

Combinatorics Homework 4  
S Hudson, written 9/30/13

**Quiz 3:** is Thursday, 10/10, mainly on problems like HW3. Also on the lectures thru 10/3 and the reading of Ch 3, Ch 4.5 (but not covers or linear extensions) and Ch 5. Try to do the first half of HW 4 before the quiz, though I will not assume you have mastered those topics yet. As usual, there may be some overlap with Quiz 2 material (eg Ch3). You are not expected to memorize all the binomial identities in the book, but should know the main ones, and should be able to derive most of the others (see Ch5 HW).

I might ask you to prove Sperner's theorem, or may just ask about one or two steps. Dilworth's theorem is less likely on Qui3, but you should know the main ideas in the proof (see exercise 5.34, for example) and it might appear later on Quiz 4.

**HW 4:** Due Thursday, Oct 17.

Ch. 4 - 36, 37, 49

Ch. 5 - 30, 34, 37, 39, 47, 48

Ch. 6 - 1, 7, 11, 12, 15, 16, 17, 21, 24ab, 28

Remarks: we will omit most of Ch.4, but read over Ch. 4.5 for the HW and to prepare for Ch. 5.6. Read all of Ch 5; I may not lecture on Ch.5.5, which is often covered in Calculus. It should be fairly easy and there is one HW problem on it. Read 6.1 to 6.4.

- 4.36 Hint: you can imagine a relation as a zero-one  $n \times n$  matrix, if that helps in counting.

- 4.37 You can find proofs like this in a Discrete Math book if you are completely stuck, but please don't just copy.

- 5.46 see the last example in Ch.5.5.

I have moved some remarks about Quiz 4 to the HW 5 page. Also, HW 5 includes 2 extra-credit problems from Ch 6, which you can do for HW 4 if you prefer.