CSE015-HW06

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1 Question 1

There are 18 mathematics majors, so one mathematics major can be chosen in 18 ways. Also, there are 325 computer majors, so one computer major can be chosen in 325 ways. Using product rule, which is $18c_1 * 325c_1 = 5850$ ways.

2 Question 5

Number of different airlines from New York to Denver is 6, and Number of different airlines from Denver to San Francisco is 7. By using profuct rule, the number of different pairs of airlines we can choose from New York to San Francisco via Denver is $6 * 7 = 42$.

3 Question 7

There are 26 letters, and we can choose first letter in 26 ways. For second place to be filled in by a letter, there are still 26 ways. It is dependent from previous selections. For third place is also 26 ways. It is dependent from previous selections. By using product rule, $26 * 26 * 26 = 17576$ ways.

4 Question 8

The first letter chosen from alphabet have 26 ways. The second one have only 25 ways because there is one letter has been chosen. It is independent from previous selections. In same cse, for choosing the third letter, there are only 24 ways because there are two letters have been chosen. It is independent from previous selections. By using product rule, the three different lettered initials can be made in $26 * 25 * 24 = 15600$ ways.

5 Question 9

The first letter is chosen from the question, which is an A, and that means it is only 1 way. The remaining two place can be filled in 26 ways each, and filling these places is mutually independent. Therefore, the number of three lettered initial starting with A are $26 * 26 = 676$.

6 Question 14

Number of bit strings with length $n = 2^n$ because each bit can be chosen in two ways either 0 or 1. Because there are two 1s, the first one is at the beginning of the row and another one is at the end of row, so we have the length is $n = 2^{n-2}$.

7 Question 46

7.1

The brige must be in the picture, she must be takes one place of the 6 people, and the rest of 5 places can be arrange with rest of 9 people. The equation is ${}_9C_5 = 15120$. Also, there are 6 ways to place the brige in the 6 people group, so the total possible unique combinations are $6 * 15120 = 90720$.

7.2

The brige and the groom must be in the picture, they must take two places of the 6 people, and the rest of 4 places can be arrange with rest of 8 people. The equation is ${}_8C_4 = 1680$. Also, there are $6 * 5$ ways to place the brige and the groom in the 6 people group, so the total possible unique combinations are $6 * 5 * 1680 = 50400$.

7.3

The brige or the groom must be in the picture, she or he must takes one places of the 6 people, and the rest of 5 places can be arrange with rest of 8 people. The equation is ${}_8C_5 = 6720$. Also, there are 2 ways to choose whether brige or groom fo the 6 people group, and 6 ways to place the brige or the groom in the 6 people group, so the total possible unique combinations are $2 * 6 * 6720 = 80640$.