```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900
32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\BFS_output\python_bfs.py


Running for easy Case

1  3  4
8  6  2
7  0  5

Time in the begining before BFS run =  20:10:16.880725
Time after BFS run got completed =  20:10:16.945285
Time in seconds taken for run = 0.0
The moves taken in this step :  up right up left down

The number of nodes generated 77
The number of nodes visited: 42
The maximum length of nodelist during execution: 35
The depth from initial state at which goal state is found: 5
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\BFS_output\python_bfs.py


Running for medium Case

2  8  1
0  4  3
7  6  5

Time in the begining before BFS run =  20:10:55.836186
Time after BFS run got completed =  20:10:55.914907
Time in seconds taken for run = 0.008004
The moves taken in this step :  up right right down left left up right
down

The number of nodes generated 560
The number of nodes visited: 343
The maximum length of nodelist during execution: 217
The depth from initial state at which goal state is found: 9
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\BFS_output\python_bfs.py


Running for hard Case

5  6  7
4  0  8
3  2  1
```

```
Time in the begining before BFS run =  20:11:26.462565
Time after BFS run got completed =  20:11:30.199707
Time in seconds taken for run = 3.559694
The moves taken in this step :  up left down down right right up up left
left down down right right up up left left down down right right up up
left left down down right up

The number of nodes generated 181440
The number of nodes visited: 181364
The maximum length of nodelist during execution: 24982
The depth from initial state at which goal state is found: 30
>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900
32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\DFS_output\python_dfs.py


Running for Easy case
Input state

1  3  4
8  6  2
7  0  5

Time in the begining before DFS run =  20:17:56.080185
Time after DFS run got completed =  20:18:10.860698
Time in seconds taken for run = 14.739984


The number of states generated  96136
The number of nodes visited: 59806
The maximum length of nodelist during execution: 36330
The depth from initial state at which goal state is found: 52267
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\DFS_output\python_dfs.py


Running for medium case
Input state

2  8  1
0  4  3
7  6  5

Time in the begining before DFS run =  20:18:44.830196
Time after DFS run got completed =  20:18:59.273357
Time in seconds taken for run = 14.376223


The number of states generated  94169
The number of nodes visited: 58391
The maximum length of nodelist during execution: 35778
The depth from initial state at which goal state is found: 51255
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\DFS_output\python_dfs.py


Running for hard case
Input state

5  6  7
```

```
4  0  8
3  2  1

Time in the begining before DFS run =  20:19:39.530547
Time after DFS run got completed =  20:19:39.820256
Time in seconds taken for run = 0.183617


The number of states generated  8352
The number of nodes visited: 4702
The maximum length of nodelist during execution: 3650
The depth from initial state at which goal state is found: 4578
>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900
32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\IDS_output\python_ids.py
Running for Easy case
Input State

1  3  4
8  6  2
7  0  5

Number of 4 nodes generated in ids search with depth = 1


Number of 9 nodes generated in ids search with depth = 2


Number of 19 nodes generated in ids search with depth = 3


Number of 33 nodes generated in ids search with depth = 4




Time in the begining before IDS run =  20:23:35.827537
Time after IDS run got completed =  20:23:35.869072
Time in seconds taken for run = 0.031023
The moves taken in this step :  up right up left down

The number of states generated in the last IDS search 28
The number of nodes visited: 89
The maximum length of nodelist during execution: 6
The depth from initial state at which goal state is found: 5
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\IDS_output\python_ids.py
Running for Medium case
Input State

2  8  1
0  4  3
7  6  5

Number of 4 nodes generated in ids search with depth = 1


Number of 9 nodes generated in ids search with depth = 2


Number of 19 nodes generated in ids search with depth = 3
```

```
Number of 33 nodes generated in ids search with depth = 4


Number of 61 nodes generated in ids search with depth = 5


Number of 103 nodes generated in ids search with depth = 6


Number of 171 nodes generated in ids search with depth = 7


Number of 255 nodes generated in ids search with depth = 8



Time in the begining before IDS run =  20:25:33.310517
Time after IDS run got completed =  20:25:33.485252
Time in seconds taken for run = 0.15372
The moves taken in this step :  up right right down left left up right
down

The number of states generated in the last IDS search 142
The number of nodes visited: 793
The maximum length of nodelist during execution: 9
The depth from initial state at which goal state is found: 9
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\IDS_output\python_ids.py
Running for Hard case
Input State

