EXPLORATION VS. EXPLOITATION

CSE 511A: Introduction to Artificial Intelligence

Some content and images are from slides created by Dan Klein and Pieter Abbeel for CS188 Intro to AI at UC Berkeley.
All CS188 materials are available at http://ai.berkeley.edu.

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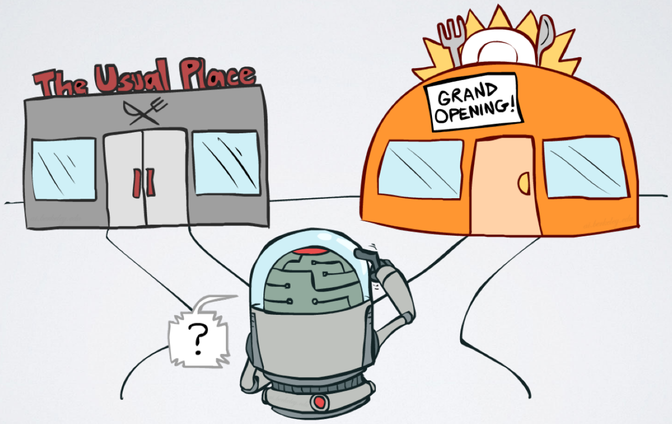
EXPLORATION VS. EXPLOITATION



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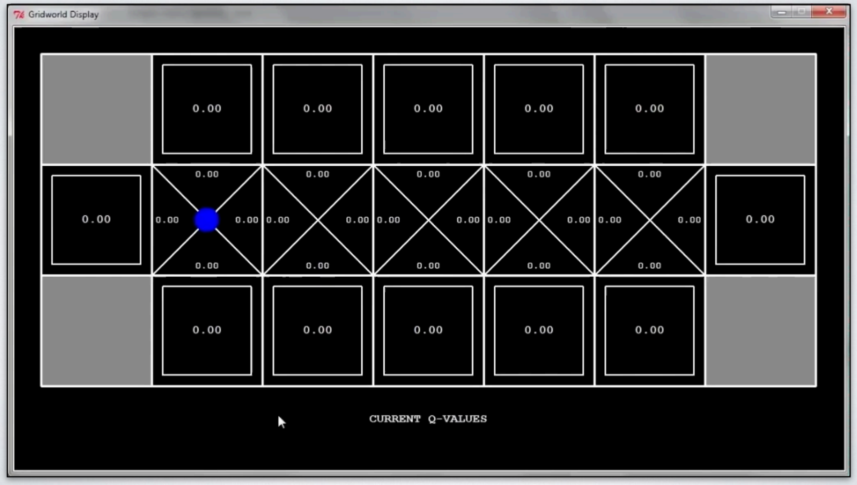

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EXPLORATION SCHEMES

- Random actions (epsilon-greedy)
  - Every time step, flip a coin
  - With small probability **ε**, act randomly
  - With large probability 1-**ε**, act on current (best) policy

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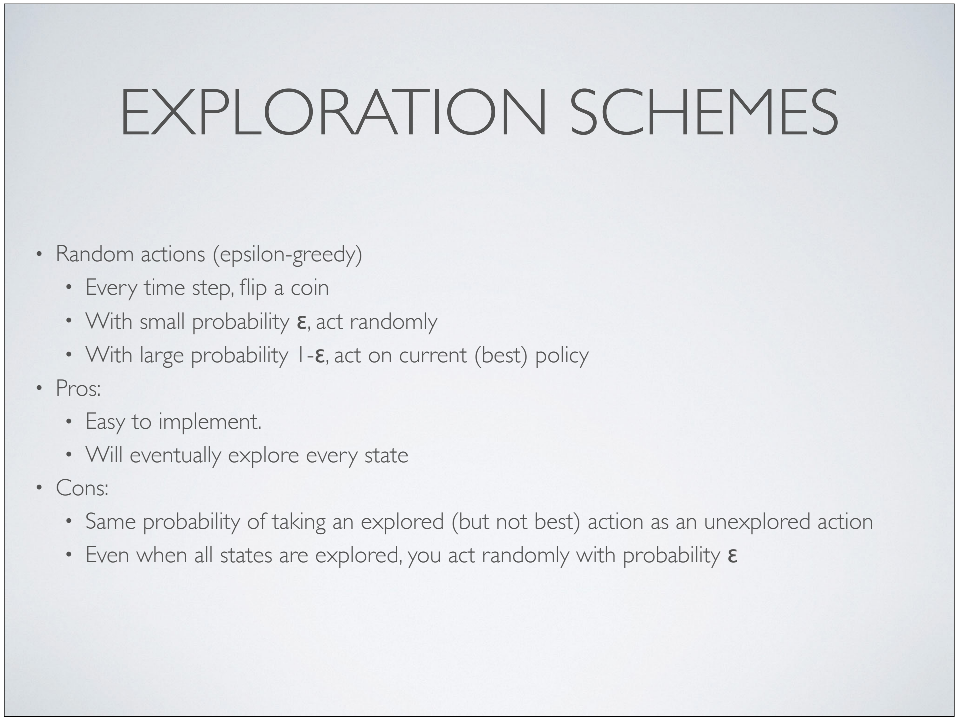

