CO 330 Combinatorial Enumeration, Fall 2017
MWF 10:30-11:20 MC 4041

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Outline

This course is, as you would expect from the title, about **combinatorial enumeration**; that is, the course is about counting discrete objects using combinatorial technics. Part of the fun and the usefulness of combinatorial enumeration comes from the nice classes of combinatorial objects which we'll study; another part comes from general techniques and the general framework we'll develop. Much of what we will do also makes sense algorithmically.

Topics (we may not cover all of these but we will cover most of them): Combinatorial classes and combinatorial specifications. Ordinary generating functions. The technique of bijective proofs. Lattice paths and the q-Binomial Theorem. Recursive structure: classes of rooted trees, Dyck paths; Catalan numbers. Formal power series and formal Laurent series The Lagrange Implicit Function Theorem. Integer partitions. Exponential generating function and labelled objects. Random generation of combinatorial objects. The pattern algebra and string enumeration.

Grading

Midterm Exam (Oct 20 in class)	20%	Homework	20%
Final Exam	60%		

You are welcome to discuss the homework assignments with your classmates, but you must **write them up independently** and **explicitly acknowledge** any discussions. Late assignments may be considered on a case-by-case basis, but **only** if you have contacted me **before** the deadline.

Formalities

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility.

[Check www.uwaterloo.ca/academicintegrity/ for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline,
http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm.
For typical penalties check Guidelines for the Assessment of Penalties,
http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals,
http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.

Note for students with disabilities: Access Ability Services, located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the Access Ability Services at the beginning of each academic term.