National University of Computer & Emerging Sciences, Karachi

Fall-2018 CS-Department

CS211-Discrete Structures

Practice Assignment-III

Note:

1- This is hand written assignment.

2- Just write the question number instead of writing the whole question.

Submission date: Thursday, 13th December, 2018 by 12:00 pm

1. A wired equivalent privacy (WEP) key for a wireless fidelity (WiFi) network is a string of either 10, 26, or 58 hexadecimal digits. How many different WEP keys are there?
2. How many functions are there from the set {1, 2, . . . , *m*}, where *m* is a positive integer, to the set {0, 1}?
3. How many one-to-one functions are there from a set with five elements to sets with five elements?
4. Use a tree diagram to determine the number of subsets of {3, 7, 9, 11, 24} with the property that the sum of the elements in the subset is less than 28.
5. Eight members of a school marching band are auditioning for 3 drum major positions. In how many ways can students be chosen to be drum majors?
6. A committee of five people is to be chosen from a group of 20 people. How many different ways can a chairperson, assistant chairperson, treasurer, community advisor, and record keeper be chosen?
7. Nine people in our class want to be on a 5-person basketball team to represent the class. How many different teams can be chosen?
8. A deli offers 5 different types of meat, 3 types of breads, 4 types of cheeses and 6 condiments. How many different types of sandwiches can be made of 1 meat, 2 bread, 1 cheese, and 3 condiment?
9. Police use photographs of various facial features to help eyewitnesses identify suspects. One basic identification kit contains 15 hairlines, 48 eyes and eyebrows, 24 noses, 34 mouths, and 28 chins and 28 cheeks. Find the total number of different faces.
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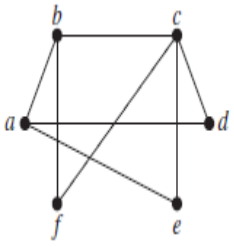
11. (a)What is the coefficient of x^5 in $(1 + x)^{11}$? (b)What is the coefficient of x^7 in $(1 + x)^{11}$?
12. How many bit strings of length 10 either begin with three 0s or end with two 0s?
13. Show that if there are 30 students in a class, then at least two have last names that begin with the same letter.
14. Assuming that no one has more than 1; 000; 000 hairs on the head of any person and that the population of New York City was 8; 008; 278 in 2010, show there had to be at least nine people in New York City in 2010 with the same number of hairs on their heads.
15. Show that if there are 30 students in a class, then at least two have last names that begin with the same letter.
16. There are 38 different time periods during which classes at a university can be scheduled. If there are 677 different classes, how many different rooms will be needed?
17. Find which of the following graphs are bipartite. Redraw the bipartite graphs so that their bipartite nature is evident.

a)



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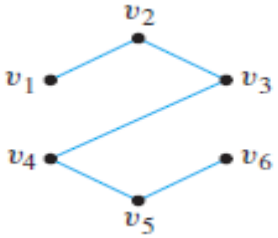
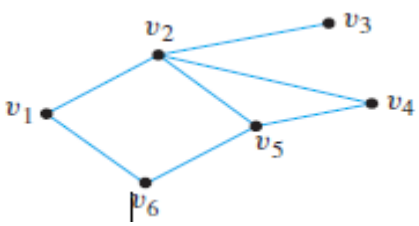
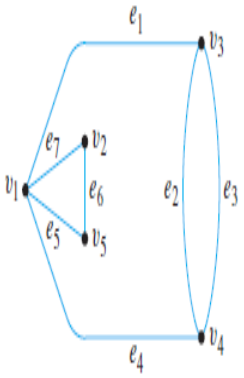


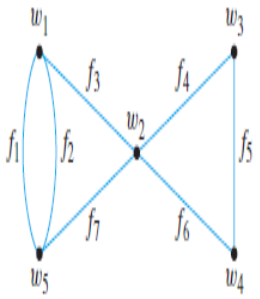
c)



