MA/CSSE 473 Day 19 Announcements and Summary

Announcements:

1. HW8 due tomorrow; HW9 due Monday (with a grace day until Tuesday because of the break; HW 10 due next Thursday.
2. I added two problems to HW 9 this morning. There are now 7 problems.
3. In my office today: Hours 6-8, possibly first half of 10.

Main ideas from today:

1. Some "left-over" divide and conquer algorithms:

   Fake Coin problem: How many weighings are necessary to find the lighter coin (assume there is exactly one)?

   Median-finding (use a quicksort-like partition)

2. Explain the winning strategy for one-pile Nim where a player can take1..m chips on one turn, ant the winner is the one to take the last chip.

3. What is the winning strategy for 2-pile Nim? Each player can take any nonzero number of chips *from either of the piles*.

4. **A strategy for n-pile Nim.**

5. Define $x \oplus y$, the "Nim sum" of x and y. (note that $\oplus$ is associative and commutative)

6. What is $11 \oplus 14$? _____

7. Notation for x_i, y_i, s, and t:

8. Lemma 1 and its proof

9. Lemma 2 and its proof

10. Lemma 3 and its proof

11. Briefly describe the Josephus problem