5  6  7
4  0  8
3  2  1

Number of 5 nodes generated in ids search with depth = 1


Number of 13 nodes generated in ids search with depth = 2


Number of 21 nodes generated in ids search with depth = 3


Number of 37 nodes generated in ids search with depth = 4


Number of 69 nodes generated in ids search with depth = 5


Number of 129 nodes generated in ids search with depth = 6
```

```
Number of 193 nodes generated in ids search with depth = 7

Number of 259 nodes generated in ids search with depth = 8

Number of 311 nodes generated in ids search with depth = 9

Number of 513 nodes generated in ids search with depth = 10

Number of 741 nodes generated in ids search with depth = 11

Number of 1349 nodes generated in ids search with depth = 12

Number of 1407 nodes generated in ids search with depth = 13

Number of 2237 nodes generated in ids search with depth = 14

Number of 2191 nodes generated in ids search with depth = 15

Number of 3411 nodes generated in ids search with depth = 16

Number of 4111 nodes generated in ids search with depth = 17

Number of 7053 nodes generated in ids search with depth = 18

Number of 5010 nodes generated in ids search with depth = 19

Number of 10460 nodes generated in ids search with depth = 20

Number of 13844 nodes generated in ids search with depth = 21

Number of 11342 nodes generated in ids search with depth = 22

Number of 10354 nodes generated in ids search with depth = 23

Number of 21457 nodes generated in ids search with depth = 24
```

```
Number of 25529 nodes generated in ids search with depth = 25

Number of 36315 nodes generated in ids search with depth = 26

Number of 27306 nodes generated in ids search with depth = 27

Number of 42467 nodes generated in ids search with depth = 28

Number of 28408 nodes generated in ids search with depth = 29

Number of 57964 nodes generated in ids search with depth = 30

Number of 44270 nodes generated in ids search with depth = 31



Time in the begining before IDS run =  20:26:30.301368
Time after IDS run got completed =  20:26:34.486636
Time in seconds taken for run = 4.171258
The moves taken in this step :  down right up up left left down down
right right up up left left down right up left down down right right up
up left left down down right right up left

The number of states generated in the last IDS search 43024
The number of nodes visited: 401790
The maximum length of nodelist during execution: 28
The depth from initial state at which goal state is found: 32
>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900
32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\Greedy_output\python_greedy.py


Running for  case with heursitic based on number of tiles out of place
Printing the input state

1  3  4
8  6  2
7  0  5

Time in the begining before greedy run =  20:06:59.650143
Time after greedy run got completed =  20:06:59.713195
Time in seconds taken for run = 0.001
The moves taken in this step :  up right up left down

The number of states generated : 14
The number of nodes visited: 7
The maximum length of nodelist during execution: 7
The depth from initial state at which goal state is found: 5
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\Greedy_output\python_greedy.py


Running for  case with heursitic based on number of tiles out of place
Printing the input state

2  8  1
0  4  3
7  6  5

Time in the begining before greedy run =  20:07:16.047346
Time after greedy run got completed =  20:07:16.202013
Time in seconds taken for run = 0.054544
The moves taken in this step :  up right right down left left up right
down

The number of states generated : 263
The number of nodes visited: 158
The maximum length of nodelist during execution: 105
The depth from initial state at which goal state is found: 9
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\Greedy_output\python_greedy.py


Running for  case with heursitic based on number of tiles out of place
Printing the input state
```

```
5  6  7
4  0  8
3  2  1

Time in the begining before greedy run =  20:07:31.595868
Time after greedy run got completed =  20:07:35.566097
Time in seconds taken for run = 3.900828
The moves taken in this step :  up left down down right up left up right
down right up left left down right right down left up left down right
right up left up left down right right up left left down right right down
left up right up left down left up right down down right up left up right
down left left down right up right down left left up right

The number of states generated : 2996
The number of nodes visited: 1800
The maximum length of nodelist during execution: 1196
The depth from initial state at which goal state is found: 66
>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900
32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\Greedy_output\python_greedy.py


Running for easy case with heursitic based on manhattan distance
Printing the input state

1  3  4
8  6  2
7  0  5

Time in the begining before greedy run =  19:44:19.502554
Time after greedy run got completed =  19:44:19.568603
Time in seconds taken for run = 0.001001
The moves taken in this step :  up right up left down

The number of states generated : 12
The number of nodes visited: 6
The maximum length of nodelist during execution: 6
