# 1 Homework 7

Due in class Wednesday October 20th

Solve the following problems from the lecture notes:
7.1.19
7.1.22

Solve the following problem from the text page 348:
Problem 8

(a) Consider all ways to write a positive integer \( n \) as an ordered sum of positive integers. For example, 3 can be written as 1 + 1 + 1, 1 + 2, 2 + 1, 3. 4 can be written as 1 + 1 + 1 + 1, 1 + 2 + 1, 1 + 1 + 2, 2 + 1 + 1, 3 + 1, 1 + 3, 2 + 2. Next consider the number of ways to write \( n \) as an ordered sum with exactly \( k \) terms. So, the number of ways to write 3 with 2 terms is 2. The number of ways to write 4 with 3 terms is 3.

Give a bijection between the ways to write \( n \) as an ordered sum with exactly \( k \) terms and subsets of size \( k - 1 \) of a set of size \( n - 1 \).

(b) Now we want to write any positive integer \( n \) as an ordered sum of non-negative integers. For example, we can write 3 as an ordered sum of 2 non-negative integers as 2 + 1, 1 + 2, 3 + 0, 0 + 3.

Give a bijection between the ways to write \( n \) as an ordered sum of non-negative integers with exactly \( k \) terms and subsets of size \( k - 1 \) of a set of size \( n + k - 1 \).