

Homework 1

Assigned 1/19/17 Due 1/31/16

Consider the search tree below. For each search strategy below, a) give the goal state found (if none, write “NONE”), b) say whether or not this goal state is optimal, and c) give the order in which the nodes are visited together with the state of the queue at each step of the search as we did in class. New nodes are maintained in the queue *in alphabetical* order whenever the order is indifferent for the search algorithm.

1) Uniform Cost

2) Greedy

3) A*:

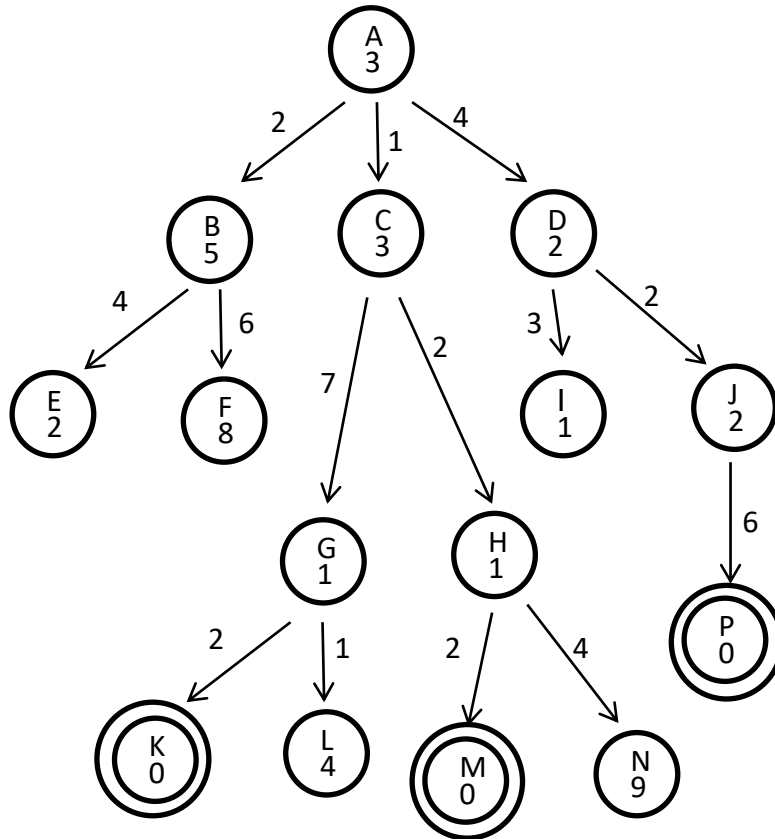
4) Depth First

5) Beam w/ beam width=3:

6) Hill-Climbing

SEARCH TREE

Node A is the root of the tree. As in class, the double circled nodes are the goal states. The number inside each node represents the value of the heuristic for that node. The number by each edge represents the cost of traversing the edge.



7. Using the search tree above, specify the values for each of the following. Write UNDEF if the value does not exist.

a) $f(A)$

b) $f(M)$

c) $g(C)$

d) $g(F)$

e) $h(J)$

f) $f(K)$

8. Define *admissible*. Be brief.

9. Two admissible A* searches A1 and A2 have heuristic functions h_1 and h_2 respectively. h_1 is more informed than h_2 .

a) What does this mean?

b) What guarantees follow from this?

10. For each case below, say whether constrained convex optimization may be directly applied. Answer “Yes” “No” or “Impossible to say” Briefly explain your answer.

Function	Domain
a) $x^3 - 3x^2 - x - 12$	$1.5 \leq x \leq 5.5$
b) $x^3 - 3x^2 - x - 12$	$-1.5 \leq x \leq 1.5$
c) $x^2 + 5y^4 + 10$	$1.5 \leq x^2 + y^2 \leq 5.5$