

Homework Assignment No. 5

This assignment is due on Tuesday, March 8th at 2:00pm. Remember to turn it in by class on Monday if you want it to be graded by office hours the next day.

Problem 1 For this problem, select the option below that is true. The adjusted winner procedure

a *applies only to two-party disputes or disputes that can be recast as two-party disputes.*

b *applies to either two-party or three-party disputes.*

c *applies to n -party disputes for all n .*

Problem 2 Suppose that Bob is entitled to one-fourth of a cake and Carol is entitled to the other three-fourths. In a few sentences, explain how divide-and-choose can be used to achieve an allocation in which each party is guaranteed to receive at least as much as he or she is entitled to.

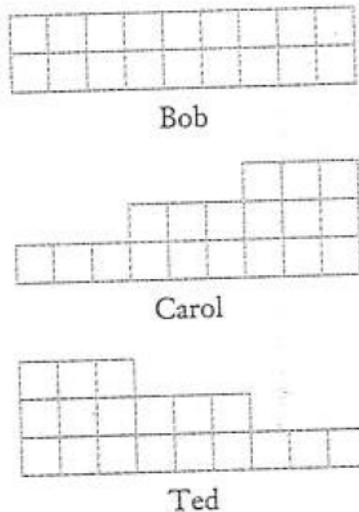
Problem 3 Define the three properties: (1) , (2) envy-free, and (3) Pareto-optimal.

a *equitable*

b *envy-free*

c *Pareto-optimal*

Problem 4 Suppose that Bob, Carol, and Ted view a cake as having 18 units of value, with each unit of value represented by a small square (as in the accompanying illustration). Suppose, however, that the players value various parts of the cake differently (or that Bob views the cake as being perfectly rectangular, whereas Carol and Ted see it as skewed in opposite ways). We represent this pictorially as follows:



a If Bob and Carol use divide-and-choose to divide the cake between them, how large a piece will each receive assuming they follow the suggested strategies that go with divide-and-choose and that Bob is the divider?

b If Carol and Ted use divide-and-choose to divide the cake between them, how large a piece will each receive (assuming that they follow the suggested strategies that go with divide-and-choose and that Carol is the divider)?

Problem 5 The last-diminisher method isn't the only cake-division procedure that yields a proportional allocation for any number of players. This method is the lone-chooser method. For the parties Bob, Carol, and Ted:

- i. Bob and Carol divide the cake into two pieces using divide-and-choose.
- ii. Bob now divides the piece he has into three parts that he considers to be the same size. Carol does the same thing with the piece she has.
- iii. Ted now chooses whichever of Bob's three pieces that he wants and whichever of Carol's piece he wants.
- iv. Bob and Carol keep their remaining pieces.

a *Explain why Ted thinks he is getting at least one-third of the cake.*

b *Explain why Bob and Carol each think they are getting at least one-third of the cake.*

c *Explain why, in general, this scheme is not envy-free.*