

Create a graph with the given properties.

1) Three even and two odd vertices

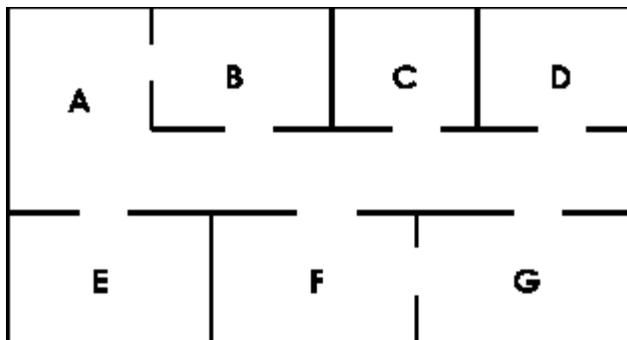
2) Seven vertices with one bridge

Represent the following with a graph.

3)

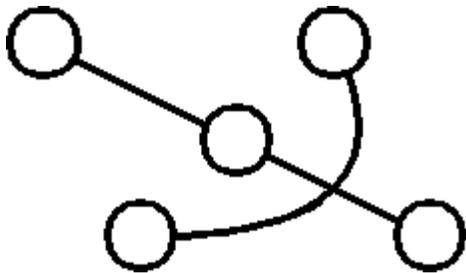


4)



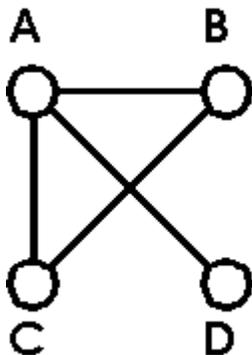
Determine whether the graph is connected or disconnected.

5)

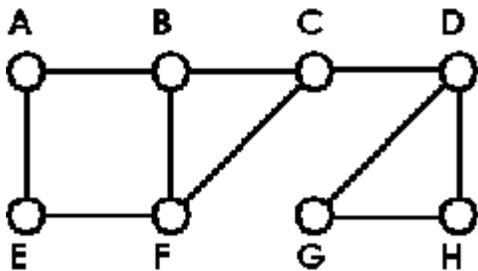


Identify any bridges in the graph or say there are none.

6)

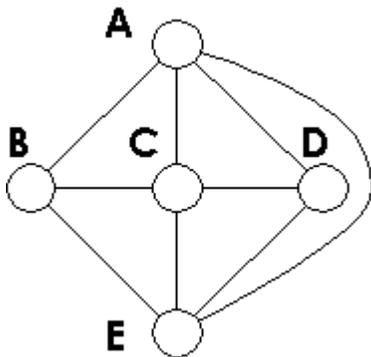


7)

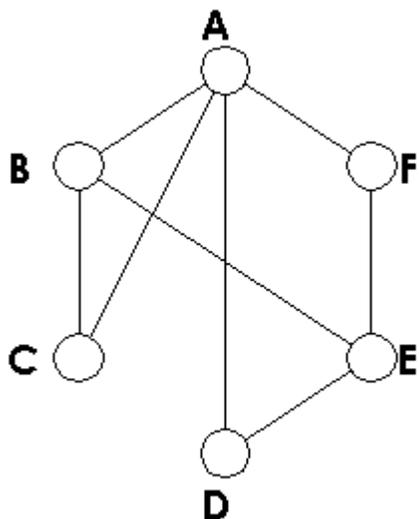


Give an appropriate answer.

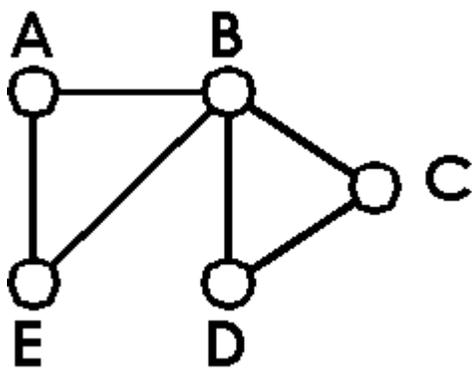
8) Using the following graph, find an Euler path that starts with vertex B.



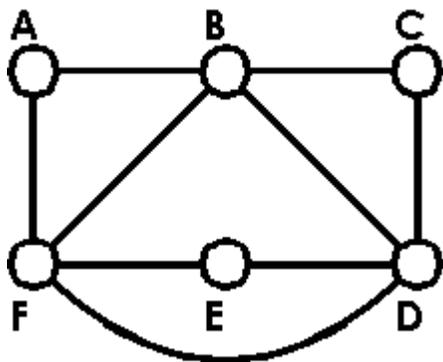
9) Using the following graph, find an Euler path that starts with vertex E.



10) Using the following graph, find an Euler circuit that begins and ends with vertex A.

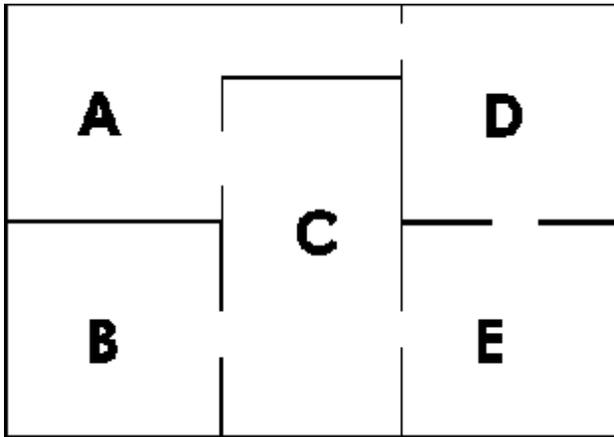


11) Using the following graph, find an Euler circuit that begins and ends with vertex B.

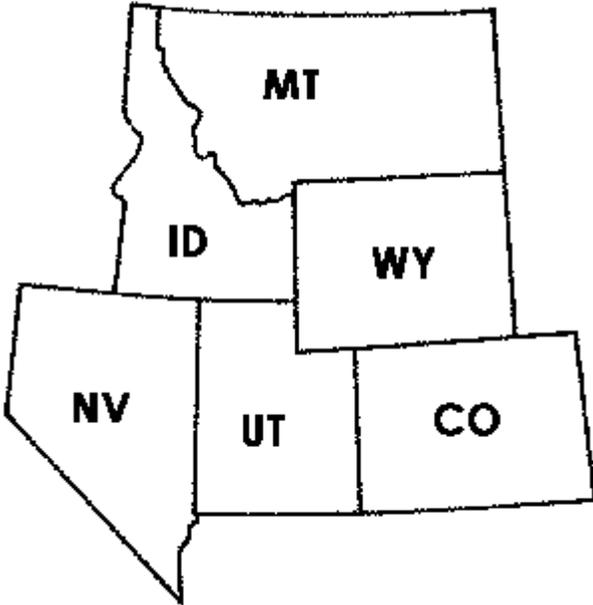


**Solve the problem.**

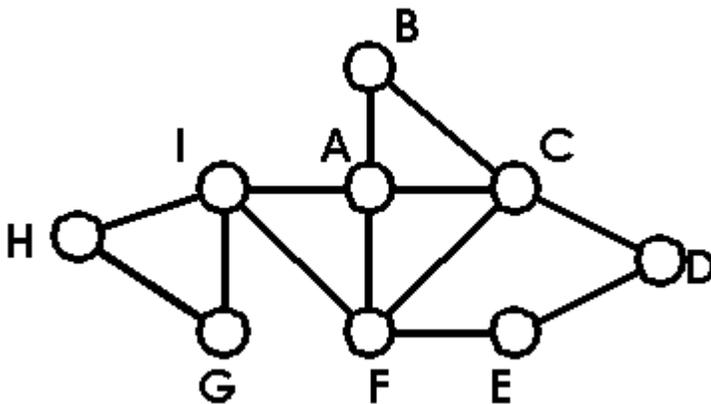
- 12) For the floor plan below, is it possible to find a path that starts in room D and passes through each doorway exactly one time?



