Goal: Understand the method of **Sealed Bids**.

1. Sealed bids: general idea

- Scheme for dividing stuff that cannot be split: house, car,
- Since assignment of stuff to parties will be unequal, it requires exchange of cash to even things out

2. Steps:

   (a) List items to be divided
   (b) Individuals submit a sealed bid for each item
   (c) Determine each person's total bid
   (d) Determine each person's fair share: (their total bid) / (# people)
   (e) Award each item to the highest bidder
   (f) Determine each person's initial allocation of money to holding pot:
      - if award − fair share is positive, individual pays difference **into** pot
      - if award − fair share is negative, individual gets difference **from** pot
   (g) Divide remaining surplus in pot equally

3. Example ITEMS: Vase, Earrings, Ice Skates. PEOPLE: Sam, Omar

	Sam	Omar
vase	$10	$5
earrings	$4	$15
ice skates	$20	$16
total bid	10+4+20 = $34	5+15+16 = $36
fair share (bid / #people)	$\frac{34}{2} = \$17$	$\frac{36}{2} = \$18$
who gets what (award)	vase, skates	earrings
award value	10+20 = $30	$15
(award value) − (fair share)	30 − 17 = $13	15 − 18 = $-3
pays in / receives	pays $13 into holding pile	receives $3 from the holding pile
total surplus	$13 in − $3 out = $10	
share of surplus	$\frac{\$10}{2 \text{ people}} = \$5$	$5
Final Allocation	vase, skates, pays $13 in, gets $5 back out. So pays $8 total (13−5=8)	earrings, gets $3, then gets $5 more. So gets $8 total.

One last Q: Is it fair??

Sam: 10+20−8 = 22 ≥ 17 ✓

Omar: 15+8 = 23 ≥ 18 ✓

Sanity Check: These numbers are the same. So Sam pays Omar $8.

4. Same Example with different bids:

	Sam	Omar
vase	$10	$5
earrings	$4	$1
ice skates	$20	$10
total bid	34	16
fair share	17	8
who gets what (award)	vase, earrings, skates	Nothing
award value	34	0
(award value) − (fair share)	34 − 17 = 17	0 − 8 = −8
pays in / receives	pays $17 into holding pile	gets $8 from holding pile
total surplus	17 − 8 = 9	
share of surplus	$\frac{9}{2}$ = 4.5	$\frac{9}{2}$ = 4.5
Final Allocation	vase, earrings, skates pays $12.50	gets only $12.50 cash

Aside: pays 17 receives 4.5
17 − 4.5 = 12.50

Check: gets 8 then 4.5.
So 8 + 4.50 = 12.50

Q| Is the outcome fair to each person according to their values? Sam: 34 − 12.50 = $21.50 ≥ $17 ✓

Omar: $12.50 ≥ $8 ✓

So, it's possible of one person to out bid everyone else and get all the stuff and another person to get only cash.

What keeps someone from bidding high to get everything?

What keeps someone from bidding low even if they don't want something?