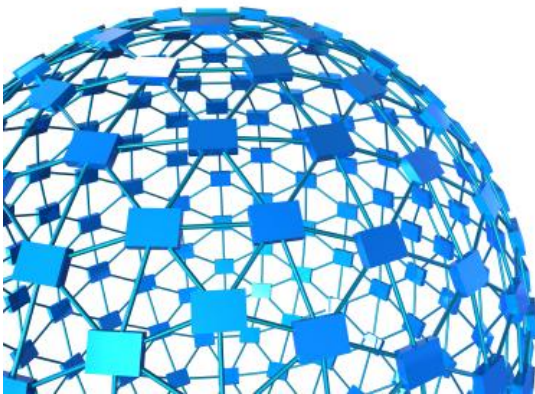


# A Game Theory Approach to Voting Behavior

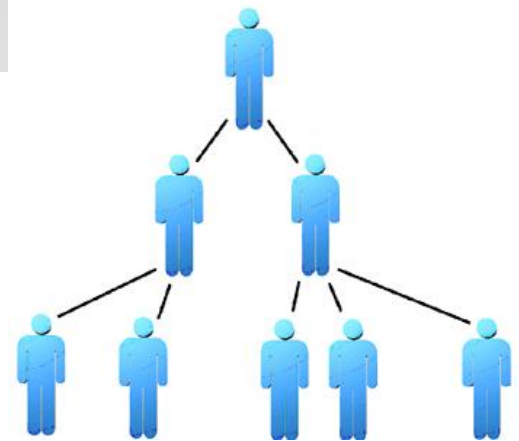
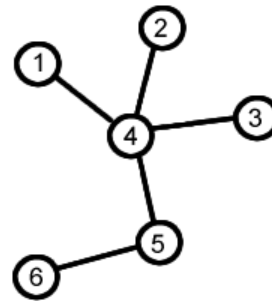
By  
Jim Manning

Mentor  
Dr. Midge Cozzens



# What is Viral Marketing?

- Start off with a small group of individuals
- “Word-of-Mouth”
- Initial individual tells two of his friends and they tell their friends...
- Not necessarily selling a product
- Viral → Think Virus





- Game Theory: Prisoner's Dilemma

- Payoff Table / Nash Equilibrium

|               | Confess | Don't Confess |
|---------------|---------|---------------|
| Confess       | (10,10) | (0,20)        |
| Don't Confess | (20,0)  | (1,1)         |

