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**AI Project 2**

1) a) If you consistently pick the higher h value (lower g value), you will be exploring the nodes closer to the start and thus expand/ explore more nodes than you need to in order reach the goal state. Because you are focusing on the lower heuristic value and not the ones closer to the goal state, you explore all nodes with f value equal to c*.

b) By picking larger g-values, you are choosing the lower h value and moving closer to the goal state. Because you are moving towards the goal, you will have to expand less cells. This means that only some of the non-goal states whose f-values are equal to c* will be expanded. In other words, if the cells with equal f-values include the goal state, if you explore the lower h values first, you will only explore the goal and not do the other ones unnecessarily.

c) Choosing the lower h value means that you will always explore the ones closest to the goal state first. This means that each time you will either calculate the value for the same number of cells or less than the algorithm that chooses the smaller g-value. Based on the two answers before, it becomes clear that breaking a tie in favor of lower h values is the better decision if you want to explore as few nodes as possible.

2) The cost of going from one node to another is 1. The path found has a cost of 4 while the min. path only has a cost of 3. Because of our inconsistent heuristic, we did not even expand node C.

$g=0$ $> f=2$
$h=2$

$f=2 < g=1$
$h=1$

$g=1$ $> f=3$
$h=2$

$s=3 < g=2$
$h=1$

$g=3$ $f=3$
$h=0$

$g=4$ $f=4$
$h=0$
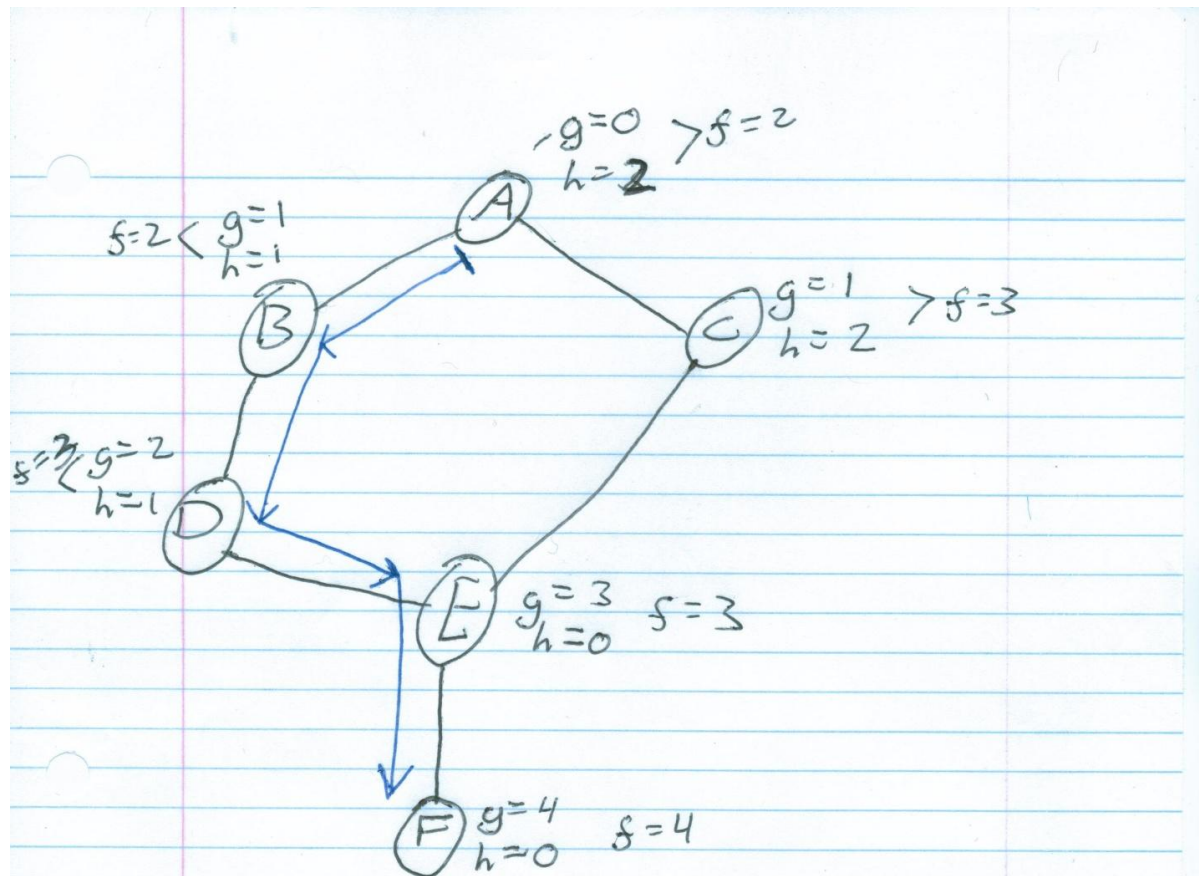
Expand Higher G First

ORDER Expanded/Explored:
① A
② B
③ D – Explored over C because higher G value
④ E – Explored over C because Higher G value
⑤ F – Goal so End

PATH FOUND: A → B → D → E → F

SHORTEST PATH: A → C → E → F