Oct 9 Exam Chat

Zoom poll to start: I can do a quick overview of the *theory* on some areas, or we can talk through your specific questions. If you have questions, paste them in Zoom chat! If you want theory, should I talk about...:

1. Search algorithms (BFS, DFS, UCS, Greedy, A-star)
2. Heuristics
3. Local search: hill-climbing, annealing, and genetic algorithm
4. Game Trees and Minimax
5. Expected Value

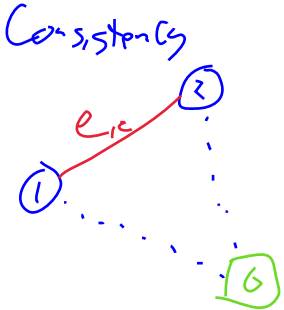
Announcements and To-Dos

Announcements:

1. Exam posted! Note that the original version asked for a "single state" in 1E which was not possible. You may either re-download the exam *OR* explain why that question was impossible.

Last time we learned:

1. EVIU and EVPI, with some discussion of ethics.



$h(1) + e_{12} \geq h(2)$

AND

$h(2) + e_{12} \geq h(1)$

Genetic Algorithm

1. GOAL: Find a single state OR a state that satisfies some property (algebraic)

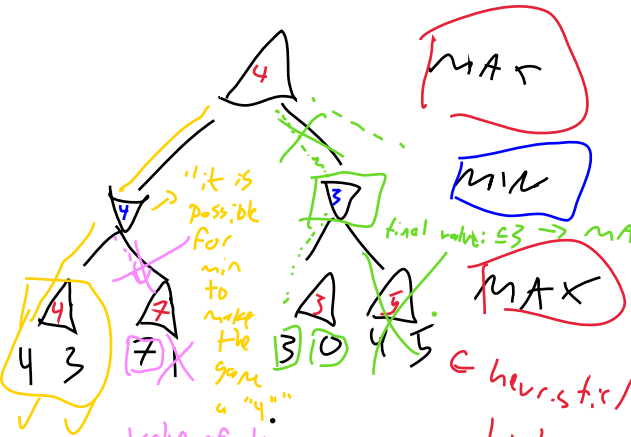
2. fitness: distance: how far is any given "state" from the/a goal.

3. P(reproduce) for each member: $\frac{\text{fitness}_i}{\sum \text{fitness}} = P_i$ (if fitness ≥ 0)

4. Create reproduction: choose elements/states via P_i

5. New states: blend parents, add randomness.

Game Trees & Minimax



if optimal:

value of this node player 2: is 2 ⇒

b/c 7 > 4, min doesn't like this idea.

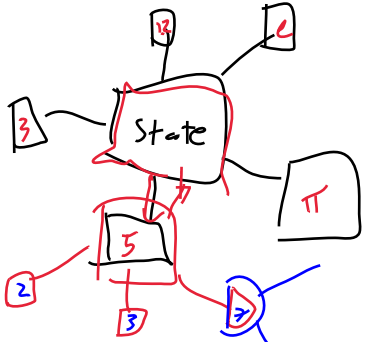
← heuristic/score:
higher means better for that player

Hill-Climbing:

- very similar to "greedy" search algorithm
- very little memory

Evaluation: pick largest OR smallest

P_accept higher the better the ne~ candidate.



maybe:
-> take something continuous, discretize.

d_{Bayes}: minimizes loss.

Expected loss: given a decision & a loss function, how much on average do we "lose".

Expected loss w/ perfect info: 0. $(+, p(x)|y)$

global min of $L(d,x)$.

Expected loss w/ Bayes' decision: $E[loss]$ $E[L(d,x)] = \int Loss \cdot f(x)\,dx$

Expected loss w/ no-model for uncertainty: choose $d = E[X]$ $= \int x\, f(x)\,dx$

no shape; still get average

$$E[L(d,x)] = \int \text{Loss}\, f(x)\, dx$$
$$= \int L(d,x)\, f(x)\, dx$$