Prisoner's Dilemma

Best Response ← in L3.

1 \ 2	Quiet	Fink
Quiet	2, 2 →	0, 3
	↓	↓
Fink	3, 0 →	1, 1

strategy, not outcome, payoff.

NE = (F, F)

(one player can switch to better)

Nash equilibrium: ① can be no nash equilibrium.
② do not need to be optimal, but stable

- each player chooses action that provides highest payoff, given beliefs about others' actions (Given choice of the other, better choose ---) belief.
- Beliefs are correct

more beliefs involved than the puzzle.

Split & steal

1 \ 2	split	steal
split	50, 50	0, 100
steal	100, 0	0, 0

NE (steal, steal)
(steal, split)
(split, steal)

dominant strategy: no matter other do, do better with dominant strategy.

strictly dominant strategy: . - - ~ . . strictly better — .

Stag Hunt

1 \ 2	stag	hare
stag	2, 2 ←	0, 1
	↑	↓
hare	1, 0 →	1, 1

NE (S, S)
(h, h)

Bach or Stravinsky (Battle of the Sexes)

1 \ 2	B	S
B	2, 1 ←	0, 0
	↑	↓
S	0, 0 →	1, 2

play 1 prefer B, player prefer S.
Both hope to come with another person.

NE (B, B) (S, S).

Matching Pennies

1 \ 2	H	T
H	1, -1	-1, 1
T	-1, 1	1, -1

match: player 2 -1, player +1
vice versa.

no NE, randomize.

zero-sum game (conflict)

Chicken

1 \ 2	Swerve	straight
Swerve	2, 2	1, 3
straight	3, 1	0, 0

NE (Swerve, straight)
(straight, swerve)

Three Players

contribute or not.

[0, 0, 0]
E N H

E:

C \ N	C	N
C	5, 5, 5	3, 6, 3
N	6, 3, 3	4, 4, 1

H:

C \ N	C	N
C	3, 3, 6	1, 4, 4
N	4, 1, 4	2, 2, 2

NE (N, N, N)

N players

each player chooses Y or N.

If all choose Y, each player gets 1, otherwise, each get 0.

NE: all Y, all N, k players play Y with $k \neq n-1$