18. Determine whether given two sets of graphs are isomorphic.

a)





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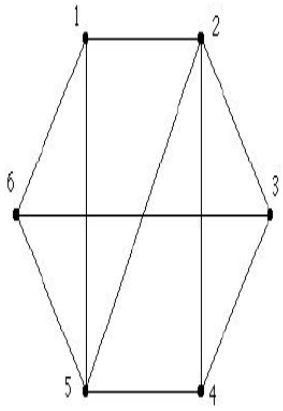
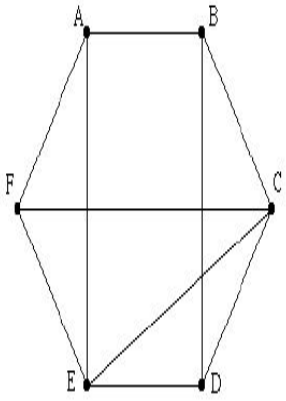
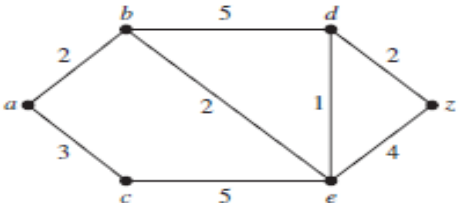




19. Find the length of a shortest path between *a* and *z* in the given weighted graph by using Dijkstra's algorithm.

a)



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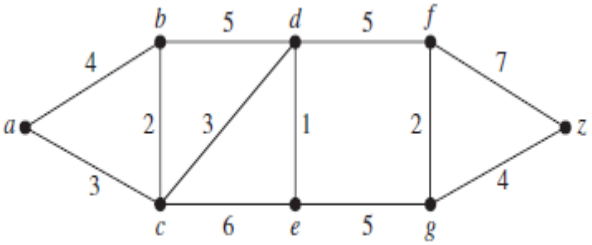
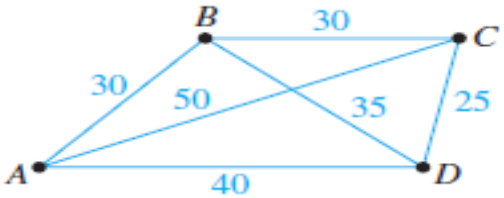


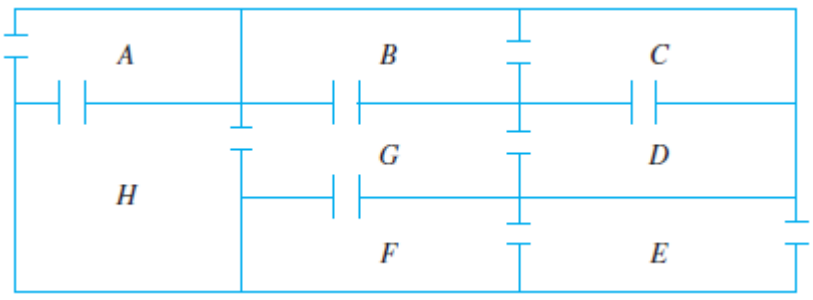
20. a) In a group of 15 people, is it possible for each person to have exactly 3 friends? Explain. (Assume that friendship is a symmetric relationship: If x is a friend of y, then y is a friend of x.)

    b) In a group of 4 people, is it possible for each person to have exactly 3 friends? Why?

21. Imagine that the drawing below is a map showing four cities and the distances in kilometers between them. Suppose that a salesman must travel to each city exactly once, starting and ending in city A. Which route from city to city will minimize the total distance that must be traveled?

