

CS 206 - Introduction to Discrete Structures II

September 15, 2016

Homework: 1

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Due Date: Wednesday, September 21 (1:20pm) Teaching Assistant: Hareesh Ravi

Assignment 1:

In how many ways can 8 people be seated in a row if

1. there are no restrictions on the seating arrangement?
2. persons A and B must sit next to each other?
3. there are 4 men and 4 women and no 2 men or 2 women can sit next to each other?
4. there are 5 men and they must sit next to each other?
5. there are 4 married couples and each couple must sit together?

Assignment 2:

Suppose we have the word "Mississippi". Let $S = \{M, i, s, s, i, s, s, i, p, p, i\}$ be a multiset of the letters in the word "Mississippi". Recall that in the multiset S we can have repetitions of the same letter, but the order of the letters in S are not important.

1. How many arrangements using the letters in S are possible?
2. How many different arrangements using the letters in S are possible? Here we say two arrangements A and B are alike (i.e., not different) if one arrangement, say A can be transformed to the other, say B if we permute the instances of the same letter.
3. How many different words (including meaningless words) of length 5 (i.e, that contains 5 letters) can we have using the letters in S ? For example, $ssssi$ and $issss$ are two different words of length 5, but all permutation of 4 letters s in $ssssi$ that give $ssssi$ are not different.
4. Suppose we choose a multiset of 5 letters in S . How many choices do we have?
5. Suppose we choose a multiset of 5 letters in S . How many choices do we have if the two p letters must be in the set at the same time?
6. Suppose we choose a multiset of 5 letters in S . How many choices do we have if the two p letters cannot be in the set at the same time?