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  - Will eventually explore every state
- Cons:
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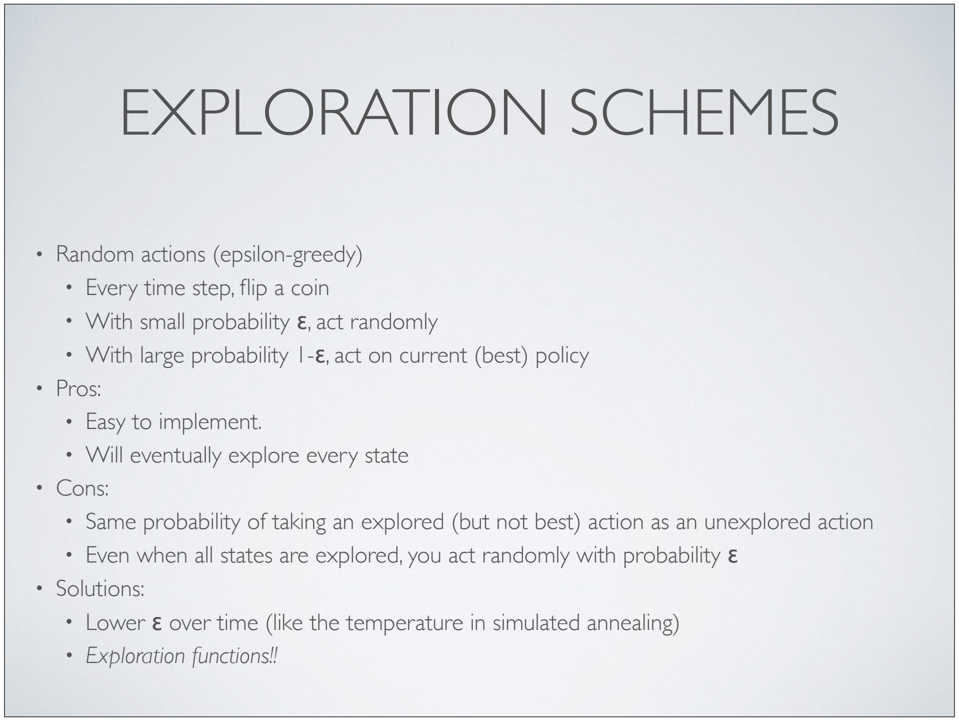
  - Even when all states are explored, you act randomly with probability **ε**