- 13) The following map shows the states Idaho, Montana, Wyoming, Colorado, Utah, and Nevada. Find a route that starts and ends in Colorado and crosses each common state border exactly one time.

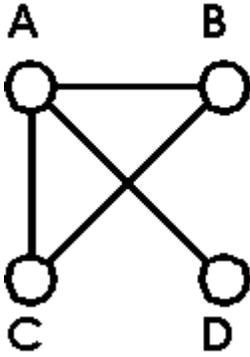


- 14) Use Fleury's algorithm to find an Euler circuit for the following graph.

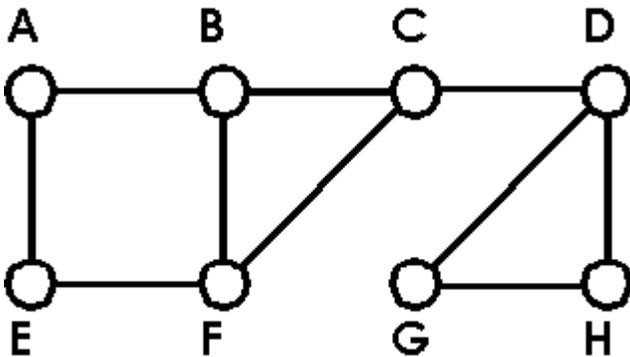


Find two different Hamilton paths for the given graph.

15)

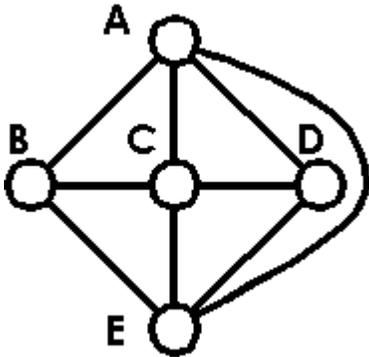


16)



Find two different Hamilton circuits for the given graph.

17)



Solve the problem.

18) Sarah Katerinov is a high school student in Chicago. She will be going to college next year and is planning to visit the following campuses: University of Wisconsin at Madison, Harvard, and Ohio State University. How many different ways can she visit each of these schools and return to her starting point in Chicago?

19) Erik Allen repairs photocopy machines. According to his schedule, he needs to visit 9 different offices today. How many ways can Erik visit these offices and return to his headquarters?

- 20) Chelsea Avanos is searching for a job. She lives in Winston-Salem, North Carolina, and has interviews in Tacoma, Washington; Pittsburgh, Pennsylvania; and Gainesville, Florida. The costs for one-way flights between these cities are summarized below:

	Gainesville	Pittsburgh	Tacoma	Winston-Salem
Gainesville	-	\$353	\$746	\$408
Pittsburgh	\$353	-	\$725	\$391
Tacoma	\$746	\$725	-	\$1028
Winston-Salem	\$408	\$391	\$1028	-

- Represent this traveling salesman problem with a complete graph showing the prices of the flights on the appropriate edges.
- Use the Brute Force algorithm to find the least expensive route for Chelsea to travel to each city and return home to Winston-Salem.
- What is the minimum cost she can pay?

- 21) An amusement park safety inspector plans to leave his home in Cincinnati, Ohio to inspect roller coasters at parks in the following cities: Williamsburg, Virginia; Atlanta, Georgia; Cleveland, Ohio; and Myrtle Beach, South Carolina. The costs of one-way flights between these locations are listed below:

	Atlanta	Cincinnati	Cleveland	Myrtle Beach	Williamsburg
Atlanta	-	\$97	\$110	\$104	\$395
Cincinnati	\$97	-	\$35	\$355	\$281
Cleveland	\$110	\$35	-	\$400	\$390
Myrtle Beach	\$104	\$355	\$400	-	\$225
Williamsburg	\$395	\$281	\$390	\$225	-

- Represent this traveling salesman problem with a complete graph showing the costs on the appropriate edges.
- Use the Nearest Neighbor method to approximate the optimal route for the inspector to travel to each city and return to Cincinnati. Give the cost of the route found.
- Randomly select another route from Cincinnati to the other cities and compute the cost of this route. Compare this cost to the cost found in part (b).