**HW #8, due November 2nd**

Chapter 8: 19, 20, 22, 23, 24, 26bcd, 27, 28 (For 19 & 20 you need to use the $c_{n,k}$.)

**Extra Problems for HW #8**

**Problem 1:** This is a Maple assignment on Stirling numbers of the second kind.

(a) Into the Maple command line, $|>$, type the following:

```
f: = \text{product}(1/(1-k*x), k=1..3);
```

Then, in a new line, type the following:

```
\text{Order:=20; series(f,x)};
```

You get a series expansion of $f(x) = x^3(1-x)(1-2x)(1-3x)$. Enter the coefficients of this series into the Online Encyclopedia of Integer Sequences, and say what the coefficient of $x^n$ is in the series representation of $f(x)$.

(b) Repeat Step (a) but with $k=1..4$.

(c) In general, what is the coefficient of $x^n$ in the series representation of

$$f(x) = \frac{x^k}{(1-x)(1-2x) \cdots (1-kx)},$$

where $k$ is fixed? Another way of stating this is to say that $f(x)$ is a generating function for some sequence $A_{n,k}$, or equivalently,

$$f(x) = \sum_{n=0}^{\infty} A_{n,k} x^n,$$

and then we ask what is $A_{n,k}$?

(d) Let $x$ be the number of letters in your first name and $y$ be the number of letters in your last name. If $p = xy$, use (c) to calculate $S_{75,p}$.