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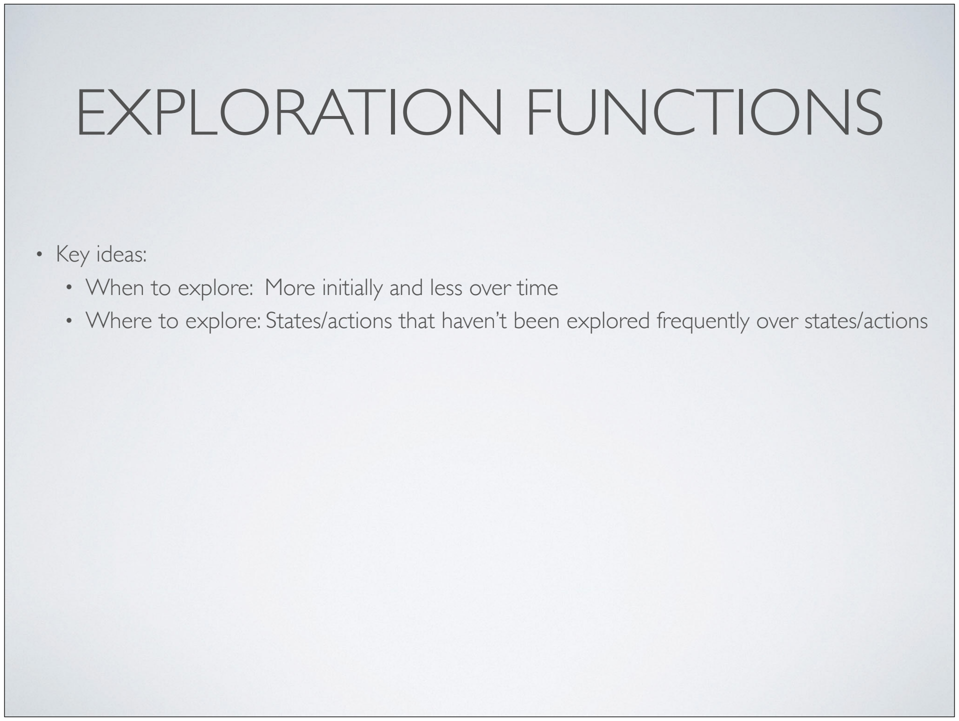
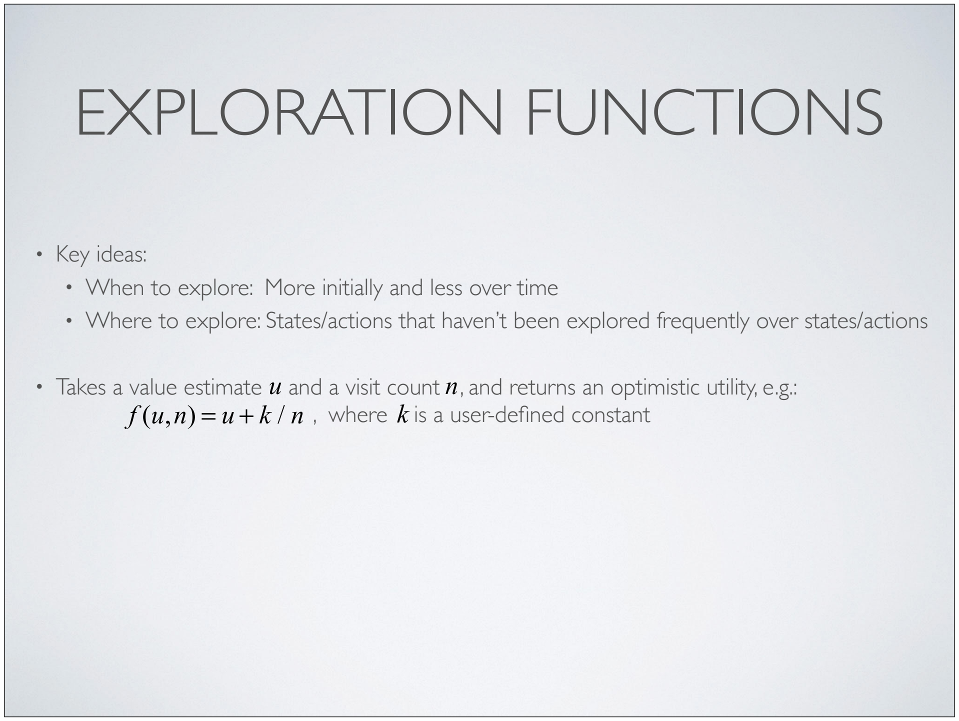
- Solutions:
  - Lower **ε** over time (like the temperature in simulated annealing)
  - *Exploration functions!!*



EXPLORATION FUNCTIONS

- Key ideas:
  - When to explore: More initially and less over time
  - Where to explore: States/actions that haven't been explored frequently over states/actions



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- Important observation: $\lim_{n \to \infty} f(u,n) = u$