Institut for Matematik og Datalogi
Syddansk Universitet

February 7, 2002
JFB

Discrete Mathematics with Applications
F02 – Lecture 2

Lecture, February 4

We began with an introduction to the course. Then, we covered most of sections 1.1 through 1.3 in the textbook and covered everything but Cartesian products in section 1.4.

Lecture, February 11

We will finish sections 1.4 through 1.7 of chapter 1 and begin on sections 3.1 through 3.3 of chapter 3. The subsection of section 2.3 having to do with division will be covered with section 3.1 to give a source of examples. Sections 3.4 and 3.5 of chapter 3 will be skipped, since they are covered in other courses. (If you have not already seen this material, please read it.) The section of the notes, entitled "Structural Induction", will be covered in connection with chapter 3.

Lecture, February 18

We will continue with chapter 3.

Announcement

One solution to the Maple lab has been posted on the course's Web page. Check to see if it resembles your solution or if there's an easier way of doing it. The University has an arrangement so that students can buy the Maple program for their own computers for only 25 kr. You can buy it in the bookstore, but you may also just use the Maple on the department's computers if you prefer.

Problems to be discussed on February 12

- The following could be a property of a set S of integers. Write down the formal negation of this property: $\forall x \in S,\ x \geq k\ :\ \exists y \in S\ :\ x^3 = y$.

- The problems with parentheses will only be discussed if there is time.

  10.e, and 26 from section 1.5. (Note the definition before problem 22.)

  12, 26, 27, (57) from section 1.6.

  (20), 21, 31, 32d, 33, 36, 37, (39), (40), and (42) from section 1.7.
  For problem 21, you can check your result using Maple. For example, to compute $\sum_{k=1}^{n}(2k-1)$, you can type `sum(2*k-1,k=1..n);`. Now if you right click on the result, you can choose `Simplify`, and you should get the answer you computed yourself. (Note that you can create a set with the first 30 values in the sequence in Maple, as follows: `a:={seq(sum(2*i-1,i=1..n),n=1..30)};` to see how it looks. Or you can check the sum of a geometric progression, as in Example 12.)
  For problem 28, is it necessary to assume that not all of a, b, and c are equal to zero? Why?

- Show that $\mathbb{Q}$ is countable. (Hint: see problem 37 from section 1.7.)