15 Oct 2014
Math 181

You and your partner are now roommates. Your job is to fairly divide the list of chores between the two of you. The list of chores is vacuuming, yard work, washing dishes, cleaning the bathroom, clean the rest of the kitchen (minus dishes), dust, wash windows (includes blinds and curtains), and taking the trash out.

Distribute 100 points (secretly) among the chores, where the number of points represents how *undesirable* a particular chore is to you. Once you have both finished, record your point allocations in the following table:

Name:		
Vacuum		
Yard Work		
Dishes		
Bathroom		
Kitchen		
Dust		
Windows		
Trash		

Determine a fair division of the chores using the Adjusted Winner Procedure. To determine the initial winner/loser of the item, think of it as the higher bid "wins" the right to say "my roommate will handle _____". At the end of the procedure, decide with your partner how you will handle "shared" chores.

If you need help remembering some of the steps, here are some hints:
1. Find an initial assignment determined by winning bids. Calculate the number of points each person is receiving.
2. Compute the *point ratio* for each of the initial winner's items.
3. Move items beginning with lowest point ratios by setting the ending point values equal to each other.

Use the Knaster Inheritance Procedure to help three siblings—Alice, Bob, and Charlie—find a fair division of their parents' classic car collection. Each sibling submitted secret bids, which are listed in the following table:

	Alice	Bob	Charlie
Duesenberg	$18,000	$15,000	$15,000
Bently	18,000	24,000	20,000
Ferrari	16,000	12,000	16,500
Pierce-Arrow	14,000	15,000	13,500
Cord	24,000	18,000	22,000

Recall that the highest bidder wins the car, and places all but $\frac{1}{n}$ of their bid into a "kitty" (where $n = 3$ in this case). Each losing bid gets to extract $\frac{1}{n}$ of *their* bid for the item from the kitty. The rest of the money is divided equally among the n heirs.

Two players rank a series of objects, from most preferred to least preferred, as follows:

A	B
Car	Boat
Investments	Investments
MP3 Player	Car
Boat	Washer/Dryer
TV	TV
Washer/Dryer	MP3 Player

Assuming Player A goes first, what is the best strategy to obtain the most preferred items? Take turns so that each of you is Player A at least once.