CPSC 322, Practice Exercise
Solutions to Heuristic Search

1 Directed Questions

- What is the distinction between informed and uninformed search? **Answer:** Uninformed search doesn't take into account any information about the goal (until the goal is reached). Informed search uses estimates of distance to the goal.

- What is a heuristic? **Answer:** A heuristic is an estimate of the distance to the goal.

- When is a heuristic admissible? **Answer:** A heuristic is admissible if it doesn't overestimate the distance to the goal.

- A* can be seen as a combination of what two search strategies? **Answer:** It can be viewed as a combination of lowest-cost-first and best-first.

2 Heuristic Search

Consider the search problem represented in Figure 1, where a is the start node and e is the goal node. The pair $[f, h]$ at each node indicates the value of the f and h functions for the path ending at that node. Given this information, what is the cost of each path? The cost $< a, c >= 2$ is given as a hint. **Answer:** $< a, b >= 1$, $< b, c >= 1$, $< a, c >= 2$, $< c, e >= 1$, $< c, f >= 1$

Is the heuristic function h admissible? Explain why or why not. **Answer:** Yes, it is admissible because it never overestimates the distance to the goal.
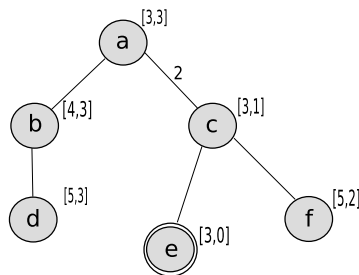

Figure 1: Heuristic Search Problem

3 Learning Goals

You can:

- Construct admissible heuristics for appropriate problems. Verify heuristic dominance. Combine admissible heuristics.

- Define/read/write/trace/debug different search algorithms
    - With / Without Costs
    - Informed / Uninformed