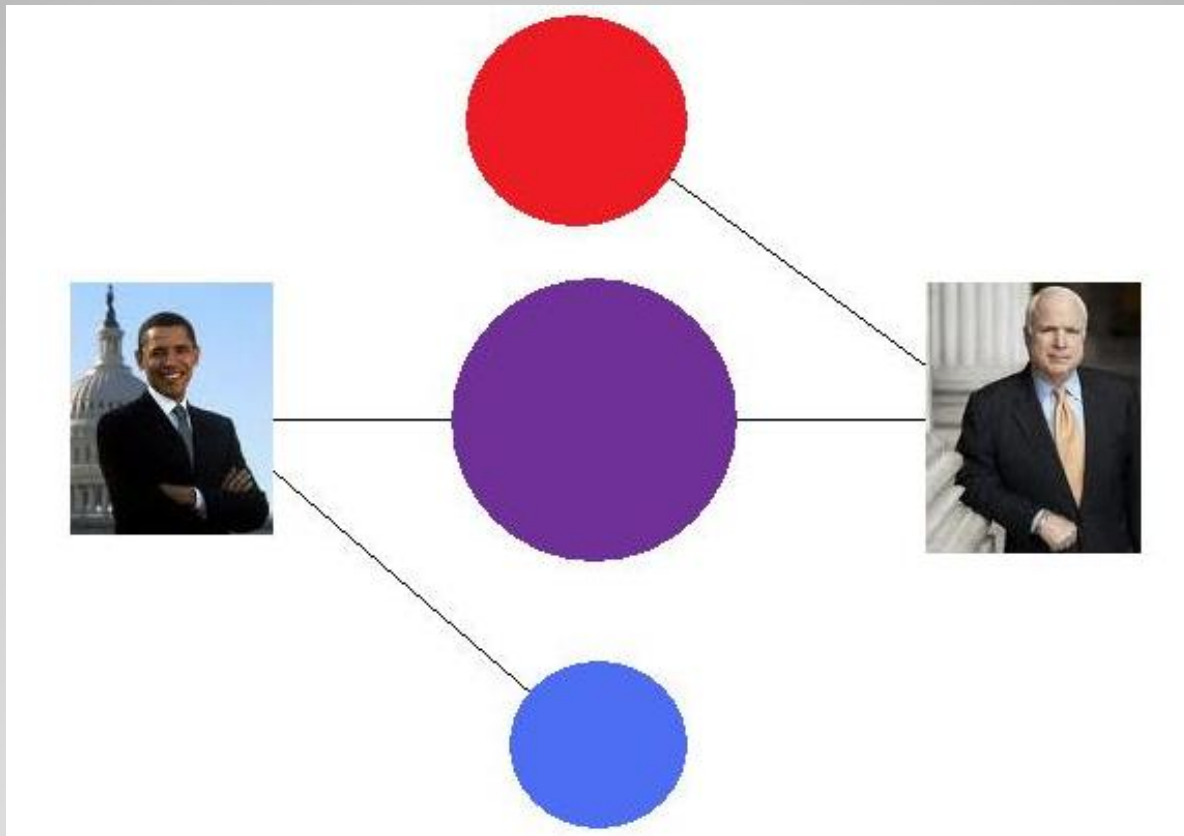
# 2008 Presidential Exit Poll

|                           | Obama      | McCain     | Other |
|---------------------------|------------|------------|-------|
| <b>Liberal (22%)</b>      | <b>89%</b> | 10%        | 1%    |
| <b>Moderate (44%)</b>     | <b>60%</b> | 39%        | 1%    |
| <b>Conservative (34%)</b> | 20%        | <b>78%</b> | 2%    |

|                           | Liberal | Moderate   | Conservative |
|---------------------------|---------|------------|--------------|
| <b>Democrat (52.8%)</b>   | 37%     | <b>50%</b> | 13%          |
| <b>Republican (45.9%)</b> | 5%      | 37%        | <b>58%</b>   |
| <b>Other (1.3%)</b>       | 16%     | 33%        | <b>51%</b>   |

- Actual: Obama (.529) – McCain (.456) – Other (.015)

# Graphical Representation



# One Step Payoffs

|        | Liberal | Moderate | Conservative |
|--------|---------|----------|--------------|
| Obama  | 19.6%   | 26.4%    | 6.8%         |
| McCain | 2.2%    | 17.2%    | 26.5%        |

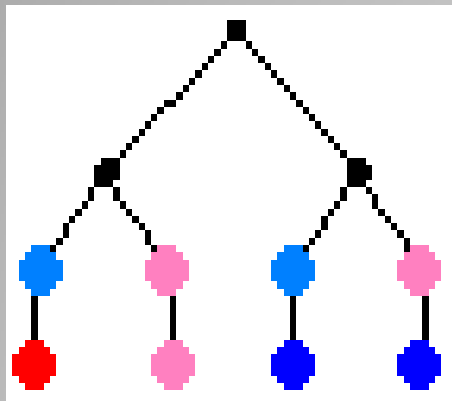
|              | Liberal         | Moderate        | Conservative    |
|--------------|-----------------|-----------------|-----------------|
| Liberal      | ( .196 , .022 ) | ( .196 , .172 ) | ( .196 , .265 ) |
| Moderate     | ( .264 , .022 ) | ( .264 , .172 ) | ( .264 , .265 ) |
| Conservative | ( .068 , .022 ) | ( .068 , .172 ) | ( .068 , .265 ) |

# One Step Payoffs After Nature

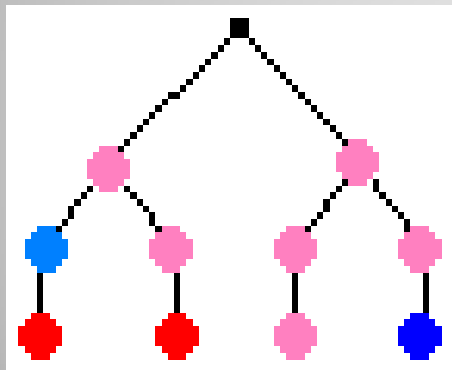
|              | Liberal         | Moderate        | Conservative    |
|--------------|-----------------|-----------------|-----------------|
| Liberal      | ( .530 , .459 ) | ( .446 , .544 ) | ( .496 , .498 ) |
| Moderate     | ( .614 , .376 ) | ( .530 , .461 ) | ( .580 , .414 ) |
| Conservative | ( .563 , .426 ) | ( .479 , .510 ) | ( .529 , .464 ) |

- Restrict Democrats to liberal and moderate strategies.
- Restrict Republicans to moderate and conservative strategies.

