Hans in the Wild
Workshop 'AI in the Wild'
Groningen, 20 October 2004

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- **ideal agents and cognition**
- **optimal strategies in the Pit game**
- **complexity of playing Cluedo**
- **presuppositions in dialogue systems**
- **Hans in the Wild**

Ideal agents and cognition

modelling ideal agents $\Leftrightarrow$ cognitive modelling

Ideal agents are perfectly rational, and computationally unlimited.
So they are 'perfect' players, and 'perfect' logicians.
Obviously, ideal agents do not behave like real or simulated agents.
The question addressed today: *are they a desirable ideal?*
Are they the norm to be approached?

State transformation

$$x = 4 \qquad \xRightarrow{\quad x := 2 \quad} \qquad x = 2$$

State variables are assigned new values after program execution.

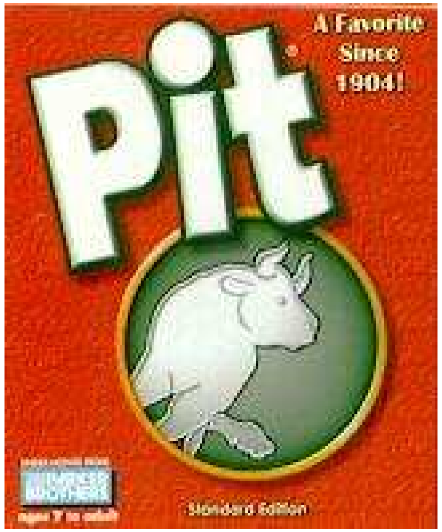
Information state transformation

Anne is dealt a clubs or a hearts card. It is clubs. She now picks up her card.

$$\underline{\clubsuit} \overset{a}{\text{——————}} \heartsuit \qquad \xRightarrow{\text{Anne looks at card}} \qquad \underline{\clubsuit}$$

Instead of state variables, we now have information state variables.

The Pit game



– Well-known case study in macroeconomics
– Proceduralized model for peer-to-peer communication in e-commerce
– No known results in microeconomics / game theory

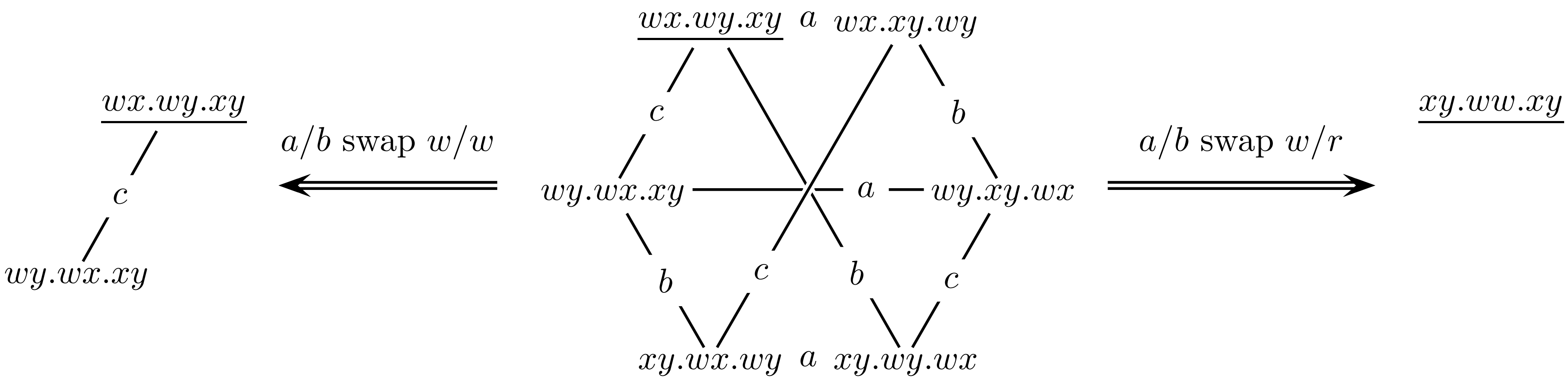
The Pit game

The object of Pit is to corner the market on Barley, Corn, Flax, Hay, Oats, Rye and Wheat by trading cards with other players. There are seven players. There are nine cards in each suit. Shuffle the cards. Deal nine cards to each player.

Players – traders – should try to corner the commodity of which they hold the most cards. When the cards have been sorted, the Dealer strikes the bell and announces, "The Exchange is open." To trade, a player takes from his hand one to four cards of the same suit, holds the cards up so that the suits do not show and calls out, "Trade One! One! One!" or "Two! Two! Two!" etc. Only equal numbers of cards may be traded. Trading continues until one player gets nine cards of the same suit. That player must quickly ring the bell and call out, "Corner on Wheat!" etc.

The player then scores the amount marked on the commodity he has cornered (Wheat, 100 points; Oats, 60 points, etc.). When a corner is won, all the cards are reshuffled and dealt by the last winner and another corner is played for. The game is won by the first trader to get 500 points.

Information state transition in the Pit game



- *Middle*: epistemic state for card deal $wx.wy.xy$ (Anne holds: Wheat & Flax, Bill: Wheat & Rye, Cath: Flax & Rye)
- *Left*: after Anne and Bill may trade, and trade their Wheat cards
- *Right*: after Anne trades her Wheat card for Bill's Rye card

On the left, what next game action is optimal?

Nash equilibria for SixPit

- $shared_n$: offer the card for trade that you know to share with the player you traded with."
- $distinct_n$: offer the card for trade that you know to share with the other player."

Game matrix for SixPit:

$a \backslash b$	$distinct_b$	$shared_b$
$distinct_a$	$(-\frac{1}{3}, -\frac{1}{3})$	$(\frac{1}{3}, -\frac{1}{6})$
$shared_a$	$(-\frac{1}{6}, \frac{1}{3})$	$(\frac{1}{6}, \frac{1}{6})$

Equilibria:

- $(distinct_a, shared_b)$
- $(shared_a, distinct_b)$
- $(\frac{1}{2} \cdot distinct_a + \frac{1}{2} \cdot shared_a, \frac{1}{2} \cdot distinct_b + \frac{1}{2} \cdot shared_b)$ (payoff $(0, 0)$)

Game matrix for SixPit

Now we give Wheat, Rye and Flax different points.
Each player now has eight pure strategies, the matrix has 8^3 entries.

Strategy	B_1			B_2			B_3			B_4			B_5			B_6			B_7			B_8		
	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y	Q^w	Q^x	Q^y
A_1	0	0	0	$-\frac{2}{18}$	$\frac{2}{18}$	0	$-\frac{2}{18}$	0	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	0	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$
	0	0	0	$\frac{4}{18}$	$-\frac{4}{18}$	0	$\frac{4}{18}$	0	$-\frac{2}{18}$	$\frac{8}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	0	$\frac{2}{18}$	$-\frac{2}{18}$	$\frac{4}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{4}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{8}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$
	0	0	0	$-\frac{2}{18}$	$\frac{2}{18}$	0	$-\frac{2}{18}$	0	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	0	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$
A_2	$\frac{4}{18}$	$-\frac{4}{18}$	0	$\frac{2}{18}$	$-\frac{2}{18}$	0	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$
	$-\frac{2}{18}$	$\frac{2}{18}$	0	$\frac{2}{18}$	$-\frac{2}{18}$	0	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$
	$-\frac{2}{18}$	$\frac{2}{18}$	0	$-\frac{4}{18}$	$\frac{4}{18}$	0	$-\frac{2}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{4}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$
A_3	$\frac{4}{18}$	0	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	0	$-\frac{1}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{1}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$
	$-\frac{2}{18}$	0	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	0	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$
	$-\frac{2}{18}$	0	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	0	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{5}{18}$
A_4	$\frac{8}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{8}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$
	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$
	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{4}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{4}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{5}{18}$
A_5	0	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	0	$\frac{1}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{4}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$-\frac{4}{18}$	$\frac{4}{18}$	$-\frac{1}{18}$
	0	$-\frac{1}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{8}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	0	$\frac{1}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{8}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$
	0	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	0	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$
A_6	$\frac{4}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{4}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$
	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{4}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$
	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$
A_7	$\frac{4}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{4}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$
	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$
	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{1}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{8}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{8}{18}$
A_8	$\frac{8}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{8}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$	$\frac{5}{18}$	$-\frac{2}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$
	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{2}{18}$	$\frac{2}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$\frac{2}{18}$	$-\frac{2}{18}$	$-\frac{1}{18}$	$-\frac{4}{18}$	$\frac{4}{18}$	$-\frac{1}{18}$	$-\frac{1}{18}$	$\frac{1}{18}$	$-\frac{1}{18}$	$-\frac{1}{18}$	$\frac{4}{18}$	$-\frac{4}{18}$	$\frac{2}{18}$	$\frac{1}{18}$	$-\frac{4}{18}$
	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{2}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$\frac{1}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{5}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{8}{18}$	$-\frac{4}{18}$	$-\frac{2}{18}$	$\frac{8}{18}$

Table A.1: Expected Payoff of the Arbitrary Deal when C Plays Strategy 1

Is this useful for Pit players to know?

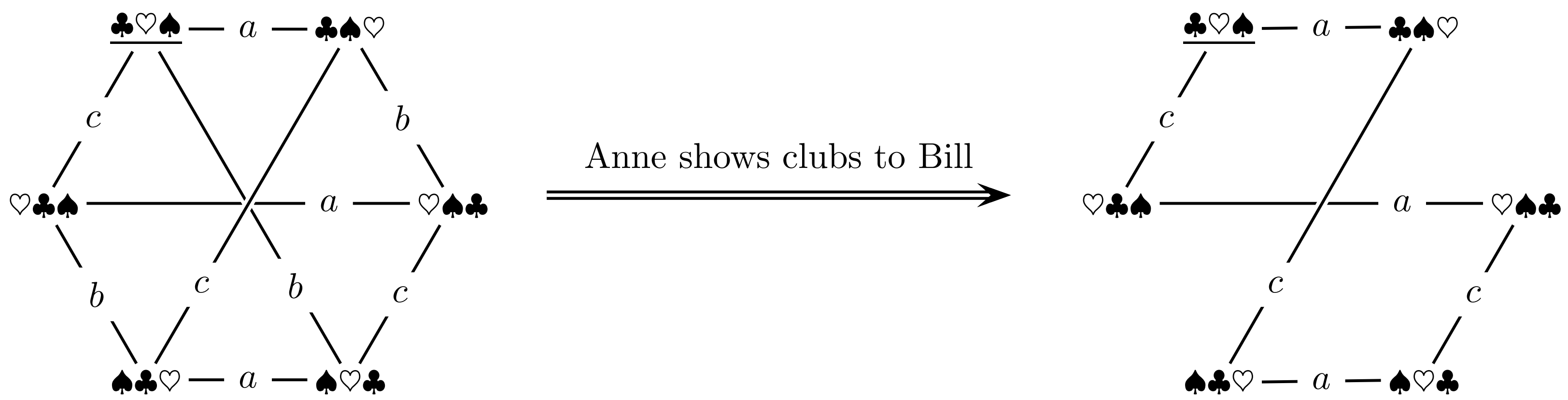
Cluedo

Game actions:

