Manhattan Distance Test cases

Example 1

Enter initial state separated by space:

1 2 3 0 4 6 7 5 8

Enter goal state separated by space:

1 2 3 4 5 6 7 8 0

Press '1' for Misplaced Tiles AND '2' for Manhattan Distance.

2

Step: 0

[1 2 3 0 4 6 7 5 8]

Action: None

Path cost(gn): 0

Heuristic cost(hn): 6

Step: 1

[1 2 3 4 0 6 7 5 8]

Action: right

Path cost(gn): 1

Heuristic cost(hn): 4

Step: 2

[1 2 3 4 5 6 7 0 8]

Action: down

Path cost(gn): 2

Heuristic cost(hn): 2

Step: 3

[1 2 3 4 5 6 7 8 0]

Action: right

Path cost(gn): 3

Heuristic cost(hn): 0

Total Explored nodes: 4

Total Expanded nodes: 8

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Example 2

Enter initial state separated by space:

2 8 1 3 4 6 7 5 0

Enter goal state separated by space:

3 2 1 8 0 4 7 5 6

Press '1' for Misplaced Tiles AND '2' for Manhattan Distance.

2

Step: 0

[2 8 1 3 4 6 7 5 0]

Action: None

Path cost(gn): 0

Heuristic cost(hn): 8

Step: 1

[2 8 1 3 4 0 7 5 6]

Action: up

Path cost(gn): 1

Heuristic cost(hn): 6

Step: 2

[2 8 1 3 0 4 7 5 6]

Action: left

Path cost(gn): 2

Heuristic cost(hn): 4

Step: 3

[2 0 1 3 8 4 7 5 6]

Action: up

Path cost(gn): 3

Heuristic cost(hn): 4

Step: 4

[0 2 1 3 8 4 7 5 6]

Action: left

Path cost(gn): 4

Heuristic cost(hn): 4

Step: 5

[3 2 1 0 8 4 7 5 6]

Action: down

Path cost(gn): 5

Heuristic cost(hn): 2

Step: 6

[3 2 1 8 0 4 7 5 6]

Action: right

Path cost(gn): 6

Heuristic cost(hn): 0

Total Explored nodes: 7

Total Expanded nodes: 12

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Example 3

Enter initial state separated by space:

1 3 2 4 5 6 0 8 7

Enter goal state separated by space:

1 2 3 4 5 6 7 8 0

Press '1' for Misplaced Tiles AND '2' for Manhattan Distance.

2

Step: 0

[1 3 2 4 5 6 0 8 7]

Action: None

Path cost(gn): 0

Heuristic cost(hn): 6

Step: 1

[1 3 2 0 5 6 4 8 7]

Action: up

Path cost(gn): 1

Heuristic cost(hn): 8

Step: 2

[0 3 2 1 5 6 4 8 7]

Action: up

Path cost(gn): 2

Heuristic cost(hn): 10

Step: 3

[3 0 2 1 5 6 4 8 7]

Action: right

Path cost(gn): 3

Heuristic cost(hn): 10

Step: 4

[3 5 2 1 0 6 4 8 7]

Action: down

Path cost(gn): 4

Heuristic cost(hn): 10

Step: 5

[3 5 2 1 8 6 4 0 7]

Action: down

Path cost(gn): 5

Heuristic cost(hn): 10

Step: 6

[3 5 2 1 8 6 4 7 0]

Action: right

Path cost(gn): 6

Heuristic cost(hn): 8

Step: 7

[3 5 2 1 8 0 4 7 6]

Action: up

Path cost(gn): 7

Heuristic cost(hn): 10

Step: 8

[3 5 0 1 8 2 4 7 6]

Action: up

Path cost(gn): 8

Heuristic cost(hn): 12

Step: 9

[3 0 5 1 8 2 4 7 6]

Action: left

Path cost(gn): 9

Heuristic cost(hn): 14

Step: 10

[0 3 5 1 8 2 4 7 6]

Action: left

Path cost(gn): 10

Heuristic cost(hn): 14

Step: 11

[1 3 5 0 8 2 4 7 6]

Action: down

Path cost(gn): 11

Heuristic cost(hn): 12

Step: 12

[1 3 5 4 8 2 0 7 6]

Action: down

Path cost(gn): 12

Heuristic cost(hn): 10

Step: 13

[1 3 5 4 8 2 7 0 6]

Action: right

Path cost(gn): 13

Heuristic cost(hn): 8

Step: 14

[1 3 5 4 0 2 7 8 6]

Action: up

Path cost(gn): 14

Heuristic cost(hn): 8

Step: 15

[1 3 5 4 2 0 7 8 6]

Action: right

Path cost(gn): 15

Heuristic cost(hn): 6

Step: 16

[1 3 0 4 2 5 7 8 6]

Action: up

Path cost(gn): 16

Heuristic cost(hn): 6

Step: 17

[1 0 3 4 2 5 7 8 6]

Action: left

Path cost(gn): 17

Heuristic cost(hn): 6

Step: 18

[1 2 3 4 0 5 7 8 6]

Action: down

Path cost(gn): 18

Heuristic cost(hn): 4

Step: 19

[1 2 3 4 5 0 7 8 6]

Action: right

Path cost(gn): 19

Heuristic cost(hn): 2

Step: 20

[1 2 3 4 5 6 7 8 0]

Action: down

Path cost(gn): 20

Heuristic cost(hn): 0

Total Explored nodes: 1459

Total Expanded nodes: 2360

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Example 4

Enter initial state separated by space:

3 5 1 4 2 6 7 8 0

Enter goal state separated by space:

1 3 5 4 2 6 7 8 0

Press '1' for Misplaced Tiles AND '2' for Manhattan Distance.

