CSE 321: Discrete Structures **Winter 2000**

Assignment #7

Due in class: Wednesday, March 1

1. A fair coin is tossed six times. Find the probability of each of the following events.

   (a) No heads result.

   (b) One heads results.

   (c) Two heads result.

   (d) Three heads result.

   (e) More than three heads result.

   (f)–(j) Repeat each of the above under the assumption that the coin is biased to yield heads with probability only $\frac{1}{3}$.

2. Use induction on n to prove that $\forall\, m, n \in \mathbb{N}$ with $n \geq m$,

$$\sum_{k=m}^{n} \binom{k}{m} = \binom{n+1}{m+1}.$$

   [Caution: Note the basis of this induction.]

3. Let A be a ten-element subset of $\{1, 2, 3, \ldots, 50\}$. Prove that for every A formed in this way, there are at least two distinct four-element subsets of A whose elements sum to the same value.

   [Hint: How many distinct four-element subsets does such an A have?]

4. Section 4.3 Exercise 60

5. Section 4.4 Exercise 36