Note on last time:

In general sum games, having fewer options can improve outcome for a player. (Unlike 0-sum games)

This has many real applications.

Pascal's Wager:

<table>
<thead>
<tr>
<th>God exists</th>
<th>righteous</th>
<th>0 + ∞</th>
<th>5 - ∞</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>no god</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Information

play either A or A'  
A = \begin{pmatrix} 1 & 4 \\ 0 & 3 \end{pmatrix}  
A' = \begin{pmatrix} 1 & 0 \\ 4 & 1 \end{pmatrix}

based on a coin toss.

\[
\frac{A + A'}{2} = \begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix} \quad \text{value} = 2.
\]

1st change: more sequentially: P1, then P2.

\Rightarrow \text{ same outcome,}

2nd change: P1 knows the coin result,  
P2 does not.

In A  P1 picks 1  \Rightarrow P2 can determine  
In A'  P1 picks 2 \Rightarrow the coin from P1 action

Outcome is 1, worst for P1.
Used car market (market for lemons)

- A good car is worth $12000$ to the seller, worth $15000$ to the buyer.

If car is sold for $x \in [12000, 15000]$, 
- seller gains $x - 12000$,
- buyer gains $15000 - x$.

- A lemon is worth $6000$ to seller $8000$ to buyer.

Only seller knows if the car is a lemon or not.

Assume fraction $p$ of cars are lemons.

Buyers expected value from the car is $p \cdot 8 + (1-p) \cdot 15 = 15 - 7p$
if a seller asks for Q for a car, if Q<15-7p, car is sold. If Q>15-7p, not sold.

Sellers with good cars are more likely to value the car above 15-7p
Sellers with lemons always can sell.
Over time fraction of lemons in sold cars increases eventually only lemons are sold. Even though a good car can be sold at a gain to both buyer + seller.
Value of car to seller:

Value to buyer:

Lemons  Good

Equilibrium Market price

Lemons  Good
HW 6 online will be open until tomorrow, 9:00.