

Computer Science and Engineering Department

Artificial Intelligence (UCS-521)

Lab Assignment-3

Note: As a data scientist, you have been assigned a job to solve the 8 puzzle problem. To generate the states of the search space, you need to define the rules/operators properly. As a solution, you need to print the intermediate steps of the solution as well as total number of moves used to achieve the goal state.

1	<p>If the initial and final states are as below and $H(n)$: number of misplaced tiles in the current state n as compared to the goal node need to be considered as the heuristic function. You need to use Best First Search algorithm.</p> <div><div>Initial:</div><table><tr><td>2</td><td></td><td>3</td></tr><tr><td>1</td><td>8</td><td>4</td></tr><tr><td>7</td><td>6</td><td>5</td></tr></table></div> <div><div>Goal:</div><table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>8</td><td></td><td>4</td></tr><tr><td>7</td><td>6</td><td>5</td></tr></table></div>	2		3	1	8	4	7	6	5	1	2	3	8		4	7	6	5
2		3																	
1	8	4																	
7	6	5																	
1	2	3																	
8		4																	
7	6	5																	
2	<p>If the initial and final states have been changed as below and approach you need to use is Hill Climbing searching algorithm. $H(n)$: number of misplaced tiles in the current state n as compared to the goal node as the heuristic function for the following states.</p> <div><div><table><tr><td>2</td><td>8</td><td>3</td></tr><tr><td>1</td><td>5</td><td>4</td></tr><tr><td>7</td><td>6</td><td></td></tr></table><div>Initial State</div></div><div><div><table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>8</td><td></td><td>4</td></tr><tr><td>7</td><td>6</td><td>5</td></tr></table><div>Final State</div></div></div></div>	2	8	3	1	5	4	7	6		1	2	3	8		4	7	6	5
2	8	3																	
1	5	4																	
7	6																		
1	2	3																	
8		4																	
7	6	5																	
3	<p>Apply A* searching algorithm by taking $H(n)$: number of correctly placed tiles in the current state n as compared to the goal node. as the heuristic function.</p> <div><div>Initial:</div><table><tr><td>2</td><td></td><td>3</td></tr><tr><td>1</td><td>8</td><td>4</td></tr><tr><td>7</td><td>6</td><td>5</td></tr></table></div> <div><div>Goal:</div><table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>8</td><td></td><td>4</td></tr><tr><td>7</td><td>6</td><td>5</td></tr></table></div>	2		3	1	8	4	7	6	5	1	2	3	8		4	7	6	5
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4	<p>Apply AO* searching algorithm on the following search tree.</p> <div><p style="text-align: center;">Initial State</p></div>																		