MA111: Contemporary mathematics

Alex and Blair split a 2-bedroom apartment for \$550 per month so that each was paying \$50 less than they expected, given how great their rooms were. Why is Alex so mad?

	Master	Other	Which room?	Rent	
Alex	\$350	\$325	Master	\$300	
Blair	\$315	\$300	Other	\$250	
Total	\$550 total		Both	\$550	
Why does Alex think Blair got the better deal?					
What does Alex think Blair should pay?					
Can you fix it?					

• So the answer to the final quiz question is no.

• No matter which room we give to Blair for

Important concepts

Assignment problem: each person gets one thing;

maximize total happiness and then use money to even things up. hard, but you guys are good at it

• Shared experience problem: should the group do it?

is the total benefit to the group more than the total cost?

- if so, divide the cost according to how much people enjoy it
- Indivisible items currently shared: who should get the object
 Give each object to whoever wants it most

Those people pay everyone else for their portion

1 Everybody pays the maximum they said they would into a shared pile of money

2 The pile is used to pay everyone (the minimum possible if there is a choice)

3 The leftover money is split between everyone, either equally or proportional to how much they paid in

Details for shared object

• Shared object is basically the same

in #1 the only ones who pay are the ones who get an object – they pay full price

in #2 everyone gets 1/n of their price back – even the one who got the objects

step #3 is totally the same

• Many people combine steps #1 and #2:

with 4 people, each person who gets an object pays 75% to the shared pile, and the three people who didn't get it take 25% back.

Even though 25% + 25% + 25% = 75%, the "25% of what" are smaller than the "75% of what", so there is money leftover for step #3.

Exit quiz

- Chores! Alex and Blair also want to split the chores. They see two main chores: keeping the kitchen tidy and keeping the living room tidy. Neither wants to do the chores and would be willing to pay the other to do it.
- They set their prices at the tipping point: if Alex does the kitchen, they want \$20 per month, but they are willing to pay Blair \$20 per month to do it.

	Kitchen	Living
Alex	\$20	\$15
Blair	\$10	\$10

- Who should do each chore?
- Who pays whom? How much?
- Explain why both Alex and Blair are happier than they expected.