

Assignment 2

Policies

Due date: **17:00 Thu. Feb. 28, 2019**

How to submit:

- email to **xingshi.cai@math.uu.se** with title "Combinatorics -- Assignment 2"
- or leave it in my mailbox at math department on the 4-th floor of Angstrom laboratory, near the printer of corridor 1 (it's also very close to the entrance of corridor 7).

Extension policy: unless the dog ate your assignment, there is **no extension**.

Grading method:

- a completed assignment will get 1 point, even with some wrong answers
- partially completed assignments will get 0 point -- an answer **without any proof is considered incomplete**.

Assignment Problems

Read example 2.25 and solve

- 2.9.16 (a), (c), (e)

Read example 8.5 and 8.6 and solve

- 8.8.2 (c), (h), (k)
- 8.8.8

Read section 8.5 and solve

- 8.8.17

Read section 8.6 and solve

- 8.8.20 (a), (e), (f)
- 8.8.26

A general suggestion -- When you write down a generating function, it's always a good idea to check at least if the coefficients of x^0 , x^1 , x^2 are correct.

For assignment, you simply put the GF into WolframAlpha. Then you will automatically get these numbers. (Of course in exams you will need to do this checking by hand.)

Challenge Problem (optional)

This exercise is optional. You do not need to do it to get the point for this assignment.

Let $r \geq 1$ be an integer.

(a) Let a_n be the number of ways to partition n into integers $\leq r$. Let $a_0 = 1$.

Compute a_0, \dots, a_4 for $r = 2$.

(b) What is the GF for $(a_n, n \geq 0)$? Prove your answer.

Hint: Re-read the section on integer partition. Change the GF in the book just a little bit.

(c) Let b_n be the number of ways to partition n into at most r parts. Let $b_0 = 1$.

Compute b_0, \dots, b_4 for $r = 2$.

(d) What is the GF for $(b_n, n \geq 0)$? Prove your answer.