CS 271 (Spring 2013) — Assignment 7
Due: 04/09/2013

(1) Read Sections 5.2 and 5.3, and Sections 6.1, 6.2, 6.3.

(2) In the real world, find (at least) one example each for the following:

- Wanting to enumerate all permutations of a set S.
- Wanting to enumerate all subsets of a set S.
- Wanting to enumerate all subsets of size k of a set S.

(3) Solve the following exercises from the textbook

(a) Section 5.2, Exercises 10, 14, 26, 30

(b) Section 5.3, Exercises 10, 14, 22, 38

(c) Section 6.1, Exercises 42, 44, 46, 72, 74

(d) Section 6.2, Exercises 8, 32, 36, 38

(4) [0 points]
Chocolate Problem (2 chocolate bars): Let G be an undirected graph with n nodes and with no 3-cycles and no 4-cycles. Prove that G contains at most $O(n^{1.5})$ edges. (In general, graphs could contain up to $\Omega(n^2)$ edges, so this means that such graphs are pretty sparse.)

[Since we haven't defined graphs yet, here's a quick definition: We have n individuals/nodes. An edge is a direct link between a pair — think of friendship between the individuals. The condition about 3-cycles means that there are no 3 people all of whom are friends with each other. The condition about 4-cycles means that there are no (u, v, w, x) such that u is friends with v, v is friends with w, w is friends with x, and x is friends with u. (That v and x can't be friends, and the same for u and w, is ensured already by the "no 3-cycle" condition.)