showing cards, denying ownership of cards, not winning, winning

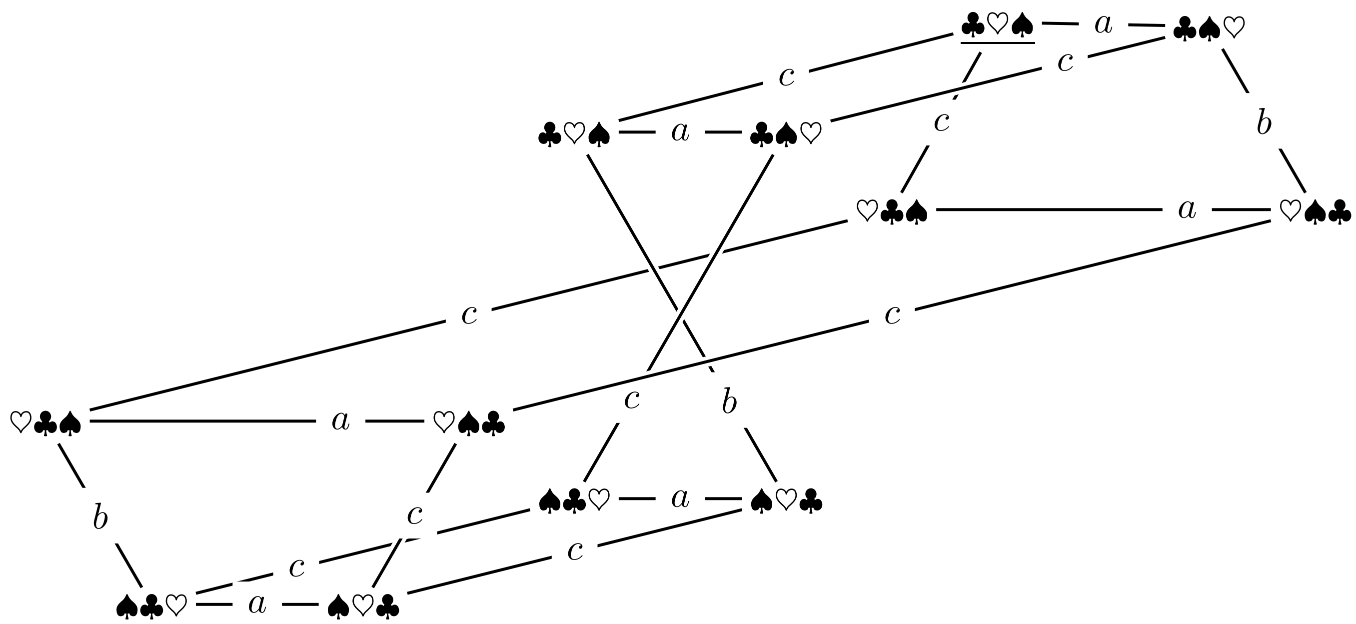
Information state transformation in Cluedo

Anne shows (only) to Bill her clubs card. Cath cannot see the face of the shown card, but notices that a card is being shown.



Information state transformation in Cluedo

Anne whispers into Bill's ear that she does not have the spades card, given a (public) request from Bill to whisper into his ear one of the cards that she does not have. Cath cannot hear what is being whispered



Game design and complexity

The whisper action involves choice: 'no hearts', or 'no spades'.
The resulting model is $\frac{2\times 3}{3} = 2$ times bigger:
The player can choose between **two out of three** to whisper,
for each of the player's **three** cards.

If you show a card in Cluedo, does this increase complexity too?
A suspicion in Cluedo is about a room, weapon and murder suspect.
After a card is shown, the resulting model is $\frac{3\times 3}{21} = \frac{9}{21}$ times **smaller**:
The player can choose between **three out of 21** to show,
for each of the player's **three** cards.

Suppose a suspicion in Cluedo also involved 'time of the murder', and 'motive'.
Now the resulting model would be $\frac{5\times 5}{21} = \frac{25}{21}$ times **larger**!
Would Cluedo have been fun in that case?
Did Pratt know when he designed Cluedo?

Can we design playable games?

How *really* to win Cluedo?

move 24: Masha: plum, lodenpijp, bibliotheek. Five nonshow actions. Masha wins.

	B							N							F							L							E							M						
	B	N	F	L	E	M	t	B	N	F	L	E	M	t	B	N	F	L	E	M	t	B	N	F	L	E	M	t	B	N	F	L	E	M	t	B	N	F	L	E	M	t
green	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0		2		0	0	2	0	0	0	0	0	0	1	0
mustard	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
peacock	0	0	1	0	0	0	0	0	0	2		0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
plum	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1
scarlett	0	0	0	0	0	0	0		0		0		0	0	2		0	0		0	0	2			0		0	0	0	0	0	0	1	0	0				0		0	0
white	0	2	0	0	0	234	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	3	0	0	0	456		0	0	0	0	0	1	0
kandelaar	0	2		0	0	23		0	0		0	0			0	0	1	0	0	0	0	0			0	0			0	3		0	0	45					0	0	0	0
revolver	1	0	0	0	0	0	0	1	0	0	0	0	0	0	23	0	0	0	2	0		23	0	0	0	2	0		1	0	0	0	0	0	0	1	0	0	0	0	0	0
dolk	0		0	0	0	4			0	0	0	0					0	0	0	3				0	0	0	3				0	0	0	26		0	0	0	0	0	1	0
lodenpijp	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0	0	1
touw	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
steeksle	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
danszaal	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	23			0			0	1	0	0	0	0	0
biljartk	0		0	0	0	2			0	0	0	0			0	0	1	0	0	0	0			0	0	0					0	0	0	4				0	0	0	0	0
serre	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
eetkamer	0	0						0	0	2		0	0		0	0	0		0	0		0	0	0	1	0	0	0	0	0			0	0		0	0				0	0
hall	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
keuken	0							0	1	0	0	0	0	0			0								0								0								0	0
biblioth	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0	2		0	0	0	0	0	0	1
zitkamer	0	0	0	0	1	0	0	0	0	0	0	1	0	0	3		0	0	2			3		0	0	2			0	0	0	0	1	0	0	0	0	0	0	1	0	0
studeerk	1	0	0	0	0	0	0		0	0	0	0					0	0	0	3				0	0	0	3				0	0	0	6							0	0

Who else knew the murderer in this move? Nobody! This is the first game protocol I made, where I couldn't point out an earlier winner. Also it is remarkable, that untill the last move, nobody knew any of the murder cards. Actually the last move was although an informed question mostly a lucky guess. The four moves preceding the last move were very uninformative for the requesting player and/or for all players. (PS An implementation in CLP(FD), module in Sicstus Prolog, is soon to come; all info is then formalized in constraints, e.g. the action of showing a card becomes an inequality $a + b + c \geq 1$, where a, b, c Booleans.)

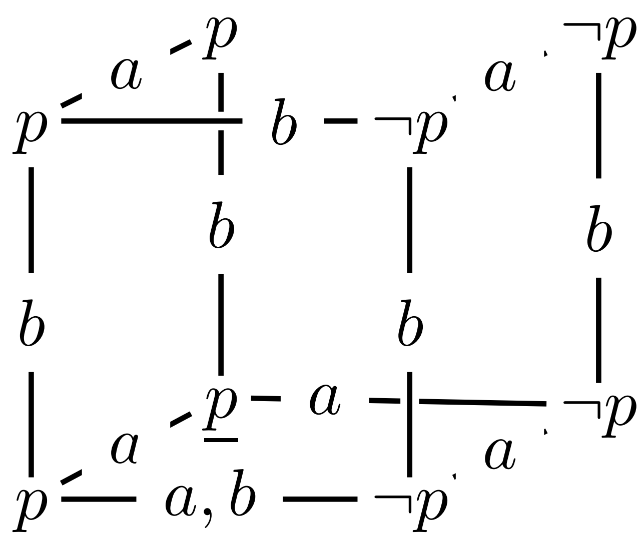
Presuppositions in dialogue

> *Anne approaches Bert on the street. She addresses him with "Good afternoon, sir." – Bert nods in assent –* (i) *and continues with "Would you by any chance know the way to the railway station?"* (ii) *Bert responds with "Certainly, madam, I can help you out."* (iii) *and continues with "First to the left that way, and then second to the right. You can't miss it."* (iv) *Anne concludes with "Thank you very much, sir" and continues her way in the pointed direction.* (v)