2

Step: 0

[3 5 1 4 2 6 7 8 0]

Action: None

Path cost(gn): 0

Heuristic cost(hn): 4

Step: 1

[3 5 1 4 2 0 7 8 6]

Action: up

Path cost(gn): 1

Heuristic cost(hn): 6

Step: 2

[3 5 0 4 2 1 7 8 6]

Action: up

Path cost(gn): 2

Heuristic cost(hn): 8

Step: 3

[3 0 5 4 2 1 7 8 6]

Action: left

Path cost(gn): 3

Heuristic cost(hn): 8

Step: 4

[3 2 5 4 0 1 7 8 6]

Action: down

Path cost(gn): 4

Heuristic cost(hn): 8

Step: 5

[3 2 5 4 1 0 7 8 6]

Action: right

Path cost(gn): 5

Heuristic cost(hn): 6

Step: 6

[3 2 5 4 1 6 7 8 0]

Action: down

Path cost(gn): 6

Heuristic cost(hn): 4

Step: 7

[3 2 5 4 1 6 7 0 8]

Action: left

Path cost(gn): 7

Heuristic cost(hn): 6

Step: 8

[3 2 5 4 1 6 0 7 8]

Action: left

Path cost(gn): 8

Heuristic cost(hn): 8

Step: 9

[3 2 5 0 1 6 4 7 8]

Action: up

Path cost(gn): 9

Heuristic cost(hn): 10

Step: 10

[3 2 5 1 0 6 4 7 8]

Action: right

Path cost(gn): 10

Heuristic cost(hn): 8

Step: 11

[3 0 5 1 2 6 4 7 8]

Action: up

Path cost(gn): 11

Heuristic cost(hn): 8

Step: 12

[0 3 5 1 2 6 4 7 8]

Action: left

Path cost(gn): 12

Heuristic cost(hn): 8

Step: 13

[1 3 5 0 2 6 4 7 8]

Action: down

Path cost(gn): 13

Heuristic cost(hn): 6

Step: 14

[1 3 5 4 2 6 0 7 8]

Action: down

Path cost(gn): 14

Heuristic cost(hn): 4

Step: 15

[1 3 5 4 2 6 7 0 8]

Action: right

Path cost(gn): 15

Heuristic cost(hn): 2

Step: 16

[1 3 5 4 2 6 7 8 0]

Action: right

Path cost(gn): 16

Heuristic cost(hn): 0

Total Explored nodes: 381

Total Expanded nodes: 625

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Example 5

Enter initial state separated by space:

1 2 3 8 0 4 7 6 5

Enter goal state separated by space:

2 8 1 0 4 3 7 6 5

Press '1' for Misplaced Tiles AND '2' for Manhattan Distance.

2

Step: 0

[1 2 3 8 0 4 7 6 5]

Action: None

Path cost(gn): 0

Heuristic cost(hn): 8

Step: 1

[1 0 3 8 2 4 7 6 5]

Action: up

Path cost(gn): 1

Heuristic cost(hn): 10

Step: 2

[0 1 3 8 2 4 7 6 5]

Action: left

Path cost(gn): 2

Heuristic cost(hn): 8

Step: 3

[8 1 3 0 2 4 7 6 5]

Action: down

Path cost(gn): 3

Heuristic cost(hn): 6

Step: 4

[8 1 3 2 0 4 7 6 5]

Action: right

Path cost(gn): 4

Heuristic cost(hn): 6

Step: 5

[8 1 3 2 4 0 7 6 5]

Action: right

Path cost(gn): 5

Heuristic cost(hn): 6

Step: 6

[8 1 0 2 4 3 7 6 5]

Action: up

Path cost(gn): 6

Heuristic cost(hn): 6

Step: 7

[8 0 1 2 4 3 7 6 5]

Action: left

Path cost(gn): 7

Heuristic cost(hn): 4

Step: 8

[0 8 1 2 4 3 7 6 5]

Action: left

Path cost(gn): 8

Heuristic cost(hn): 2

Step: 9

[2 8 1 0 4 3 7 6 5]

Action: down

Path cost(gn): 9

Heuristic cost(hn): 0

Total Explored nodes: 32

Total Expanded nodes: 55

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Example 6

Enter initial state separated by space:

1 2 3 7 4 5 6 8 0

Enter goal state separated by space:

1 2 3 8 6 4 7 5 0

Press '1' for Misplaced Tiles AND '2' for Manhattan Distance.

2

Step: 0

[1 2 3 7 4 5 6 8 0]

Action: None

Path cost(gn): 0

Heuristic cost(hn): 8

Step: 1

[1 2 3 7 4 0 6 8 5]

Action: up

Path cost(gn): 1

Heuristic cost(hn): 8

Step: 2

[1 2 3 7 0 4 6 8 5]

Action: left

Path cost(gn): 2

Heuristic cost(hn): 8

Step: 3

[1 2 3 7 8 4 6 0 5]

Action: down

Path cost(gn): 3

Heuristic cost(hn): 6

Step: 4

[1 2 3 7 8 4 0 6 5]

Action: left

Path cost(gn): 4

Heuristic cost(hn): 6

Step: 5

[1 2 3 0 8 4 7 6 5]

Action: up

Path cost(gn): 5

Heuristic cost(hn): 6

Step: 6

[1 2 3 8 0 4 7 6 5]

Action: right

Path cost(gn): 6

Heuristic cost(hn): 4

Step: 7

[1 2 3 8 6 4 7 0 5]

Action: down

Path cost(gn): 7

Heuristic cost(hn): 2

Step: 8

[1 2 3 8 6 4 7 5 0]

Action: right

Path cost(gn): 8

Heuristic cost(hn): 0

Total Explored nodes: 12

Total Expanded nodes: 22