

# Week 1 Lecture 2

August 30, 2017

Textbook Reference: Chapters 1,2

- Stretch 1 (Pg. 97): What are the next two letters in the following sequence? OTTFFSSE.
  - **Solution:** Each letter in the sequence represents a number: O = One, T = Two, T = Three, F = Four, F = Five, S = Six, S = Seven, E = Eight. Hence, the next two letters are N = Nine and T = Ten.
- Heap of Beans (20 minutes)
  - **Directions:** Place 16 beans in a pile. Two people play against each other taking turns removing either 1, 2, or 3 beans from the pile on each turn. The person who removes the last bean(s) wins the game. Describe a winning strategy for this game.
  - **Hints:**
    - \* For each game draw a table to keep track of who goes first, how many beans each player takes, and who ends up winning (example on Pg. 18).
    - \* Try and work backwards. What situation(s) ensures that a player wins?
  - **Solution:** Make sure you go second and that your opponent is always left with a multiple of four beans in the pile before they take their turn.
- Two Beans Heaps (if finished)
  - **Directions:** There are two heaps of 10 beans each on the table. You and a partner alternate moves until all the beans are gone. The player to take the last bean(s) wins. A move consists of removing one bean from one of the piles, or of removing a bean from each pile. What is a winning strategy?
  - **Solution:** Always go second and mirror what player 1 does. Another way to think about this is making sure the number of beans in each pile is even.
- Homework Assignment 1: Write a letter to a friend or family member explaining the rules and object of the game, and how to win.
  - Refer to Pg. 96 of the text for a checklist in writing this and future assignments.