Example 2: Prisoner's Dilemma

If they both stay quiet ⇒ each will spend 1 yr. in prison.

If one and only one of them finks ⇒ 4 yrs. jail to the other person.

If both fink ⇒ each will spend 3 yrs in prison.

Strategic Game:

Players ⇒ The 2 suspects
Actions ⇒ Each player's set of actions is {Quiet, fink}
Preferences ⇒ Suspect 1's ordering of the action profiles, from best to worst: (fink, quiet), (Quiet, Quiet), (fink, fink), (Quiet, fink)
Suspect 2's ⇒ (Quiet, fink), (Quiet, Quiet), (fink, fink), (fink, Quiet)

payoff functions:

for suspect 1, we need u_1 for which:

u_1(fink, quiet) > u_1(Quiet, Quiet) > u_1(fink, fink) > u_1(Quiet, fink)

Simple specification ⇒ $u_1(F, Q) = 3$
$u_1(Q, Q) = 2$
$u_1(F, F) = 1$
$u_1(Q, F) = 0$

Similarly for suspect 2, $u_2(Q, F) = 3$
$u_2(Q, Q) = 2$
$u_2(F, F) = 1$
$u_2(F, Q) = 0$

suspect 1 \ suspect 2	Quiet	fink
Quiet	2, 2	0, 3
fink	3, 0	1, 1

The Prisoner's Dilemma models a situation in which there are gains from cooperation (each player prefers that both players choose Quiet than they both choose Fink) but each player has an incentive to "free ride" (choose Fink) whatever the other player does.

There are many examples that follow similar structures: