

CS 188 SECTION 1

ABOUT ME

- Daylen Yang
- daylen@berkeley.edu (but use Piazza!)
- Sections MW 4-5pm in 310 Soda
 - Steven and Karthik will be covering my section next week

UPCOMING DEADLINES

- Project 0 (Python Tutorial) is due this Friday at 5pm
 - There are Project 0 Office Hours today and tomorrow, 5-6pm in 510 Soda
- Project 1 (Search) is due next Friday at 5pm
 - You can work with a partner, but both of you must submit code
 - General office hours start next week

WHAT HAVE YOU LEARNED SO FAR?

- Reflex vs. planning agents
- Search problems and state spaces
- Five types of Tree Search
- Admissible and Consistent Heuristics
- Graph Search

SEARCH PROBLEMS

- A state representation
- A start state
- Actions you can take in a particular state
- A goal state

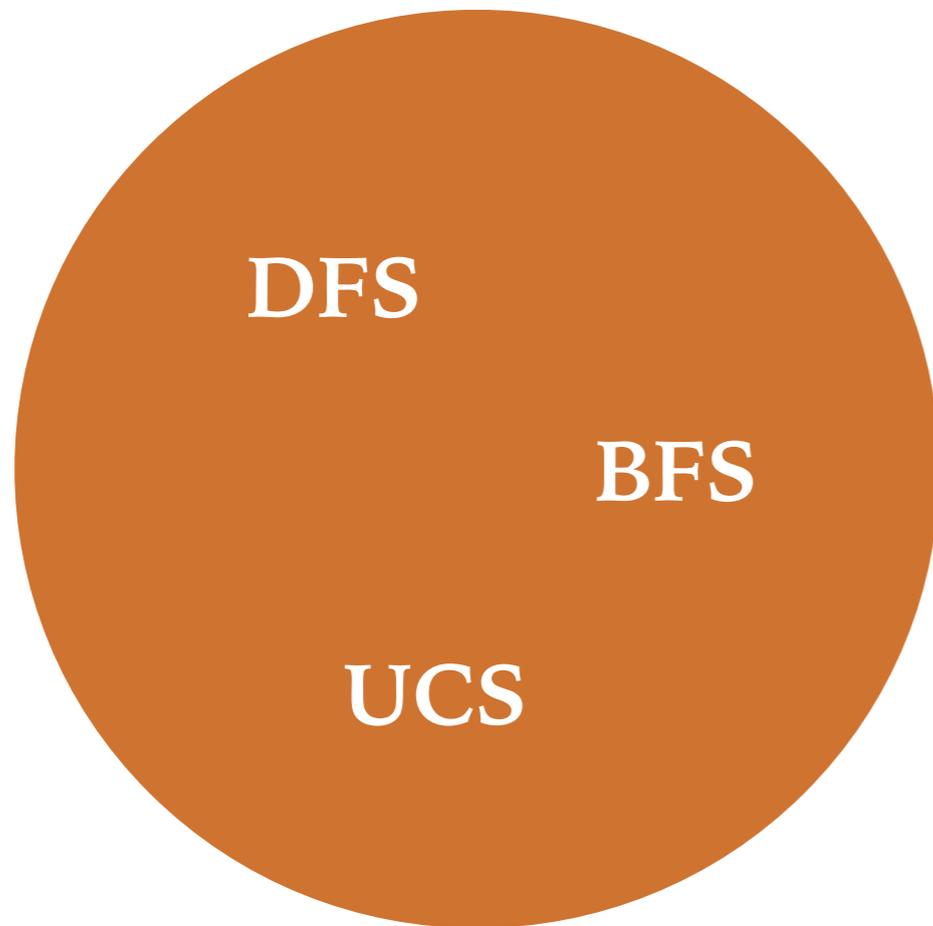
STATE SPACES

- State space = the set of all possible states in your representation
- State space size: how many states?
 - You need to use a bit of counting (CS 70)

