Quiz 9

CSCE 580

March 30, 2017

Consider the state-space search problem in the figure below (Source: S. Edelkamp and S. Schroedl. *Heuristic Search: Theory and Applications*. Morgan-Kaufmann, 2012.), where heuristic estimates (the *h* function) are shown in parenthesis for each node, the start node is *a*, and the goal node is *g*.



Does Best-First Search use *h*?

**Answer**: yes.

Run Best-First Search with multiple-path pruning by hand by filling out the table below. Break ties in the order up, left, right, and then down. Please fill up the third row completely.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Step | Selection | OPEN | CLOSED |  |
| 1 | {} | [a] | {} |  |
| 2 | *a* | [*d(5),c(8),b(13)*] |  |  |
| 3 |  |  |  | Since the goal node *g* is generated, DFS stops |

**Answer**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Step | Selection | OPEN | CLOSED |  |
| 1 | {} | [*a(11)*] | {} |  |
| 2 | *a* | [(*d(5),a) ,c(8),b(13)*] | {*a*} |  |
| 3 | *d* | *[g(0),c(8),b(13)]* | *{a,d}* | Since the goal node *g* is generated, DFS stops |

Here is pseudocode for the BFS algorithm as given by Pearl. (Source: Judea Pearl. *Heuristics: Intelligent Search Strategies for Computer Problem Solving*. Addison-Welsey, 1984.) Note that this algorithm stops upon generating the goal node, rather than upon selection of the goal node. The algorithm in your textbook stops upon selection of the goal node. For this exercise, *f = h*; therefore, the conditions of step 6c do not apply, and step 6c can be removed.

