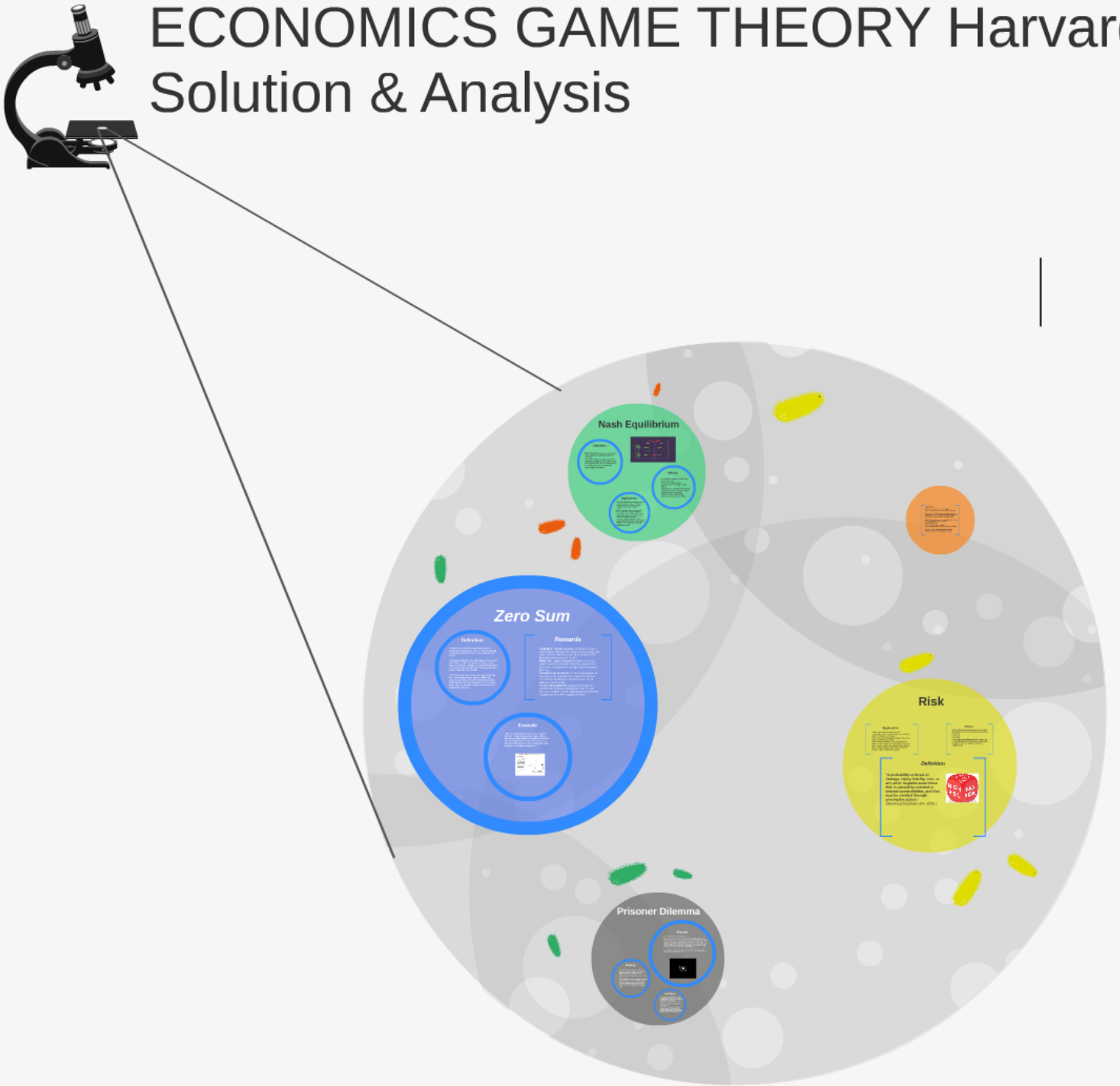
ECONOMICS GAME THEORY Harvard Case Solution & Analysis



