FAST- National University of Computer & Emerging Sciences, Karachi.

Department of Computer Science

Quiz- IV, fall 2019 -- Solution

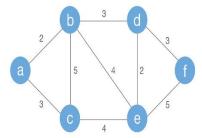**Friday, 29th November 2019**

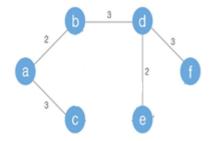| Course Code: CS 211	Course Name: Discrete Structures
Instructors: Mr. Shoaib Raza	
Student Roll No:	Section:

Time Allowed: 50 minutes.   **Maximum Points: 30 points**

Question # 1:   **[05 Marks]**

Find all minimum spanning trees for the given graph using Prim's algorithm starting at vertex a. Indicate the order in which edges are added to form each tree.
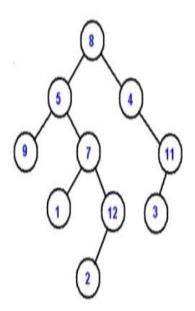

MST=13

Question # 2:   **[05 Marks]**

Determine the order in which Preorder and Postorder traversal visits the vertices of the given rooted tree.

Preorder traversal: 8, 5, 9, 7, 1, 12, 2, 4, 11, 3

Postorder: 9, 1,2, 12, 7, 5, 3,11, 4, 8

Question # 3:   [05 Marks]

(a) There are three available flights from Indianapolis to St. Louis and, regardless of which of these flights is taken, there are five available flights from St. Louis to Dallas. In how many ways can a person fly from Indianapolis to St. Louis to Dallas?

Solution:

There are three ways to make the first part of the trip and five ways to continue on with the second part of the trip, regardless of which flight was taken for the first leg of the trip. Therefore, by the product rule there are 3 x 5 = 15 ways to make the entire trip.

(b) How many anagrams (permutations of letters) are there for word "Answer"?

Solution:

Since answer has 6 different letters so there are $^6P_6$= 6! = 720 anagrams.

Question # 4:   [05 Marks]

How many ways are there to choose a committee of size five consisting of three women and two men from a group of ten women and seven men?

Solution:

The number of ways to choose three women is C(10,3) and the number of ways to choose two men is C(7,2). Using the product rule to choose three women and two men, the answer is C(10,3). C(7,2)= 2,520.

Note: The answer is not C(17,5) (which counts all committees of size five) because this ignores the fact that the committees must have exactly three women and exactly two men.

Also, the answer is not C(10,3) + C(7,2), which is a commonly made mistake. This says that you are choosing either three women or two men; it does not count committees of size five.

Question # 5:   [05 Marks]

The user codes on a certain computer consists of 3 letters, followed by 3 digits, followed by a letter, for example XYZ123A. (Assume that no distinction is made between upper-case and Lower-case letters). How many different user codes can be constructed altogether?

Solution:

The number of user codes are 26*26*26*10*10*10*26 =456976000.

Question # 6:   [05 Marks]

A test is to be generated by selecting six questions from a test bank consisting of 50 questions. How many different tests are possible, assuming that order in which the questions appear on the test is not taken into account?

Solution:

There are $^{50}C_6$ = 15890700 different tests are possible.

BEST OF LUCK!