Flocking

- C. W. Reynolds: "Flocks, herds, and schools: A distributed behavioral model" (1987)
- a flock seems to react as autonomous entity although it is a collection of individual beings
- flocking algorithm emulates this phenomenon
- results resemble various natural group movements
- boid = an autonomous agent in a flock

Rules of flocking

1. **Separation**: Do not crowd flockmates.
2. **Alignment**: Move in the same direction as flockmates.
3. **Cohesion**: Stay close to flockmates.
4. **Avoidance**: Avoid obstacles and enemies.

→ boid's behavioural urges

Observations

- stateless algorithm
  - no information needs to be maintained
  - boid re-evaluates the environment on each update cycle
- no centralized control
  - emergent behaviour

Soft computing

- L. Zadeh: methodologies that try to solve problems arising from the complexity of the natural world
  - approximation
  - partial truth
  - imprecision
  - uncertainty
- computer games have used 'hard' computing
- as the game worlds get more complex, perhaps soft computing methods would suit better

Soft computing methods

- probabilistic reasoning
  - genetic algorithms
  - Bayesian networks
- artificial neural networks
  - back-propagation networks
  - self-organizing maps
- fuzzy logic
  - fuzzy sets
  - approximate reasoning

Recapitulation

- decision-making and games
  - level of decision making
  - stance towards the player
  - use of the modelled knowledge
- examples discussed in the lectures
  - influence maps
  - flocking algorithms
- this was hardly a comprehensive guide into decision-making