Report for Programming Assignment - 1 :

Question 1:

- Assumptions:
  - The input will always be a n x n matrix given in the form of a single dimensional array.
  - The space is denoted by ‘0’.
  - The goal state has space at the first cell.
    E.g. for a 3 x 3 input, the goal state will be :

	1	2
3	4	5
6	7	8

- Observations and Results:
  - For input (8-puzzle) = 1 2 0 3 4 5 6 7 8

Astar Output:

==========

Solved

Moves => ['start', 'left', 'left']

Number of moves = 3

Number of iterations = 3

Memory used (in Bytes) = 539924

Time consumed = 0.0005693435668945312 seconds

BFS Output:

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Solved

Moves => ['start', 'left', 'left']

Number of moves = 3

Number of iterations = 8

Memory used (in Bytes) = 539924

Time consumed = 0.0004336833953857422 seconds

DFS Output:

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Solved

Moves => ['start', 'left', 'left']

Number of moves = 3

Number of iterations = 3

Memory used (in Bytes) = 539924

Time consumed = 0.0002338886260986328 seconds

IDA* Output:

==========

Solved

Moves => ['start', 'left', 'left']

Number of moves = 3

Number of iterations = 1

Memory used (in Bytes) = 539924

Time consumed = 0.00037097930908203125 seconds

➢ For input (15-puzzle) = 1 0 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Astar Output:

==========

Solved

Moves => ['start', 'left']

Number of moves = 2

Number of iterations = 2

Memory used (in Bytes) = 530276

Time consumed = 0.0004830360412597656 seconds

BFS Output:

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Solved

Moves => ['start', 'left']

Number of moves = 2

Number of iterations = 3

Memory used (in Bytes) = 530276

Time consumed = 0.00023746490478515625 seconds

DFS Output:

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Solved

Moves => ['start', 'left']

Number of moves = 2

Number of iterations = 2

Memory used (in Bytes) = 530276

Time consumed = 0.00018072128295898438 seconds

IDA* Output:

==========

Solved

Moves => ['start', 'left']

Number of moves = 2

Number of iterations = 1

Memory used (in Bytes) = 530276

Time consumed = 0.00030493736267089844 seconds

➢ For input (24-puzzle) = 1 2 3 0 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Astar Output:

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Solved

Moves => ['start', 'left', 'left', 'left']

Number of moves = 4

Number of iterations = 4

Memory used (in Bytes) = 543092

Time consumed = 0.0015478134155273438 seconds

BFS Output:

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Solved

Moves => ['start', 'left', 'left', 'left']

Number of moves = 4

Number of iterations = 30

Memory used (in Bytes) = 543092

Time consumed = 0.0027768611907958984 seconds

DFS Output:

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Solved

Moves => ['start', 'left', 'left', 'left']

Number of moves = 4

Number of iterations = 4

Memory used (in Bytes) = 543092

Time consumed = 0.00031757354736328125 seconds

IDA* Output:

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Solved

Moves => ['start', 'left', 'left', 'left']

Number of moves = 4

Number of iterations = 1

Memory used (in Bytes) = 543092

Time consumed = 0.005750894546508789 seconds

Question 2:

- Assumptions :
  - The input will always be a n x n matrix given in the form of a single dimensional array.
  - Colors are denoted by any four numbers. E.g. 1,2,3,4

- Observations and Result :
  - For input (4 x 4 grid) = 4 3 2 1 4 2 1 3 2 4 1 3 2 4 1 3

BFS Output:

==========

Solved

Solution state :

4 3 1 3

2 4 2 1

4 1 3 2

2 1 4 3

Number of iterations = 3

Memory used (in Bytes) = 584288

Time consumed = 0.002190113067626953 seconds

DFS Output:

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Solved

Solution state :

4 3 1 3

2 4 2 1

4 1 3 2

2 1 4 3

Number of iterations = 3

Memory used (in Bytes) = 584288

Time consumed = 0.0016317367553710938 seconds