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Case Study - Repeated Games (Stag Hunt)

Introduction:
In the setting of a wildlife reserve, we examine a scenario where local residents must repeatedly choose between individual deer hunting, known as "Rabbit Hunt," or collective cooperation to capture a stag, known as "Stag Hunt." The former provides a small meat reward, while the latter offers substantial meat and contributes to endangered deer conservation. This scenario unfolds as a recurring strategic game, emphasizing the villagers' choices for sustainable resource management.

Scenario:
In the wildlife reserve, the villagers' objective is twofold: to provide for their families by obtaining meat from the reserve and to conserve the endangered deer population for future generations. They have an opportunity to make this a repeated game where they can repeatedly decide whether to cooperate and hunt a stag or hunt rabbits individually.

Payoff Structure:

- If all villagers choose to hunt a stag (Cooperate), they successfully capture the stag and receive a substantial reward (a large amount of meat) and contribute to deer conservation efforts.
- If some villagers choose to hunt a stag (Cooperate), while others opt to hunt rabbits (Defect), those hunting the stag receive a substantial reward, but those hunting rabbits receive a smaller reward. The stag is still captured, but the cooperative effort is less effective for conservation.
- If all villagers choose to hunt rabbits (Defect), they receive smaller individual rewards, but the deer population remains unaffected.

Analysis:
In the one-shot version of the game, there is a dilemma. If villagers are uncertain about others' choices, they may fear that some will choose to hunt rabbits, resulting in wasted cooperation efforts. In such cases, they might choose to hunt rabbits individually to secure a minimum reward for their families.

However, in a repeated Stag Hunt, villagers have opportunities to build trust and coordinate their efforts over time. The dynamics of repeated interactions can foster cooperation, conservation, and larger rewards for all.

Strategic Dynamics:
Initially, villagers may not trust one another and may frequently opt for rabbit hunting individually. However, as they experience repeated interactions and recognize the benefits of conservation and cooperation, they may begin to coordinate their efforts more effectively.

Over time, communication and social norms within the village can evolve to reinforce cooperation. They may establish rules, monitor each other's behavior, and develop strategies to ensure that stag hunting becomes the norm rather than the exception.

Outcome:
Through repeated interactions and a shared commitment to conservation and cooperation, the villagers can transition from a state of uncertainty and individualistic decision-making to a state where they consistently choose to cooperate by hunting stags. This not only maximizes their rewards but also ensures the preservation of the endangered deer population for future generations.

Conclusion:
The Repeated Stag Hunt case study in the context of a wildlife reserve demonstrates the transformation from individualistic decision-making to cooperative conservation efforts over time. By recognizing the potential for mutual benefits and developing trust through repeated interactions, villagers can transition from a "Rabbit Hunt" mentality to a "Stag Hunt" mentality, achieving their dual objectives of sustenance and conservation. This example highlights the significance of repeated games in fostering cooperation and achieving mutually beneficial outcomes in complex social and environmental contexts.