The depth from initial state at which goal state is found: 5
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\Greedy_output\python_greedy.py


Running for medium case with heursitic based on manhattan distance
Printing the input state

2  8  1
0  4  3
7  6  5

Time in the begining before greedy run =  19:45:07.278574
Time after greedy run got completed =  19:45:07.826062
Time in seconds taken for run = 0.477432
The moves taken in this step :  right up right down left up left down
right right up left left down right up right down left

The number of states generated : 418
The number of nodes visited: 242
The maximum length of nodelist during execution: 176
The depth from initial state at which goal state is found: 19
>>>
 RESTART: C:\Users\nikhi\Downloads\AI
assinment\searchalgorithm\Greedy_output\python_greedy.py


Running for hard case with heursitic based on manhattan distance
Printing the input state
```

```
5  6  7
4  0  8
3  2  1

Time in the begining before greedy run =  19:45:23.120378
Time after greedy run got completed =  19:45:23.902399
Time in seconds taken for run = 0.665924
The moves taken in this step :  up left down down right up up left down
down right up up left down right right up left left down right right down
left up right up left left down right up right down left left down right
up left up right down down left up right up left down down right up

The number of states generated : 497
The number of nodes visited: 279
The maximum length of nodelist during execution: 218
The depth from initial state at which goal state is found: 54
>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\searchalgorithm\idastar_output\python_idastar.py


Running for easy case with heursitic based on number of tiles out of place
Printing the input state

1  3  4
8  6  2
7  0  5

Time in the begining before run =  00:27:33.366216
Time after run got completed =  00:27:33.437276
Time in seconds taken for run = 0.001001
The moves taken in this step :  up right up left down



The number of nodes visited 19
The maximum depth of recursion: 5
up right up left down

>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\searchalgorithm\idastar_output\python_idastar.py


Running for medium case with heursitic based on number of tiles out of place
Printing the input state

2  8  1
0  4  3
7  6  5

Time in the begining before run =  00:27:46.305209
Time after run got completed =  00:27:46.389770
Time in seconds taken for run = 0.002501
The moves taken in this step :  up right right down left left up right down



The number of nodes visited 87
The maximum depth of recursion: 9
up right right down left left up right down

>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\searchalgorithm\idastar_output\python_idastar.py


Running for easy case with heursitic based on number of tiles out of place
Printing the input state

1  3  4
8  6  2
7  0  5

Time in the begining before run =  00:25:31.701059
Time after run got completed =  00:25:31.768107
Time in seconds taken for run = 0.0
The moves taken in this step :  up right up left down



The number of nodes visited 19
The maximum depth of recursion: 5
up right up left down

>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\searchalgorithm\idastar_output\python_idastar.py


Running for medium case with heursitic based on number of tiles out of place
Printing the input state

2  8  1
0  4  3
7  6  5

Time in the begining before run =  00:26:10.863473
Time after run got completed =  00:26:10.944775
Time in seconds taken for run = 0.001999
The moves taken in this step :  up right right down left left up right down



The number of nodes visited 45
The maximum depth of recursion: 9
up right right down left left up right down

>>>
```

```
Python 3.6.0b1 (v3.6.0b1:5b0ca4ed5e2f, Sep 12 2016, 16:24:01) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\python_idastar - Copy - Copy.py


Running for hard case with heursitic based on number of tiles out of place
Printing the input state

5  6  7
4  0  8
3  2  1

Time in the begining before run =  00:33:20.599408
Time after run got completed =  00:33:23.393743
Time in seconds taken for run = 2.7443


uprightdownleftdownleftuprightupleftdownrightdownrightupupleftdowndownleftuprightrightupleftdowndownrightupleftuplef
tdownright

depth = 34
TRUE
>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\python_idastar - Copy - Copy.py


Running for hard case with heursitic based on manhattan distance
Printing the input state

5  6  7
4  0  8
3  2  1

Time in the begining before run =  00:34:03.171108
Time after run got completed =  00:34:03.347745
Time in seconds taken for run = 0.052037


upleftdowndownrightrightupupleftleftdowndownrightrightupupleftleftdowndownrightrightupupleftleftdowndownrightup

depth = 30
TRUE
>>>
 RESTART: C:\Users\nikhi\Downloads\AI assinment\python_idastar - Copy - Copy.py


Running for hard case with heursitic based on manhattan distance
Printing the input state

5  6  7
4  0  8
3  2  1

Time in the begining before run =  00:34:16.415712
Time after run got completed =  00:34:16.627436
Time in seconds taken for run = 0.052028


up left down down right right up up left left down down right right up up left left down down right right up up left left
```

```
down down right up

depth = 30
TRUE
>>>
```