# Decision Trees



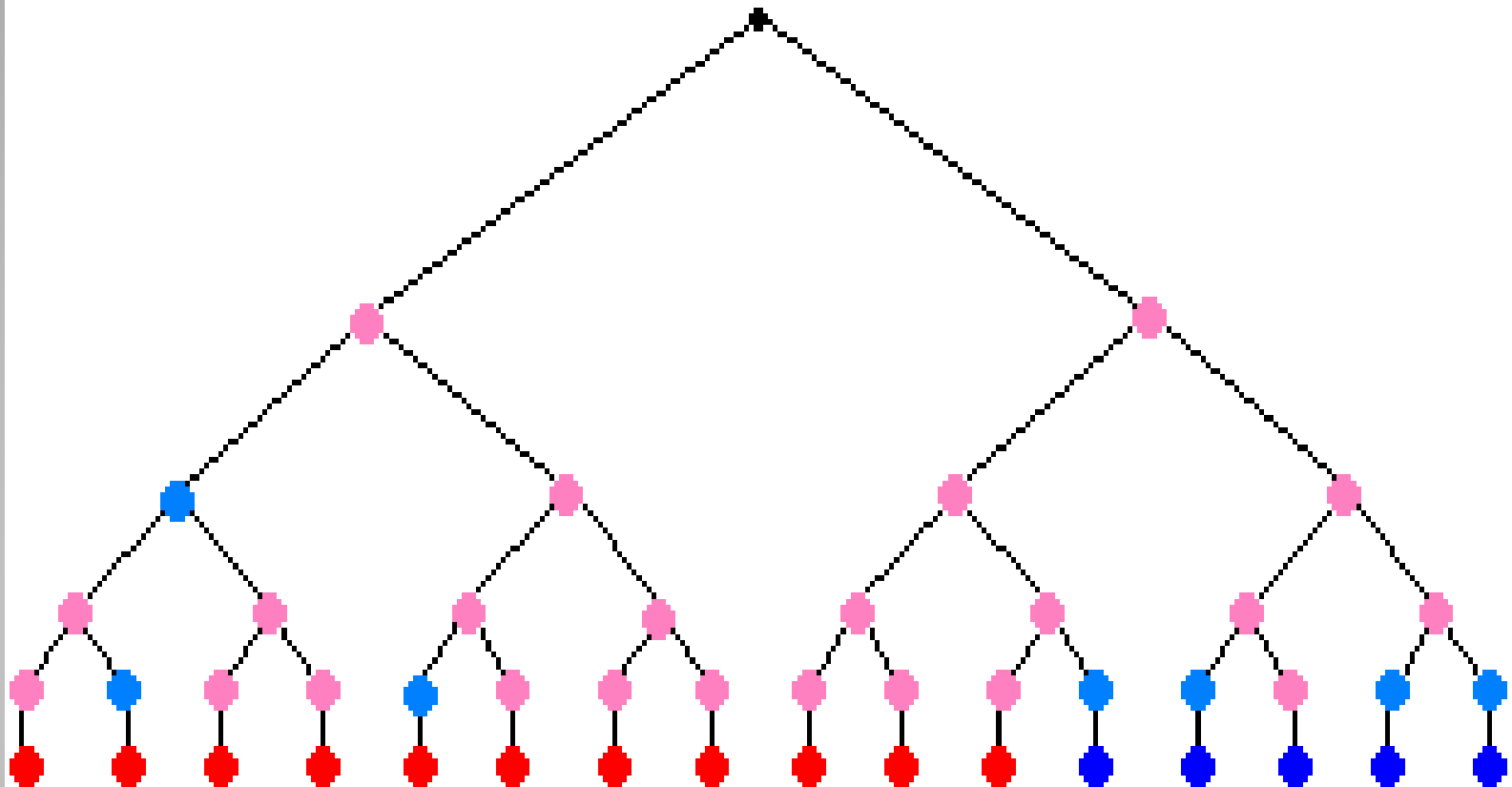
| Simultaneous | Moderate        | Conservative    |
|--------------|-----------------|-----------------|
| Liberal      | ( .446 , .544 ) | ( .496 , .498 ) |
| Moderate     | ( .530 , .461 ) | ( .580 , .414 ) |



