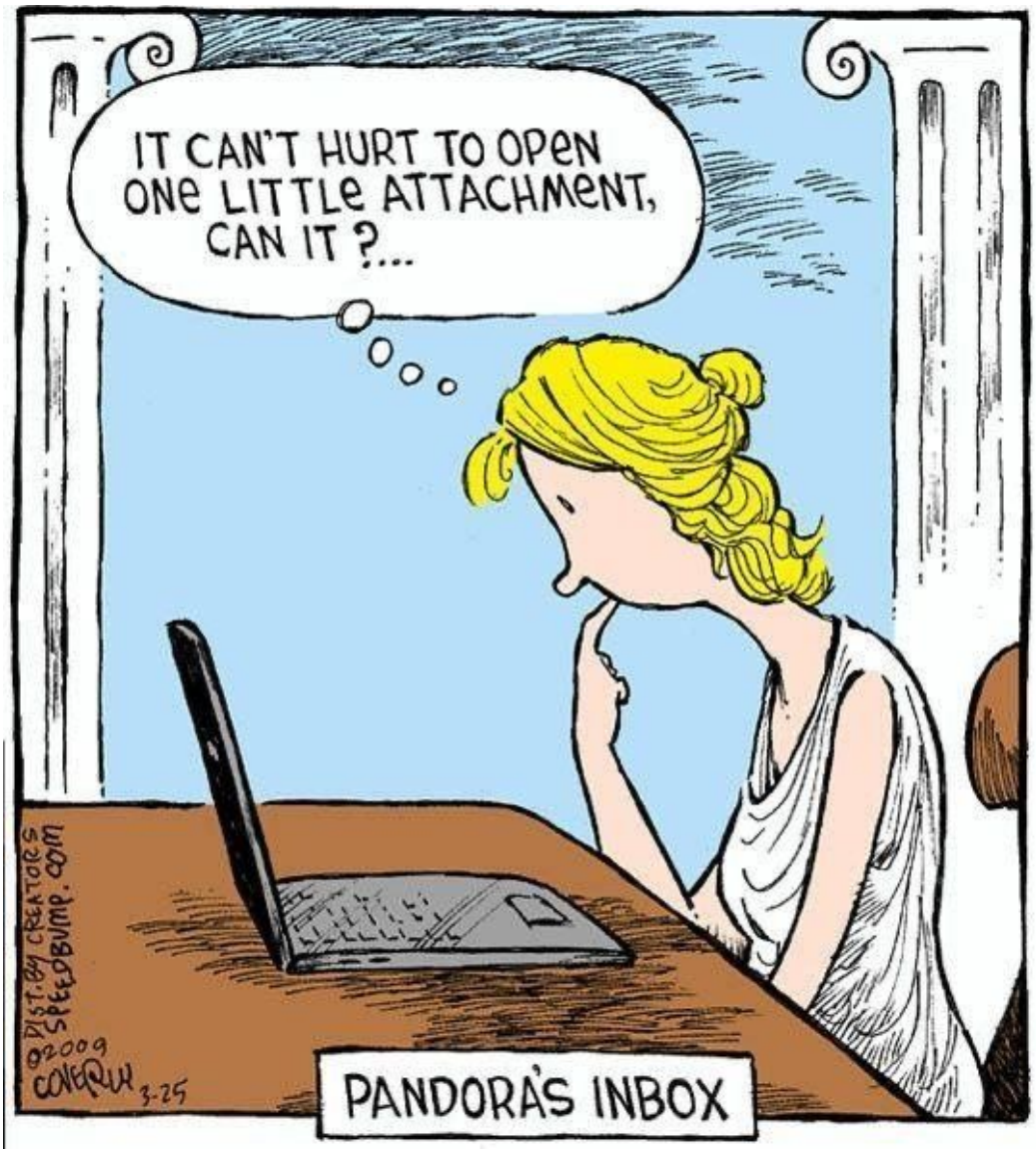
CSCI 3202

Lecture 9

September 12, 2025



Speed Bump by Dave Coverly. https://www.gocomics.com/speedbump

Announcements

- Regraded Quiz 2 and released today
  - Average is now 90% (from 73% before)
  - Added a point to you Question 3 score if you answered BFS to question about which algorithm uses a queue
  - Canvas still marks your answer as incorrect, but points are correct
- HW 3 released today. Due Friday, Sept 19 by 11:59 pm
- Quiz #3 Today
  - A*
  - Greedy
  - Heuristics

Homework 3

- The obstacles in Problem are randomly assigned. They will change each time you rerun the problem *unless* you set the code to use the same seed each time it generates a new map
  - If you set the seed at the top of the code, then run the map generation separately, the maps will be different each time
  - If you set the seed in the map generation, the maps should be the same
- **You don't have to turn in a particular map for your homework**
- Some of the seeds create very dysfunctional maps. If you get one of these, rebuild the map with a different seed.

Lecture

- Heuristics
  - Not all heuristics are about distance

    Astar and Heuristics Annotated.pdf
- Want to choose the largest, but still admissible heuristic
- Could we use h(n)= actual Euclidean distance to goal?

Search Questions

1. What does optimal mean for A*?
2. Why is a larger (but still admissible) heuristic better?
3. Can I create a new heuristic from existing ones?
   - Let h1(n) and h2(n) be admissible heuristics
   - Is h(n) = h1(n) + h2(n) admissible
   - What about h(n) = (h1(n) + h2(n)) / 2

- if $h1(n) \leq h2(n) \forall n$, which heuristic, h1(n) or h2(n) will visit the fewest nodes to create the optimal path with A∗?

Algorithm Questions

1. Assume you have a UCS search method, but want to create a BFS search path. How can you do it? Is the resulting path optimal?
2. You are using an A* search method. If you set the heuristic to 0 for all nodes, will your result be optimal? Is this method consistent?
3. For the same A* method, what happens if you set the edge weights to 0 for all edges (but keep the heuristic)? Is the result optimal? Consistent?

Path

- Path construction for A* is the same as for UCS

Search Summary

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Screenshot 2025-09-11 at 2.31.40 PM.png
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Next Week

- Probability
- Bayes Rule