Ahsanullah University of Science and Technology
Department of Computer Science and Engineering (CSE)

CSE4108: Artificial Intelligence Lab, Spring 2018

Lab Group: B2   Offline: 3   Topic: A* Search

Task 1.

In this task, you will need to implement A* search for solving a 8 puzzle. As input you will give a 4×4 initial state array, where # will denote empty space. The goal state will be a fixed 4×4 array . As output, you will print the steps and state transitions to reach from initial state to goal state. The fixed goal state is:

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & \# \end{bmatrix}$$

Let an example initial state is:

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & \# & 10 & 12 \\ 13 & 14 & 11 & 15 \end{bmatrix}$$

For example, to reach from initial to goal state in the pic, you need to go through these moves:

1) Move empty space to left.

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & \# & 12 \\ 13 & 14 & 11 & 15 \end{bmatrix}$$

2) Move empty space to down.

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & \# & 15 \end{bmatrix}$$

3) Move empty space to right.

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & \# \end{bmatrix}$$

Preferred Languages You can do the assignment in any programming language- C, C++, Java, Python, Prolog, Matlab etc. You can start learning Python by doing this assignment too.

Learning Resource For A* Search Study Norvig's book (related chapters) to learn deeply about A* search. For implementation and more easier comprehension, go to https://www.geeksforgeeks.org/a-search-algorithm/. The code shown in the class has been taken from here.