MPII's Mittagoseminar

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The Game of Go

from ancient Asia to modern computers

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Algorithms Project

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4000 years in one slide?

- born in China $\sim$ 2000 BC.
- extension in Asia (-2000 – 800AD)
  - igo in Japan,
  - wei ch'i in China
  - baduk in Korea
- 1612: creation of 4 Go schools in Japan.
- 1880: first European book (ein Deutscher: Otto Korschelt)
- 1969: first French book (Georges Perec)

N.B: Confucious looked on it as a waste of time and Cultural Revolution condemned it as a pastime of intellectuals.

- 25,000,000 players worldwide
- 20,000 American players
- 10,000 European players

Georges Perec

Chevalley (one of the foundator of the polycephal mathematician Bourbaki) → Roubaud (mathematician, poet) → Georges Perec (literary movement "Oulipo").

- Petit traité invitant à la découverte de l'art subtil du go. 1969
- La Disparition. 1969. (no e)
- Les Revenentes. 1972. (only e)
- La Vie mode d'emploi. 1978. (latin square of order 10)
- palindrom of length 5566

"Where can you play go?
In Paris, Boulevard Ara*go* and Rue Guéné*go*, in *Go*ttingen, in Glas*go*w, in Toba*go* islands, in the Galapa*go*s islands, in Akapul*ko*, in *Connect*-y-*cut*..."

Chess and Go

"You have to understand something:
Game of Go is *the* anti-chess game.
Go is *not* Japonese chess (this one is called Shôgi);
you'll never see a Go player playing Shôgi!
Let us resume here how ill we think of chess:

1. Chess is a feudal game (based on the exaltation of tournaments) which pretends to inflict some sort of social hierarchy.
2. Chess can't keep it rules straight, every three centuries someone changes the rules.
3. Chess likes to pretend that it is ancient, but it is more likely only as old as Canasta.
4: In Chess, there is only one winning formula, you either kill the other guy's king or you kiss your sister.
You win or you loose but you cannot win from one single point, which is one of supreme refinements of Go!
5. Playing Chess is not a synonym for being polite.

6. Two players of different level cannot play together with interest for the strongest player.
7. Chess matches are not love making, they are typically done in less than 10 minutes, or 30 moves.
8. In Chess, it seems like the rules are designed to confuse: there are not two pieces which follow the same rule.
9: By the way, we don't play chess."

Rules

- 2 players (black and white) play on a 19.19 board (goban).

- connected stones form a chain.
- a chain has a given amount of liberties (= free adjacent cells).
- if a player remove all the liberties of a chain, this chain get captured.

- corrolary 1: life and death.
- corrolary 2: territory.

- repetition of moves is forbidden (rule of ko = eternity)
- game ends when the two players pass
- points= number of captured stones + size of territories.

Computer Science

- beginners : 30 kyu, average player 8k, good player 1st kyu,
- 1st dan,..., 9 dan, professional players...
- no good go programs ($\sim$ weak club player)
- Mr Ing: 1 million dollars for the first program that can beat a Taiwanese professional.

Algorithms to use:

- Knuth & Moore: An analysis of alpha-beta pruning, *Artificial Intelligence*, 1975.

- evaluation function

(problem: lot of possible moves, very hard to "evaluate" a move, not like in Chess [Euwe])

- pattern recognition, hash tables

$\Longrightarrow$ good 9.9 go programs.

- larger goban: need to find some strategies (aims)
- Berlekamp "chilling strategy for endgames"

Who is the winner on an $n.n$ goban? Exp-time complete, P-space hard.

Websites

Playing on the net:

http://igs.joyjoy.net/ International Go server

http://www.teaser.fr/~jlgailly/go.html client Xgospel

Playing on the web:

http://kgs.kiseido.com/ Kiseido server

Playing at home:

http://freedom.sarang.net/software/gnugo/beta.html

Playing with officials:

http://www.european-go.org/ European Federation

http://www.dgob.de/ German Federation

http://www.tenuki.de/ German site