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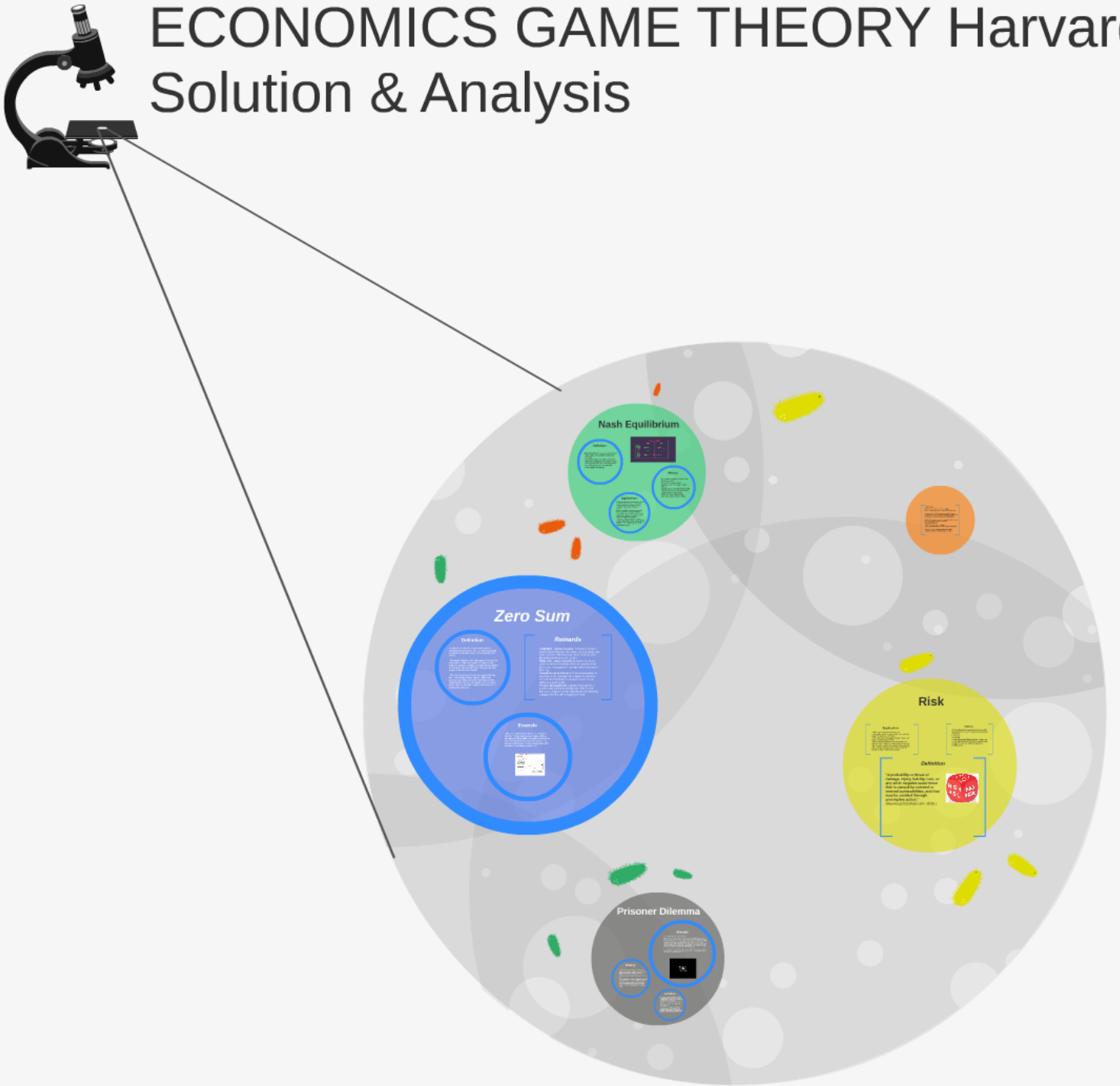

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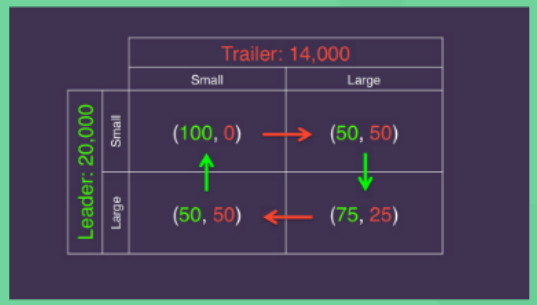
Nash Equilibrium

Definition

- Nash Equilibrium is a concept derived from a type of economics based on strategy.
- The point is for each player to know the others strategies and stick to their strategy and not care to change his or her strategy based from what the other players are doing.



History

- Amended/created by John Forbes Nash, Jr in 1950.
- He won the noble prize in economics for his paper on this theory.
- The theory is older than when John won the prize for it, but the theory slightly differs from Johns
- There has been signs of the theories existence since 1838.

Applications

- Although majority of applications will be mathematical, it can be used towards politics, accounting, math, science, military theories, and strategy in general.
- A great example I found was actually from a movie the "A Beautiful Mind."
- "Nash put some structure around how players in a "game" can optimize their outcomes by knowing others strategies." (Khan Academy, 2015)
- In the movie, Nash knows his friends are going to hit on the most beautiful girl in the place, so he talks to the second most beautiful girl.