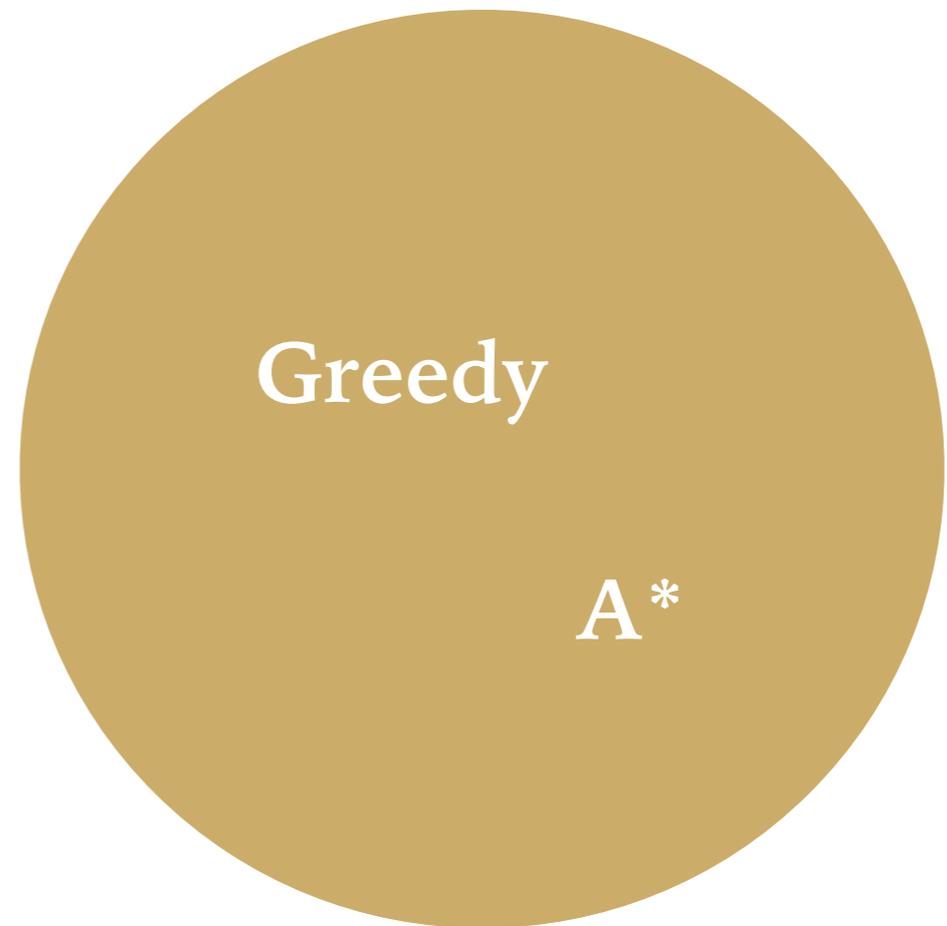
PROBLEM 1

TREE SEARCH

Uninformed



Informed



SEARCH ALGORITHMS THAT FACTOR IN COST

- **Uniform Cost Search:** Keep expanding nodes with the lowest cumulative cost $g(n)$
- **Greedy Search:** Keep expanding nodes with the lowest heuristic cost $h(n)$
- **A*:** A combination of UCS and Greedy Search. Keep expanding nodes with the lowest $f(n) = g(n) + h(n)$

PROBLEM 2

HEURISTICS

- **Admissible:** Heuristic Cost \leq Actual Cost to Goal everywhere
- **Consistent:** Heuristic Arc Cost \leq Actual Arc Cost everywhere
 - The f cost never decreases
- Consistency implies admissibility
- Admissible heuristics tend to, but are not always, consistent

EXTRA QUESTIONS ON HEURISTICS

- In Problem 2...
 - Assume $h=0$ at start. Is the heuristic admissible?
 - Assume $h=0$ at start. Is the heuristic consistent?
 - What's the maximum h value for the start so that it remains consistent?
- Can you come up with an example where the heuristic is inconsistent but admissible?