Count by writing code: Homework 2

Saad Mneimneh

For all the questions, show your reasoning as well as the #P program.

**Problem 1**
Consider the problem of assigning 5 people to 3 chairs. Explain why the following is not a good representation:

\[(!\text{person}, ?\text{chair}, !\text{person}, ?\text{chair}, !\text{person}, ?\text{chair})\]

**Problem 2**
Write a #P program to find how many anagrams you can make from your name (which consists of your first name and your last name).

**Problem 3**
Consider an alphabet of 3 letters \(\alpha\), \(\beta\), and \(\gamma\).

(a) How many words of length 10 can you make using this alphabet (the words don’t have to make sense)? Use two sets in your program, the set representing the alphabet and the set of positions you need to fill with letter in order to make the word. Make your sets either reusable or nonreusable.

(b) Repeat (a) by making one of the sets ordered.

(c) Based on (b), show how you can eliminate one of the sets.

**Problem 4**
Consider 3 people and 5 chairs. We want to seat the people on the chairs. Consider two nonreusable sets, one for people and one for chairs. In how many ways can we seat people?

(a) In the first setting, the chairs are distinguishable.

(b) In the second setting, the chairs are identical.

(c) For part (a), show how you can make one of the sets ordered, then show how you can eliminate that set.

(d) For part (b), show how you can eliminate the identical set.