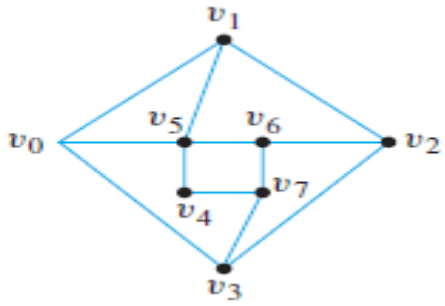


22. The following is a floor plan of a house. Is it possible to enter the house in room A, travel through every interior doorway of the house exactly once, and exit out of room E? If so, how can this be done?

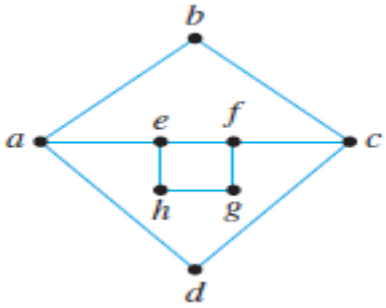


23. Find Hamiltonian circuits OR Path for those graphs that have them. Explain why the other graphs do not.

a)



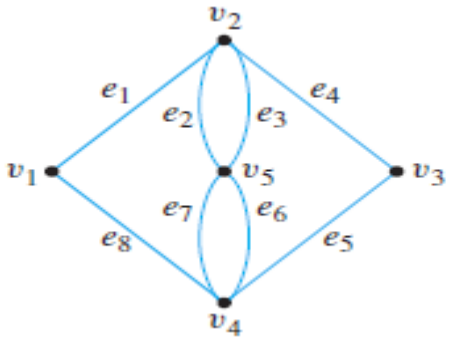
b)



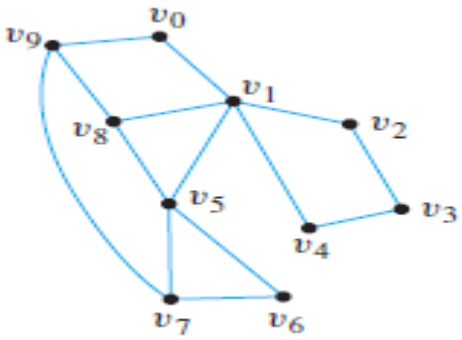
24.

a) Determine which of the graphs have Euler circuits. If the graph does not have an Euler circuit, explain why not. If it does have an Euler circuit, describe one.

i)

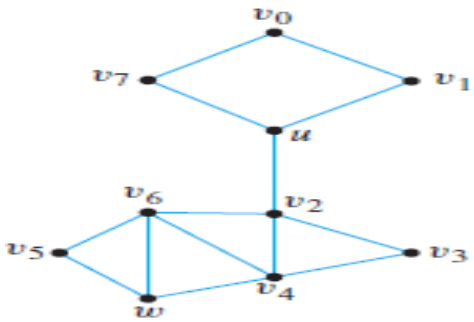


ii)

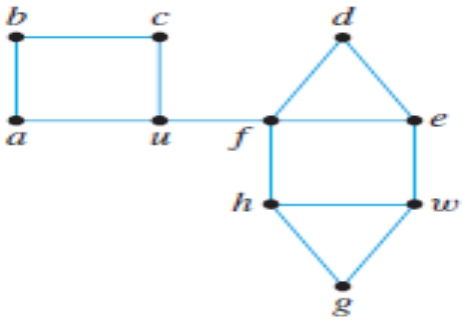


b) Determine whether there is an Euler path from u to w. If there is, find such a path.

i)

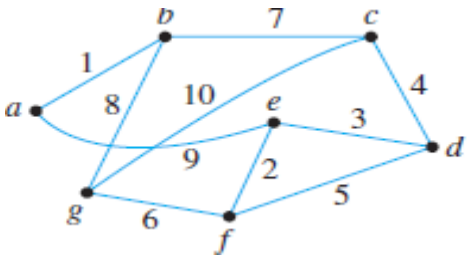


ii)



25. Use Kruskal's and Prim's algorithm to find a minimum spanning tree for each of the graphs. Indicate the order in which edges are added to form each tree.

a)



b)