Payoffs: Game Theory Games are described by labeling the payoffs that each player would receive given each possible combination of plays. The most basic way to represent these payoffs is in *ordinal* terms: 1 is the payoff received by a player from that player's *most preferred* outcome, 2 is second-most preferred, 3 is third-most preferred, 4 is least preferred. The payoffs for Player X and Player Y for a specific outcome are represented (X, Y).

Games: A Game Theory Game is defined by the particular ordering of payoffs between its different possible outcomes. If the order of payoffs in two games is the same, they are the same game. This is true regardless of the nominal scale used to denote the actual payoffs in each game, and it is also true regardless of the gaps between each of the payoffs (that is, if the most-preferred outcome is much better than the second-most preferred, but the second-most preferred is only slightly better than the third-most preferred). For example, the following two games are identical, since they are both manifestations of the prisoner's dilemma:

Example #1:

	Y: A	Y: B
X: A	$5, $5	$0, $10
X: B	$10, $0	$1, $1

Example #2:

	Y: A	Y: B
X: A	0%, 0%	-50%, 75%
X: B	75%, -50%	-25%, -25%

Game #1: Prisoner's Dilemma
Story: Two prisoners have been arrested for a petty crime, but the police suspect that both are involved in more nefarious criminal activity. The police separate the two prisoners, and offer to reduce the jail term of each in return for ratting out the other prisoner. If both stay silent, each serves a short term for the petty crime. If both rat each other out, each serves a longer term due to the greater evidence of nefarious criminal activity, but less than the maximum due to cooperation in ratting out the other. If one rats the other out but the other stays silent, the rat walks free while the silent prisoner serves the maximum term for the nefarious criminal activity.

	Prisoner Y: Silent	Prisoner Y: Rat
Prisoner X: Silent	2, 2	4, 1
Prisoner X: Rat	1, 4	3, 3

Thought Questions: How does this game change if both prisoners are members of the Mafia, which will kill any member who rats out another member? How does this game change if the prisoners are close friends or take into account moral considerations?
Prominent IR Application: Arms races

Game #2: Stag Hunt
Story: Two hungry hunters are tracking a majestic stag. Since the stag is too fast for an individual hunter, they must approach it from different angles and use their combined effort to surround the stag. Each hungry hunter wants to kill the stag to get the most meat possible, but each also wants to avoid being left with no meat if the stag escapes. A hare crosses the path of each hungry hunter while they are separated in the woods, forcing each hunter to decide whether to stay on the trail of the stag or capture the hare instead. If both hunters stay on the stag, they each get a large share of its bountiful meat. If both hunters capture hares instead, they each get a smaller amount of meat. If one hunter captures the hare while the other keeps on the stag, one gets the smaller amount of meat while the other must go home empty-handed.

		Hunter Y	
		Stag	Hare
Hunter X	Stag	1, 1	3, 2
	Hare	2, 3	2, 2

Thought Questions: How does this game change if the group of hunters is larger than two? How does this game change if the hunters are concerned about relative gains?
Prominent IR Applications: Public Goods

Game #3: Chicken
Story: Two crazy teenagers are playing a game of Chicken to try to impress their girlfriends. (Chicken is a game where two cars drive straight towards each other very fast until one driver decides to swerve away, thereby "chickening out.") As their cars near collision, each driver must choose whether to keep driving straight or swerve out of the way. If both drivers keep driving straight, they both die in the resulting car crash. If both drivers swerve away, both survive, but and neither girlfriend is very impressed. If one swerves while the other keeps driving straight, the swerver's girlfriend is disgusted by his cowardly behavior and leaves him, while the bold straight driver's girlfriend is mightily impressed.

		Driver Y	
		Swerve	Straight
Driver X	Swerve	2, 2	3, 1
	Straight	1, 3	4, 4

Thought Question: How does the prospect of death as the worst-case alternative make this game different from the others?
Prominent IR Applications: Tragedy of the Commons