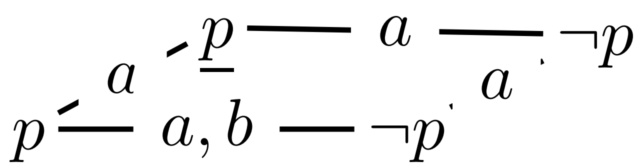
Obviously, these people aren't from New Zealand, as in that country the – by now – generic term 'mate' appears to have replaced both 'sir' and 'madam' in everyday conversation. What other meaning in terms of information exchange can we give to this scenario?

Presuppositions in dialogue

(i)



(ii)

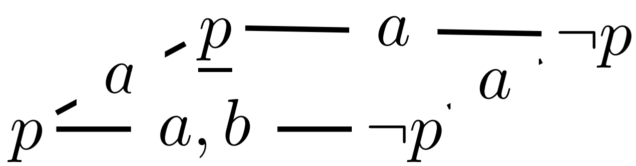


“Good afternoon, sir.” – Bert nods in assent – (i)

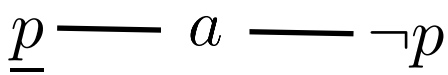
“Would you by any chance know the way to the railway station?” (ii)

The way to the railway station

(ii)



(iii)



"Would you by any chance know the way to the railway station?" (*ii*)

"Certainly, madam, I can help you out." (*iii*)

The way to the railway station

(iii) (iv)

$$\underline{p} \;—\!—\; a \;—\!—\; \neg p \qquad\qquad \underline{p}$$

"First to the left that way, and then second to the right. You can't miss it." (iv)

Alistair Knott's English-Māori translation system

The Māori pronoun system

<table>
<tr><td></td><td colspan="2">1st person</td><td>2nd person</td><td>3rd person</td></tr>
<tr><td>Sing</td><td colspan="2">au/ahau
“I/me”</td><td>koe
“you ”
(by yourself)</td><td>ia
“he/she”</td></tr>
<tr><td rowspan="2">Dual</td><td>Inclusive</td><td>Exclusive</td><td rowspan="2">kōrua
“you two”</td><td rowspan="2">rāua
“those two”</td></tr>
<tr><td>tāua
“you and I”</td><td>māua
“(s)he and I”</td></tr>
<tr><td rowspan="2">Plur</td><td>Inclusive</td><td>Exclusive</td><td rowspan="2">koutou
“you lot”</td><td rowspan="2">rātou
“that lot”</td></tr>
<tr><td>tātou
“us lot ”
(including you)</td><td>mātou
“us lot”
(but not you)</td></tr>
</table>

Turn-taking in dialogue: Determining the addressee.

If the speaker is the system, the addressee is always set to the user.
If the speaker is the user, the addressee is a matter of interpretation.

- The addressee of a *backward-looking* dialogue act **must** be the speaker of the forward act it responds to.
- The addressee of a *forward-looking* dialogue act is defined by **default** to be the speakers involved in the previous subdialogue.

A structurally-defined addressee:

Sue [to Bob]:	Do you love me?
Bob:	*Yes.*

A default (group) addressee:

Sue [to Bob & Mary]:	Shall we go to the cinema tonight?
Bob/Mary:	Good idea.
Bob:	*What film do you want to see?*

University of Otago

Hans in the Wild ...