

## Computer Science and Engineering Department

### Artificial Intelligence (UCS-411)

#### 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	<div>If the initial and final states are as below, find the value of Heuristic function, by taking</div> <div><div>(i) Euclidean Distance</div><div>(ii) Manhattan Distance</div><div>(iii) Minkowski Distance</div></div> <div><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></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	<div>If the initial and final states are as below and <math>H(n)</math>: number of misplaced tiles in the current state <math>n</math> as compared to the goal node need to be considered as the heuristic function. You need to use <b>Best First Search</b> algorithm.</div> <div><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></div>	2		3	1	8	4	7	6	5	1	2	3	8		4	7	6	5
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3	<div>If the initial and final states are as below and <math>H(n)</math>: number of misplaced tiles in the current state <math>n</math> as compared to the goal node need to be considered as the heuristic function. You need to use <b>Hill Climbing</b> algorithm.</div> <div><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></div>	2		3	1	8	4	7	6	5	1	2	3	8		4	7	6	5
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4	<div>If the initial and final states are as below and <math>H(n)</math>: Manhattan distance as the heuristic function. You need to use <b>Best First Search</b> algorithm.</div> <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
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5	<div>Solve this given problem using Uniform Cost search. A is the initial state and G is the goal state</div>																		

