National Paralegal College

Ideas in Math: MAT-201

Assignment #2

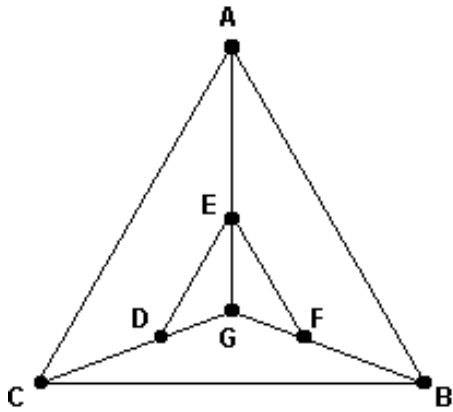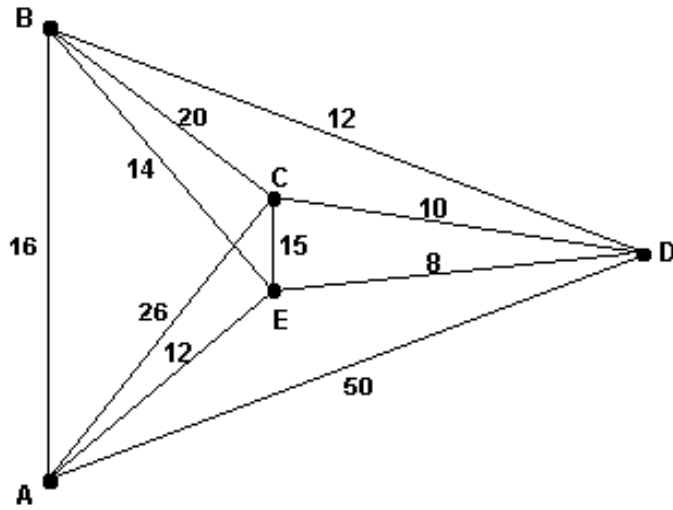|	
1.	Use the letters labeling the vertices to describe a Hamiltonian circuit for the graph below.
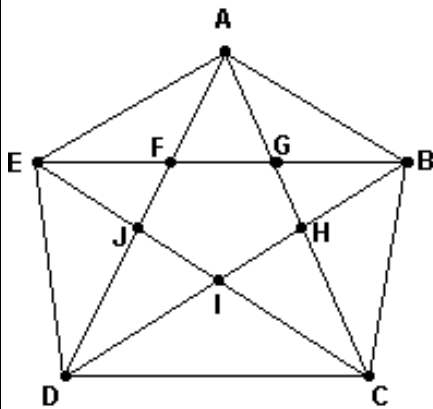
Ans:

2. Use the letters labeling the vertices to describe a Hamiltonian circuit for the graph below.
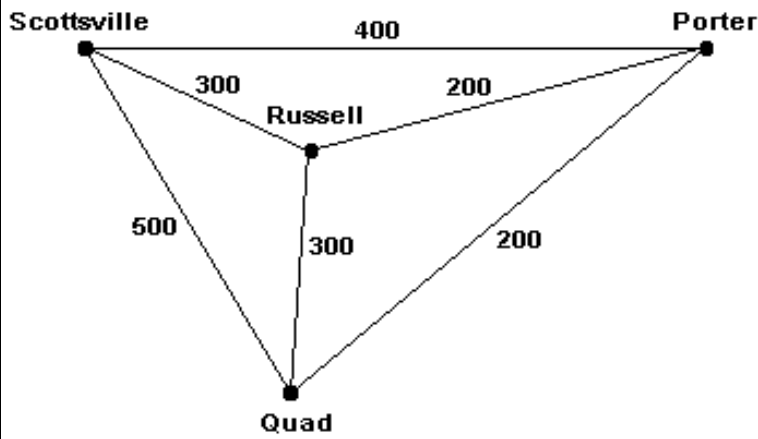

Ans:

3. For the graph below, compute the cost of the Hamiltonian circuit obtained by using the nearest-neighbor algorithm, starting at A?
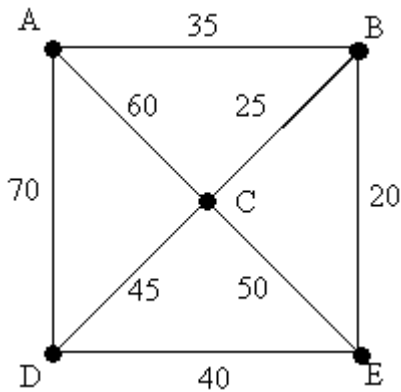

Ans:

4.	Use the brute force algorithm to solve the traveling salesman problem for the graph of the four cities shown below. Scottsville 400 Porter 300 200 Russell 500 300 200 Quad
	Ans:

5. For the graph below, what is the routing produced by using the sorted-edges algorithm to solve the traveling salesman problem.

