

Test Case 1.)

BFS

After 20000 nodes popped from the open list, no solution has been found.

A* with heuristic 1

After 20000 nodes popped from the open list, no solution has been found.

A* with heuristic 2

After 20000 nodes popped from the open list, no solution has been found.

Test Case 2.)

BFS

stateId=1

parent stateId=0

f(n)=0

g(n)=0

h(n)=0

[1, 0, 3, 4, 5, 2, 7, 8, 9, 6, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=3

parent stateId=1

f(n)=1

g(n)=1

h(n)=0

[1, 2, 3, 4, 5, 0, 7, 8, 9, 6, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=12

parent stateId=3

f(n)=2

g(n)=2

h(n)=0

[1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=32

parent stateId=12

f(n)=4

g(n)=4

h(n)=0

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 11, 13, 0, 14, 12, 16, 17, 18, 19]

stateId=78

parent stateId=32

f(n)=6

g(n)=6

h(n)=0

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 11, 13, 14, 0, 12, 16, 17, 18, 19]

stateId=182

parent stateId=78

f(n)=8

g(n)=8

h(n)=0

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 0, 11, 13, 14, 15, 12, 16, 17, 18, 19]

stateId=425

parent stateId=182

f(n)=10

g(n)=10

h(n)=0

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 0, 13, 14, 15, 12, 16, 17, 18, 19]

stateId=972

parent stateId=425

f(n)=12

g(n)=12

h(n)=0

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 0, 16, 17, 18, 19]

Length Of Path To Get To Goal: 8

Nodes Pushed To Open List: 1474

Nodes Pushed To Closed List: 669

A* with heuristic 1

stateId=1

parent stateId=0

f(n)=8

g(n)=0

h(n)=8

[1, 0, 3, 4, 5, 2, 7, 8, 9, 6, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=3

parent stateId=1

f(n)=8

g(n)=1

h(n)=7

[1, 2, 3, 4, 5, 0, 7, 8, 9, 6, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=7

parent stateId=3

f(n)=8
g(n)=2
h(n)=6
[1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

statId=11
parent statId=7
f(n)=9
g(n)=4
h(n)=5
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 11, 13, 0, 14, 12, 16, 17, 18, 19]

statId=14
parent statId=11
f(n)=10
g(n)=6
h(n)=4
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 11, 13, 14, 0, 12, 16, 17, 18, 19]

statId=35
parent statId=14
f(n)=11
g(n)=8
h(n)=3
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 0, 11, 13, 14, 15, 12, 16, 17, 18, 19]

statId=44
parent statId=35
f(n)=12
g(n)=10
h(n)=2
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 0, 13, 14, 15, 12, 16, 17, 18, 19]

statId=95
parent statId=44
f(n)=12
g(n)=12
h(n)=0
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 0, 16, 17, 18, 19]

Length Of Path To Get To Goal: 8
Nodes Pushed To Open List: 67
Nodes Pushed To Closed List: 29

A* with heuristic 2

stateId=1

parent stateId=0

f(n)=7

g(n)=0

h(n)=7

[1, 0, 3, 4, 5, 2, 7, 8, 9, 6, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=3

parent stateId=1

f(n)=7

g(n)=1

h(n)=6

[1, 2, 3, 4, 5, 0, 7, 8, 9, 6, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=7

parent stateId=3

f(n)=7

g(n)=2

h(n)=5

[1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 15, 11, 13, 10, 14, 12, 16, 17, 18, 19]

stateId=11

parent stateId=7

f(n)=8

g(n)=4

h(n)=4

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 11, 13, 0, 14, 12, 16, 17, 18, 19]

stateId=14

parent stateId=11

f(n)=9

g(n)=6

h(n)=3

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 11, 13, 14, 0, 12, 16, 17, 18, 19]

stateId=31

parent stateId=14

f(n)=10

g(n)=8

h(n)=2

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 0, 11, 13, 14, 15, 12, 16, 17, 18, 19]

stateId=41
parent stateId=31
f(n)=11
g(n)=10
h(n)=1
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 0, 13, 14, 15, 12, 16, 17, 18, 19]

stateId=77
parent stateId=41
f(n)=12
g(n)=12
h(n)=0
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 0, 16, 17, 18, 19]
Length Of Path To Get To Goal: 8
Nodes Pushed To Open List: 71
Nodes Pushed To Closed List: 31

Test Case 3.)

BFS

After 20000 nodes popped from the open list, no solution has been found.

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