Review1 February 26, 2020
COSC 4368: Artificial Intelligence

### 1) Best first Search and A* [10]

Consider the search space below, where *S* is the start node and *G1* and *G2* satisfy the goal test. Arcs are labeled with the cost of traversing them and the estimated cost to a goal (the h function itself) is reported inside nodes.
For each of the following search strategies, indicate which goal state is reached (if any) and list, *in order*, all the states *popped off of the OPEN list*. When all else is equal, nodes should be removed from OPEN in alphabetical order.

**a) Best-First-Search (using function h only) [3]**

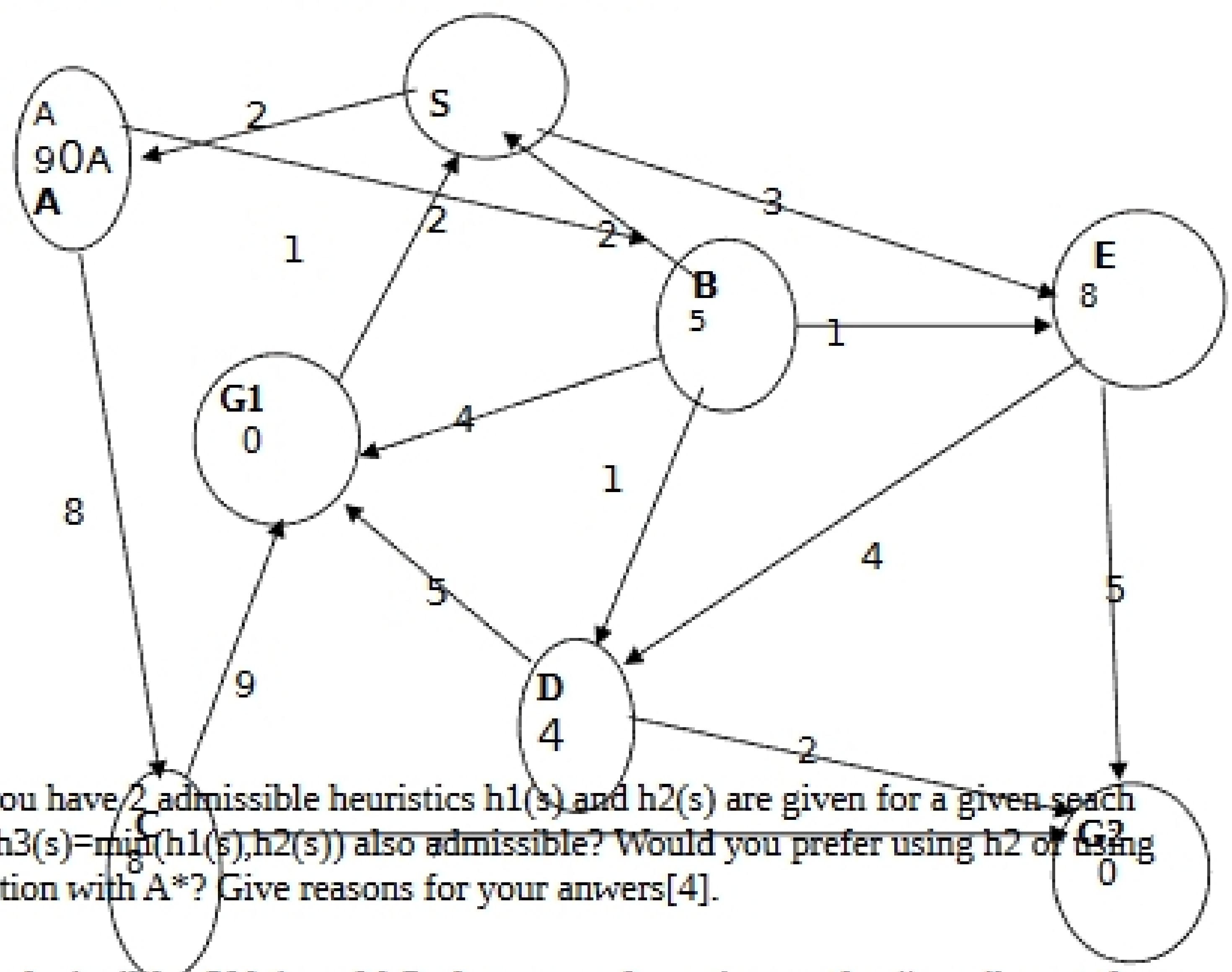
Goal state reached: G2 [1]

States popped off OPEN: S, E, G2 [2]

**b) A* (using f=g+h)[4]**

Goal state reached: G1 [1]

States popped off OPEN: S, A, B, G1 [3]




c) Assume you have 2 admissible heuristics h1(s) and h2(s) are given for a given seach problem. Is h3(s)=min(h1(s),h2(s)) also admissible? Would you prefer using h2 or using h3 in conjuction with A*? Give reasons for your anwers[4].

Yes, h3 is admissible. If h1 and h2 always underestimate the "true" cost then the lesser of the two will certainly underestimate the true cost as well; therefore, h3 is admissible.

I will prefer h2, because h2 is always greater equal than h3 and therefore it provides a closer approximation of the true cost. As a matter of fact, h2 dominates h3, which translates into equal or better efficiency of the search, as discussed on the bottom of page 106 of our textbook.

## 2) Local Search

a) Assume you apply randomized hill climbing to a minimization involving a continuous, differentiable function that has 3 minima. Will it always find the optimal solution? Give reasons for your answer! [3]

No, HC might climb down the wrong minimum depending on the chosen starting point

b) What is the "main" difference between simulated annealing and randomized hill climbing? [2]