| Dem First | Moderate        | Conservative    |
|-----------|-----------------|-----------------|
| Liberal   | ( .446 , .544 ) | ( .496 , .498 ) |
| Moderate  | ( .592 , .398 ) | ( .580 , .414 ) |

| Rep First | Moderate        | Conservative    |
|-----------|-----------------|-----------------|
| Liberal   | ( .446 , .544 ) | ( .496 , .498 ) |
| Moderate  | ( .489 , .501 ) | ( .580 , .414 ) |

# Two Step Version – Rep First

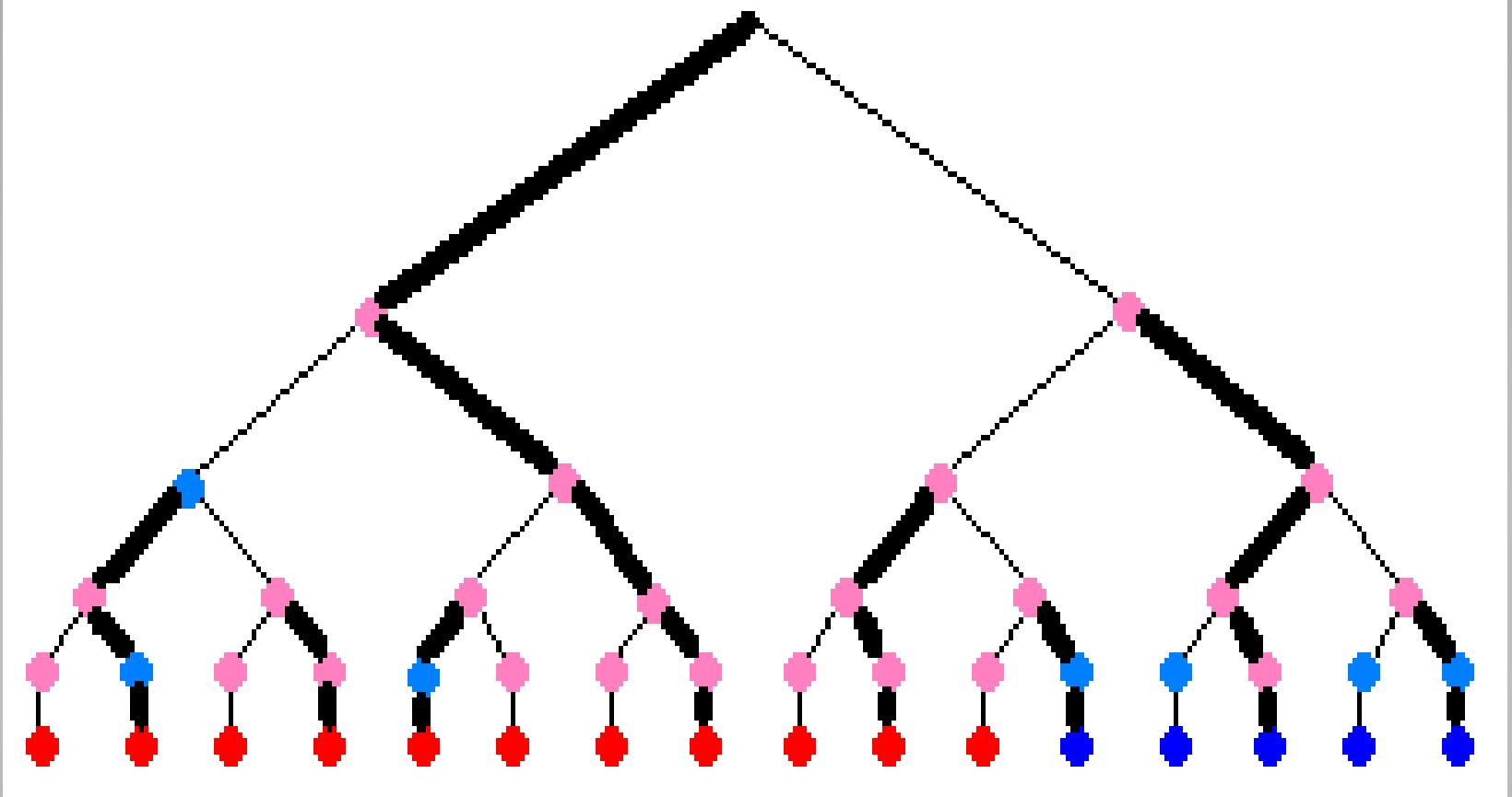


# Two Step Version – Rep First

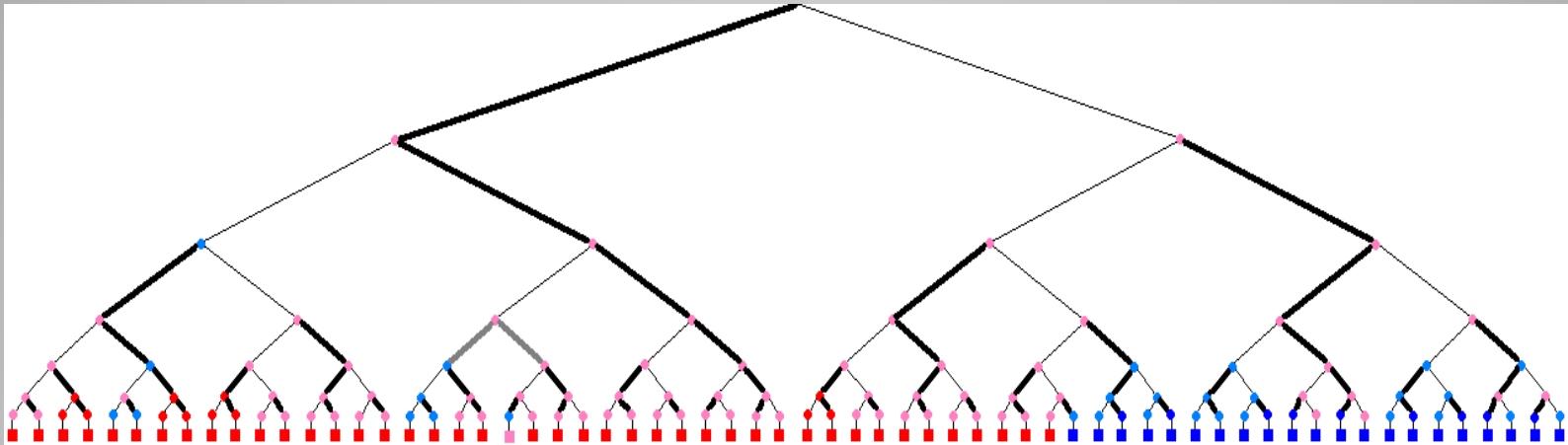
|   | Dem   | Rep   |
|---|-------|-------|
| 1 | 38.6% | 60.6% |
| 2 | 42.3% | 56.9% |
| 3 | 39.6% | 60.0% |
| 4 | 45.8% | 53.9% |
| 5 | 48.6% | 50.7% |
| 6 | 48.0% | 51.1% |
| 7 | 45.8% | 53.9% |
| 8 | 46.2% | 53.4% |

|    | Dem   | Rep   |
|----|-------|-------|
| 9  | 39.6% | 60.0% |
| 10 | 45.8% | 53.9% |
| 11 | 48.7% | 50.8% |
| 12 | 59.0% | 40.7% |
| 13 | 56.1% | 43.6% |
| 14 | 56.5% | 43.1% |
| 15 | 59.0% | 40.7% |
| 16 | 61.1% | 38.6% |

# Backward Induction - Equilibrium



# Three Step Version



- Perfect Equilibrium:
  - **Republicans:** Moderate, Conservative, Conservative.
  - **Democrats:** Moderate, Moderate, Liberal.

# Future Research

- Interaction between moderates and other ideological groups
- Individual players (electors) rather than using ideological blocs
- Congressional elections

# Sources

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**Thank you for your attention!**

Questions?