Good Afternoon, Colleagues

Are there any questions?
Good Afternoon, Colleagues

Are there any questions?

• Where do the numbers come from? Do they matter?
Good Afternoon, Colleagues

Are there any questions?

- Where do the numbers come from? Do they matter?
- Proportional games
Logistics

- Schedule overview

- Be working towards progress reports!
Game Theory

- Multiagent systems
- Economics
- Social science, law, etc.
Bach/Stravinsky

• My wife and I agree to meet at a concert
Bach/Stravinsky

- My wife and I agree to meet at a concert
- Unfortunately, there are 2: Back and Stravinsky
Bach/Stravinsky

- My wife and I agree to meet at a concert

- Unfortunately, there are 2: Back and Stravinsky

- No time to get in touch with each other
Bach/Stravinsky

- My wife and I agree to meet at a concert
- Unfortunately, there are 2: Back and Stravinsky
- No time to get in touch with each other
- I prefer Stravinsky, she prefers Bach
Bach/Stravinsky

• My wife and I agree to meet at a concert

• Unfortunately, there are 2: Back and Stravinsky

• No time to get in touch with each other

• I prefer Stravinsky, she prefers Bach

• But most of all, we want to be together
Bach/Stravinsky

- My wife and I agree to meet at a concert

- Unfortunately, there are 2: Back and Stravinsky

- No time to get in touch with each other

- I prefer Stravinsky, she prefers Bach

- But most of all, we want to be together

- Propose a payoff matrix
<table>
<thead>
<tr>
<th></th>
<th>Wife</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
</tr>
<tr>
<td>S</td>
<td>2,1</td>
</tr>
<tr>
<td>B</td>
<td>0,0</td>
</tr>
</tbody>
</table>

Bach/Stravinsky
Matching Pennies

- We each turn put a penny down covered
- If they match, I win, if they don’t, you win
Matching Pennies

- We each turn put a penny down covered
- If they match, I win, if they don’t, you win

Player 2

<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>1,-1</td>
<td>-1,1</td>
</tr>
<tr>
<td>T</td>
<td>-1,1</td>
<td>1,-1</td>
</tr>
</tbody>
</table>

Player 1
Matching Pennies

- We each turn put a penny down covered
- If they match, I win, if they don’t, you win

\[
\begin{array}{c|cc}
\text{Player 1} & \text{H} & \text{T} \\
\hline
\text{H} & 1,-1 & -1,1 \\
\text{T} & -1,1 & 1,-1 \\
\end{array}
\]

\[\text{Player 2}\]

Nash equilibrium?
### Mixed strategy equilibrium

<table>
<thead>
<tr>
<th></th>
<th>Player 1</th>
<th></th>
<th>Player 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action 1</strong></td>
<td>4,8</td>
<td><strong>Action 1</strong></td>
<td>2,0</td>
</tr>
<tr>
<td><strong>Action 2</strong></td>
<td>6,2</td>
<td><strong>Action 2</strong></td>
<td>0,8</td>
</tr>
</tbody>
</table>
Mixed strategy equilibrium

<table>
<thead>
<tr>
<th></th>
<th>Action 1</th>
<th>Action 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Player 1</td>
<td>4,8</td>
<td>2,0</td>
</tr>
<tr>
<td>Action 1</td>
<td>6,2</td>
<td>0,8</td>
</tr>
<tr>
<td>Action 2</td>
<td>6,2</td>
<td>0,8</td>
</tr>
</tbody>
</table>

Do actual numbers matter?