Homework 20: Chapter 21

Recall that on the next quiz, there will be a proof question.

Reading: Chapter 21

Book Exercises: 16.5 (sol), 21.1, 21.2 (Solutions)

Other Exercises: (Solutions)

1. In class, we saw the following example:

	Choc	Van	Straw
A	.4	.3	.3
B	.2	.2	.6

And three cuts:

	S_A	S_B
Choc	1	0
Van	.5	.5
Straw	.2	.8

	T_A	T_B
Choc	1	0
Van	.5	.5
Straw	0	1

	R_A	R_B
Choc	1	0
Van	.8	.2
Straw	.1	.9

The first cut is not a threshold cut. The second cut is a threshold cut.

   (a) Is the third cut a threshold division? Explain why or why not. (You will need to recall the A to B valuation ratios in your argument)

   (b) By Theorem 21.2, which cuts can we conclude are pareto-optimal?

   (c) By Theorem 21.2, which cuts can we conclude are NOT pareto-optimal?

   (d) (Optional, harder) For each cut which is NOT pareto-optimal by Theorem 21.2, find an objective improvement.

2. (Optional extra practice on threshold divisions) Consider the same cake but two new players C and D who have the following valuations:

	Choc	Van	Straw
C	.1	.6	.3
D	.2	.2	.6

   (a) What are the C to D valuation ratios?

   (b) Which of these cuts is a threshold division? Explain.

	S_C	S_D
Choc	1	0
Van	.8	.2
Straw	0	1

	T_C	T_D
Choc	.8	.2
Van	1	0
Straw	.5	.5

(c) Applying Theorem 21.2: Which of these cuts is pareto-optimal? Which is not pareto-optimal?

(d) (Optional, harder) For each cut which is NOT pareto-optimal, find an objective improvement.

Need more practice? Make up new examples and check your answers with the Division applet. Download the Wolfram CDF player online (free for students) and either download and open the applet by clicking here or go to the applet page linked above with an internet browser *other than Chrome*.

With the applet, you can activate the A to B ratios option to check your ratios, and input players values and the data for the slices to check their values for the components. Then you can slide the amount in each slice in search of an objective improvement...