AB, AC, AY, AX, BY, CC, CZ\}$. Which edges, if any, are bridges for the graph?

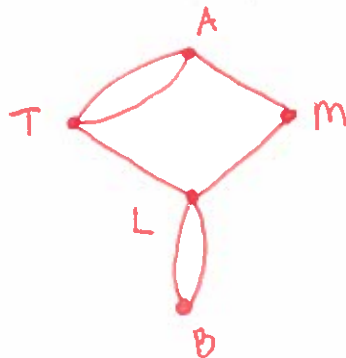
Answer: AC, AX, CZ

5. Consider the graph with vertex set $V = \{A, B, C, X, Y, Z\}$ and edge set $E = \{AB, AC, AY, AX, BY, CC, CZ\}$. Does this graph contain an Euler Path? Explain.

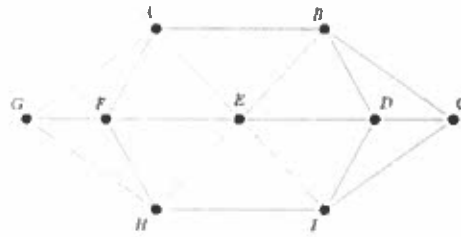
Answer: Yes, the graph is connected and exactly two vertices have odd degree.

6. Tom is dancing at a local discothèque with his friends Matt, Bill, Lisa, and Allison. Tom dances with Lisa once and Allison twice. Bill dances with Lisa two times but does not dance with Allison, and Matt dances with Lisa and Allison one time each. Using people as vertices and dances as edges construct a graph which models this situation.

Answer:



7. For the graph shown below, what is the edge set \mathcal{E} ?



Answer: AB, AG, AF, AE, BE, BD, BC, CI, DI, DE
EI, EH, EF, FG, FH, GH, HI, CD

10. Is it possible to construct a graph consisting of two vertices of even degree and three vertices of odd degree? Explain.

Answer: No. A graph will always have an even number
of odd degree vertices.