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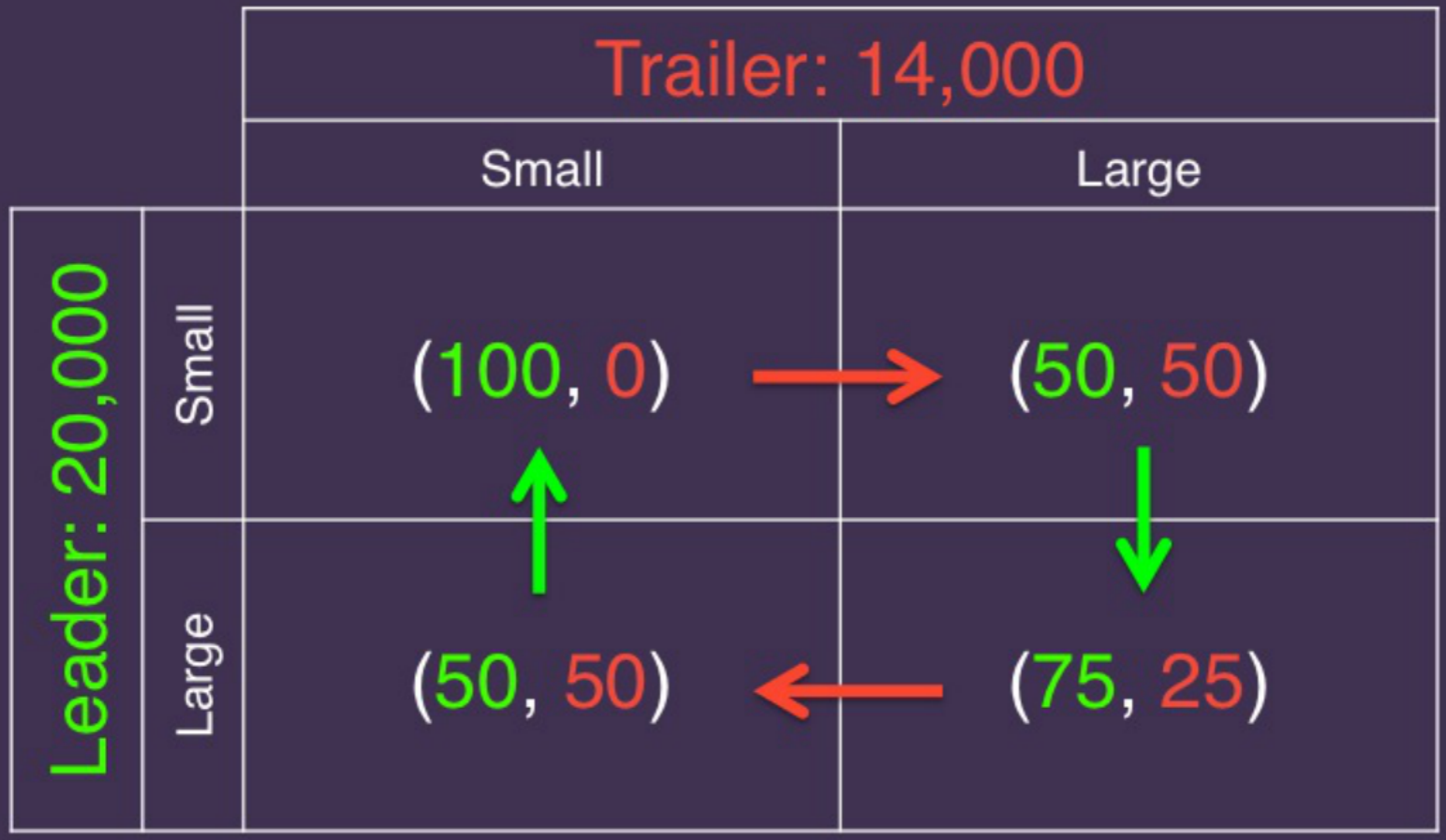
Trailer: 14,000
Small
Large
Leader: 20,000
Small
Large
(100, 0)
(50, 50)
(50, 50)
(75, 25)

Prisoner Dilemma

Example

- Here is one example of the prisoner's dilemma.
  - Two members of a criminal gang are arrested and imprisoned. Each prisoner is in solitary confinement with no means of speaking to or exchanging messages with the other. The prosecutors do not have enough evidence to convict the pair on the principal charge. They hope to get both sentenced to a year in prison on a lesser charge. Simultaneously, the prosecutors offer each prisoner a bargain. Each prisoner is given the opportunity either to: betray the other by testifying that the other committed the crime, or to cooperate with the other by remaining silent. Here is the offer: If A and B each betray the other, each of them serves two years in prison.
  - If A betrays B but B remains silent, A will be set free and B will serve three years in prison (and vice versa). If A and B both remain silent, both of them will only serve one year in prison (on the lesser charge)

History

- The prisoner's dilemma is a canonical example of a game analyzed in game theory that shows why two purely "rational" individuals might not cooperate, even if it appears that it is in their best interests to do so.
- It was originally framed by Merrill Flood and Melvin Dresher working at RAND in 1950. Albert W. Tucker formalized the game with prison sentence rewards and gave it the name "prisoner's dilemma" (Poundstone, 1992)

Definition

- A paradox in decision analysis in which two individuals acting in their own best interest pursue a course of action that does not result in the ideal outcome.
- The typical prisoner's dilemma is set up in such a way that both parties choose to protect themselves at the expense of the other participant.
- As a result of following a purely logical thought process to help oneself, both participants find themselves in a worse state than if they had cooperated with each other in the decision-making process.