MA/CSSE 473 Day 14 Announcements and Summary

Announcements:

1. HW6 (11 problems now) due Monday; **No late days may be used for this one.** It is big. If you are not half done, pick up the pace!
2. **Exam1 date:** Tuesday Sept 30. In class.
   - If you are allowed extra time for exams and plan to use that time, please talk with me soon about timing.
   - Exam 1 specification document is linked from Day 16 on the schedule page.
3. In my office today: 11:50-2:15.

Main ideas from today:

1. Recap of "order properties" of lexicographic permutations from yesterday's in-class exercise. Details on slides.
2. Generate the power set (set of all subsets) of a set $\{0, 1, \ldots, n-1\}$,

3. Bottom-up (decrease-by-one) approach
   a. Generate S_{n-1}, the collection of the 2^{n-1} subsets of $\{a_1, \ldots, a_{n-1}\}$
   b. Then $S_n = S_{n-1} \cup \{ S_{n-1} \cup \{a_n\} : s \in S_{n-1}\}$

4. Numeric approach: Each subset of $\{a_1, \ldots, a_n\}$ corresponds to an bit string of length n, where the i^{th} bit is 1 iff a_i is in the subset.

5. Gray codes: minimal change moving from one subset to the next one.

6. Transition sequence tells which bit changes as we move from one subset to the next.

7. Binary reflected Gray code.

8. Polynomial evaluation (do it on the back of this page):
   Given a polynomial $p(x) = a_n x^n + a_{n-1}x^{n-1} + \ldots + a_1 x + a_0$
   a. How can we efficiently evaluate p(c) for some number c?
   b. Apply this to evaluation of "31427894" or any other string that represents a positive integer.
   c. Write and analyze (pseudo)code.