A   35   B
60   25
70   C   20
45   50
D   40   E

Ans:

6.	You own a chain of 12 apartment complexes (including your residence) and you want to plan a trip to visit each of your properties. If it takes 1/2 minute to compute the total length of a tour, how long will it take to apply the brute force algorithm to find the optimal tour?
	Ans:

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7.	You want to create a mileage grid showing the distance between every pair of the 50 U.S. state capitals. How many numbers will you have to compute?
	Ans:

8.	The local cafe offers three different entrees, 10 different vegetables, and four different salads. A "blue plate special" includes an entree, a vegetable, and a salad. How many different ways can a special be constructed?
	Ans:

9.	In some states, license plates use a mixture of letters and numerals. How many possible plates could be constructed using three letters followed by three numerals?
	Ans:

10.	What is an advantage of a *heuristic* algorithm?
	Ans:

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11.	The route of a neighborhood garbage truck generally follows an Euler circuit. Under what circumstances should it instead follow a Hamiltonian circuit?
	Ans:

12. For each of the two diagrams, do the wiggled edges represent spanning trees? Explain.
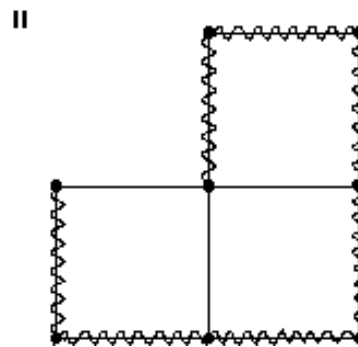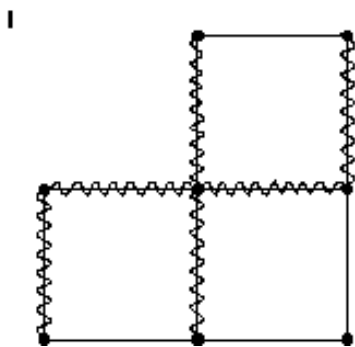
Ans:

13.	A connected graph H has a spanning tree with 50 edges. How many vertices does the spanning tree have? How many vertices does H have? What can one say about the number of edges H has?
Ans:	

14. Use Kruskal's algorithm for minimum-cost spanning trees on the graph below. Compute the cost of the tree you found.
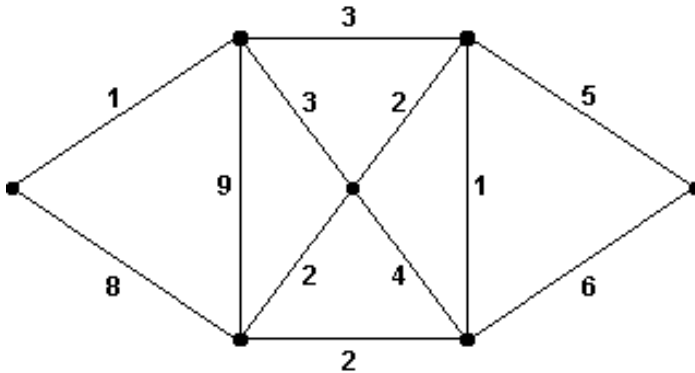
Ans:

15. Suppose a pizza delivery person needs to take pizzas to 10 houses in different neighborhoods and then return to pick up the next set to be delivered. Indicate whether each technique is likely to be useful in solving this problem.
A)   finding an Euler circuit on a graph.
B)   applying the nearest-neighbor algorithm for the traveling salesman problem.
C)   applying Kruskal's algorithm for finding a minimum-cost spanning tree for a graph.
Ans:

16. Suppose a college campus decides to install its own phone lines connecting all of the buildings where calls may be relayed through one or more buildings before reaching their destination. Indicate whether each technique is likely to be useful in solving this problem.
A)   finding an Euler circuit on a graph.
B)   applying the nearest-neighbor algorithm for the traveling salesman problem.
C)   applying Kruskal's algorithm for finding a minimum-cost spanning tree for a graph.
Ans: