

CSCE 625: ARTIFICIAL INTELLIGENCE: PROGRAMMING ASSIGNMENT 1

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Program Traces (Transcripts):

NOTE: I have tried 3 different heuristics, following are the example program traces for all the three different heuristics. I concluded that the third heuristic is the best. But I am showing the transcripts in the opposite order, with best heuristic (3rd) on the top. All explanations are in the **Heuristics_Development.pdf** file.

Heuristic no. 3: Explanation in 'Heuristics_Development.pdf' file

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

```
Initial State:
```

```
1 | ['B', 'E']
```

```
2 | ['A', 'C']
```

```
3 | ['D']
```

```
Iter= 1 Queue= 0 Depth= 0
```

```
Iter= 2 Queue= 5 Depth= 1
```

```
Iter= 3 Queue= 8 Depth= 2
```

```
Iter= 4 Queue= 11 Depth= 3
```

```
Iter= 5 Queue= 12 Depth= 4
```

```
Iter= 6 Queue= 13 Depth= 5
```

```
Iter= 7 Queue= 14 Depth= 6
```

```
Iter= 8 Queue= 15 Depth= 7
```

```
Iter= 9 Queue= 18 Depth= 8
```

```
Iter= 10 Queue= 19 Depth= 9
```

```
GOAL REACHED, SUCCESS!
```

```
Number of iterations are :10
```

```
Frontier size is :19
```

```
Run time (in seconds) :0.0090000629425
```

```
Depth of goal state is 9
```

```
Initial State:
```

```
1 | ['B', 'E']
```

```
2 | ['A', 'C']
```

```
3 | ['D']
```

```
Solution path is:
```

```
Next move:
```

```
1 | ['B']
```

```
2 | ['A', 'C']
3 | ['D', 'E']
```

Next move:

```
1 | ['B']
2 | ['A']
3 | ['D', 'E', 'C']
```

Next move:

```
1 | []
2 | ['A']
3 | ['D', 'E', 'C', 'B']
```

Next move:

```
1 | ['A']
2 | []
3 | ['D', 'E', 'C', 'B']
```

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['D', 'E', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | []
3 | ['D', 'E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E']
3 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

Initial State:

```
1 | ['C', 'D']
2 | ['A', 'E']
3 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0
```

```
Iter= 2 Queue= 5 Depth= 1
```

```
Iter= 3 Queue= 8 Depth= 2
```

```
Iter= 4 Queue= 11 Depth= 3
Iter= 5 Queue= 12 Depth= 1
Iter= 6 Queue= 15 Depth= 2
Iter= 7 Queue= 18 Depth= 3
Iter= 8 Queue= 19 Depth= 2
Iter= 9 Queue= 20 Depth= 3
Iter= 10 Queue= 21 Depth= 3
Iter= 11 Queue= 24 Depth= 2
Iter= 12 Queue= 27 Depth= 3
Iter= 13 Queue= 27 Depth= 3
Iter= 14 Queue= 28 Depth= 3
Iter= 15 Queue= 29 Depth= 4
Iter= 16 Queue= 30 Depth= 5
Iter= 17 Queue= 32 Depth= 6
Iter= 18 Queue= 35 Depth= 7
Iter= 19 Queue= 38 Depth= 8
Iter= 20 Queue= 39 Depth= 9
Iter= 21 Queue= 42 Depth= 10
Iter= 22 Queue= 45 Depth= 11
Iter= 23 Queue= 46 Depth= 12
Iter= 24 Queue= 49 Depth= 13
Iter= 25 Queue= 50 Depth= 14
```

GOAL REACHED, SUCCESS!

Number of iterations are :25

Frontier size is :50

Run time (in seconds) :0.97000002861

Depth of goal state is 14

Initial State:

1 | ['C', 'D']

2 | ['A', 'E']

3 | ['B']

Solution path is:

Next move:

1 | ['C']

2 | ['A', 'E']

3 | ['B', 'D']

Next move:

1 | ['C']

2 | ['A']

3 | ['B', 'D', 'E']

Next move:

1 | ['C']

2 | []

3 | ['B', 'D', 'E', 'A']

Next move:

1 | []

```
2 | ['C']
3 | ['B', 'D', 'E', 'A']
```

Next move:

```
1 | ['A']
2 | ['C']
3 | ['B', 'D', 'E']
```

Next move:

```
1 | ['A']
2 | ['C', 'E']
3 | ['B', 'D']
```

Next move:

```
1 | ['A']
2 | ['C', 'E', 'D']
3 | ['B']
```

Next move:

```
1 | ['A', 'B']
2 | ['C', 'E', 'D']
3 | []
```

Next move:

```
1 | ['A', 'B']
2 | ['C', 'E']
3 | ['D']
```

Next move:

```
1 | ['A', 'B']
2 | ['C']
3 | ['D', 'E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | []
3 | ['D', 'E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E']
3 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

```
Initial State:
```

```
1 | ['E', 'A']
2 | ['D', 'C']
3 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 5 Depth= 1
Iter= 3 Queue= 8 Depth= 1
Iter= 4 Queue= 11 Depth= 1
Iter= 5 Queue= 14 Depth= 2
Iter= 6 Queue= 15 Depth= 3
Iter= 7 Queue= 18 Depth= 4
Iter= 8 Queue= 19 Depth= 5
Iter= 9 Queue= 22 Depth= 6
Iter= 10 Queue= 25 Depth= 7
Iter= 11 Queue= 26 Depth= 8
```

```
GOAL REACHED, SUCCESS!
```

```
Number of iterations are :11
```

```
Frontier size is :26
```

```
Run time (in seconds) :0.501000165939
```

```
Depth of goal state is 8
```

```
Initial State:
```

```
1 | ['E', 'A']
2 | ['D', 'C']
3 | ['B']
```

```
Solution path is:
```

```
Next move:
```

```
1 | ['E']
2 | ['D', 'C']
3 | ['B', 'A']
```

```
Next move:
```

```
1 | []
2 | ['D', 'C', 'E']
3 | ['B', 'A']
```

```
Next move:
```

```
1 | ['A']
2 | ['D', 'C', 'E']
3 | ['B']
```

```
Next move:
```

```
1 | ['A', 'B']
2 | ['D', 'C', 'E']
3 | []
```

```
Next move:
```

```
1 | ['A', 'B']
2 | ['D', 'C']
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D']
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

Initial State:

```
1 | ['D', 'E']
2 | ['A', 'B']
3 | ['C']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 5 Depth= 1
Iter= 3 Queue= 8 Depth= 2
Iter= 4 Queue= 11 Depth= 3
Iter= 5 Queue= 12 Depth= 4
Iter= 6 Queue= 13 Depth= 5
Iter= 7 Queue= 16 Depth= 6
Iter= 8 Queue= 19 Depth= 7
Iter= 9 Queue= 22 Depth= 8
Iter= 10 Queue= 23 Depth= 9
Iter= 11 Queue= 26 Depth= 10
Iter= 12 Queue= 27 Depth= 11
```

GOAL REACHED, SUCCESS!

Number of iterations are :12

Frontier size is :27

Run time (in seconds) :0.330999851227

Depth of goal state is 11

Initial State:

```
1 | ['D', 'E']
2 | ['A', 'B']
3 | ['C']
```

Solution path is:

Next move:

```
1 | ['D']
2 | ['A', 'B']
3 | ['C', 'E']
```

Next move:

```
1 | ['D']
2 | ['A']
3 | ['C', 'E', 'B']
```

Next move:

```
1 | []
2 | ['A']
3 | ['C', 'E', 'B', 'D']
```

Next move:

```
1 | ['A']
2 | []
3 | ['C', 'E', 'B', 'D']
```

Next move:

```
1 | ['A']
2 | ['D']
3 | ['C', 'E', 'B']
```

Next move:

```
1 | ['A', 'B']
2 | ['D']
3 | ['C', 'E']
```

Next move:

```
1 | ['A', 'B']
2 | ['D', 'E']
3 | ['C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D', 'E']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D']
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 6 4
```

```
Initial State:
```

```
1 | ['A', 'F']
2 | ['D', 'C']
3 | ['E']
4 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 11 Depth= 1
Iter= 3 Queue= 19 Depth= 2
Iter= 4 Queue= 24 Depth= 3
Iter= 5 Queue= 32 Depth= 4
Iter= 6 Queue= 40 Depth= 5
Iter= 7 Queue= 45 Depth= 6
Iter= 8 Queue= 47 Depth= 7
```

```
GOAL REACHED, SUCCESS!
```

```
Number of iterations are :8
```

```
Frontier size is :47
```

```
Run time (in seconds) :0.411999940872
```

```
Depth of goal state is 7
```

```
Initial State:
```

```
1 | ['A', 'F']
2 | ['D', 'C']
3 | ['E']
4 | ['B']
```

```
Solution path is:
```

```
Next move:
```

```
1 | ['A']
2 | ['D', 'C', 'F']
3 | ['E']
4 | ['B']
```

```
Next move:
```

```
1 | ['A', 'B']
2 | ['D', 'C', 'F']
3 | ['E']
4 | []
```

```
Next move:
```

```
1 | ['A', 'B']
2 | ['D', 'C']
3 | ['E']
4 | ['F']
```

```
Next move:
```

```
1 | ['A', 'B', 'C']
2 | ['D']
```



```
3 | ['E']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['E']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | []
4 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 6 4
```

Initial State:

```
1 | ['A', 'C']
2 | ['D', 'E']
3 | ['F']
4 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 11 Depth= 1
Iter= 3 Queue= 19 Depth= 2
Iter= 4 Queue= 24 Depth= 3
Iter= 5 Queue= 29 Depth= 4
Iter= 6 Queue= 34 Depth= 5
Iter= 7 Queue= 36 Depth= 6
Iter= 8 Queue= 38 Depth= 7
```

GOAL REACHED, SUCCESS!

Number of iterations are :8

Frontier size is :38

Run time (in seconds) :0.419000148773

Depth of goal state is 7

Initial State:

```
1 | ['A', 'C']
2 | ['D', 'E']
3 | ['F']
4 | ['B']
```

Solution path is:

Next move:

```
1 | ['A']
2 | ['D', 'E', 'C']
3 | ['F']
4 | ['B']
```

Next move:

```
1 | ['A', 'B']
2 | ['D', 'E', 'C']
3 | ['F']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D', 'E']
3 | ['F']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D']
3 | ['F', 'E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['F', 'E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | ['F']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | []
4 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 6 5
```

Initial State:

```
1 | ['E', 'F']
2 | ['A']
3 | ['C']
4 | ['B']
5 | ['D']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 19 Depth= 1
Iter= 3 Queue= 34 Depth= 1
```

```
Iter= 4 Queue= 49 Depth= 1
Iter= 5 Queue= 64 Depth= 2
Iter= 6 Queue= 75 Depth= 3
Iter= 7 Queue= 86 Depth= 4
Iter= 8 Queue= 93 Depth= 5
Iter= 9 Queue= 103 Depth= 6
Iter= 10 Queue= 114 Depth= 7
Iter= 11 Queue= 121 Depth= 8
Iter= 12 Queue= 124 Depth= 9
Iter= 13 Queue= 130 Depth= 10
Iter= 14 Queue= 133 Depth= 11
```

GOAL REACHED, SUCCESS!

Number of iterations are :14

Frontier size is :133

Run time (in seconds) :0.616000175476

Depth of goal state is 11

Initial State:

```
1 | ['E', 'F']
2 | ['A']
3 | ['C']
4 | ['B']
5 | ['D']
```

Solution path is:

Next move:

```
1 | ['E']
2 | ['A']
3 | ['C', 'F']
4 | ['B']
5 | ['D']
```

Next move:

```
1 | []
2 | ['A']
3 | ['C', 'F', 'E']
4 | ['B']
5 | ['D']
```

Next move:

```
1 | ['A']
2 | []
3 | ['C', 'F', 'E']
4 | ['B']
5 | ['D']
```

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['C', 'F', 'E']
4 | []
```

```
5 | ['D']
```

```
Next move:
```

```
1 | ['A', 'B']
```

```
2 | ['E']
```

```
3 | ['C', 'F']
```

```
4 | []
```

```
5 | ['D']
```

```
Next move:
```

```
1 | ['A', 'B']
```

```
2 | ['E', 'F']
```

```
3 | ['C']
```

```
4 | []
```

```
5 | ['D']
```

```
Next move:
```

```
1 | ['A', 'B', 'C']
```

```
2 | ['E', 'F']
```

```
3 | []
```

```
4 | []
```

```
5 | ['D']
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D']
```

```
2 | ['E', 'F']
```

```
3 | []
```

```
4 | []
```

```
5 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D']
```

```
2 | ['E']
```

```
3 | ['F']
```

```
4 | []
```

```
5 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D', 'E']
```

```
2 | []
```

```
3 | ['F']
```

```
4 | []
```

```
5 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
```

```
2 | []
```

```
3 | []
```

```
4 | []
```

```
5 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 6 6
```

Initial State:

```
1 | ['B']
2 | ['F']
3 | ['A']
4 | ['E']
5 | ['C']
6 | ['D']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 29 Depth= 1
Iter= 3 Queue= 48 Depth= 2
Iter= 4 Queue= 67 Depth= 3
Iter= 5 Queue= 86 Depth= 4
Iter= 6 Queue= 100 Depth= 5
Iter= 7 Queue= 109 Depth= 6
Iter= 8 Queue= 113 Depth= 7
```

GOAL REACHED, SUCCESS!

Number of iterations are :8

Frontier size is :113

Run time (in seconds) :0.4359998703

Depth of goal state is 7

Initial State:

```
1 | ['B']
2 | ['F']
3 | ['A']
4 | ['E']
5 | ['C']
6 | ['D']
```

Solution path is:

Next move:

```
1 | []
2 | ['F', 'B']
3 | ['A']
4 | ['E']
5 | ['C']
6 | ['D']
```

Next move:

```
1 | ['A']
2 | ['F', 'B']
3 | []
4 | ['E']
5 | ['C']
6 | ['D']
```

Next move:

```
1 | ['A', 'B']
2 | ['F']
3 | []
```

```
4 | ['E']
5 | ['C']
6 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['F']
3 | []
4 | ['E']
5 | []
6 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['F']
3 | []
4 | ['E']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['F']
3 | []
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | []
4 | []
5 | []
6 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 7 6
```

Initial State:

```
1 | ['E', 'F']
2 | ['G']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 29 Depth= 1
Iter= 3 Queue= 53 Depth= 1
Iter= 4 Queue= 77 Depth= 1
Iter= 5 Queue= 101 Depth= 1
Iter= 6 Queue= 125 Depth= 2
Iter= 7 Queue= 144 Depth= 3
```

```
Iter= 8 Queue= 163 Depth= 4
Iter= 9 Queue= 177 Depth= 5
Iter= 10 Queue= 186 Depth= 6
Iter= 11 Queue= 190 Depth= 7
Iter= 12 Queue= 194 Depth= 8
Iter= 13 Queue= 198 Depth= 9
```

GOAL REACHED, SUCCESS!

Number of iterations are :13

Frontier size is :198

Run time (in seconds) :0.595999956131

Depth of goal state is 9

Initial State:

```
1 | ['E', 'F']
2 | ['G']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

Solution path is:

Next move:

```
1 | ['E']
2 | ['G', 'F']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

Next move:

```
1 | []
2 | ['G', 'F', 'E']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

Next move:

```
1 | ['A']
2 | ['G', 'F', 'E']
3 | ['C']
4 | ['B']
5 | ['D']
6 | []
```

Next move:

```
1 | ['A', 'B']
2 | ['G', 'F', 'E']
3 | ['C']
4 | []
5 | ['D']
```

```
6 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C']
2 | ['G', 'F', 'E']
3 | []
4 | []
5 | ['D']
6 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D']
2 | ['G', 'F', 'E']
3 | []
4 | []
5 | []
6 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['G', 'F']
3 | []
4 | []
5 | []
6 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['G']
3 | []
4 | []
5 | []
6 | []
```

```
Next move:
```

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | []
5 | []
6 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 7 4
```

```
Initial State:
```

```
1 | ['C', 'G']
2 | ['F', 'D']
3 | ['E', 'B']
4 | ['A']
```

```
Iter= 1 Queue= 0 Depth= 0
```

```
Iter= 2 Queue= 11 Depth= 1
```

```
Iter= 3 Queue= 19 Depth= 1
```



```
Iter= 4 Queue= 27 Depth= 2
Iter= 5 Queue= 32 Depth= 3
Iter= 6 Queue= 37 Depth= 4
Iter= 7 Queue= 42 Depth= 5
Iter= 8 Queue= 47 Depth= 6
Iter= 9 Queue= 55 Depth= 7
Iter= 10 Queue= 63 Depth= 8
Iter= 11 Queue= 68 Depth= 9
Iter= 12 Queue= 70 Depth= 10
```

GOAL REACHED, SUCCESS!

Number of iterations are :12

Frontier size is :70

Run time (in seconds) :0.56500005722

Depth of goal state is 10

Initial State:

```
1 | ['C', 'G']
2 | ['F', 'D']
3 | ['E', 'B']
4 | ['A']
```

Solution path is:

Next move:

```
1 | ['C']
2 | ['F', 'D', 'G']
3 | ['E', 'B']
4 | ['A']
```

Next move:

```
1 | []
2 | ['F', 'D', 'G', 'C']
3 | ['E', 'B']
4 | ['A']
```

Next move:

```
1 | ['A']
2 | ['F', 'D', 'G', 'C']
3 | ['E', 'B']
4 | []
```

Next move:

```
1 | ['A', 'B']
2 | ['F', 'D', 'G', 'C']
3 | ['E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['F', 'D', 'G']
3 | ['E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['F', 'D']
3 | ['E']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['F']
3 | ['E']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['F']
3 | []
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | []
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 7 6

Initial State:

```
1 | ['E', 'F']
2 | ['G']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 29 Depth= 1
Iter= 3 Queue= 53 Depth= 1
Iter= 4 Queue= 77 Depth= 1
Iter= 5 Queue= 101 Depth= 1
Iter= 6 Queue= 125 Depth= 2
Iter= 7 Queue= 144 Depth= 3
Iter= 8 Queue= 163 Depth= 4
Iter= 9 Queue= 177 Depth= 5
Iter= 10 Queue= 186 Depth= 6
Iter= 11 Queue= 190 Depth= 7
Iter= 12 Queue= 194 Depth= 8
```

Iter= 13 Queue= 198 Depth= 9

GOAL REACHED, SUCCESS!

Number of iterations are :13

Frontier size is :198

Run time (in seconds) :0.595999956131

Depth of goal state is 9

Initial State:

```
1 | ['E', 'F']
2 | ['G']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

Solution path is:

Next move:

```
1 | ['E']
2 | ['G', 'F']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

Next move:

```
1 | []
2 | ['G', 'F', 'E']
3 | ['C']
4 | ['B']
5 | ['D']
6 | ['A']
```

Next move:

```
1 | ['A']
2 | ['G', 'F', 'E']
3 | ['C']
4 | ['B']
5 | ['D']
6 | []
```

Next move:

```
1 | ['A', 'B']
2 | ['G', 'F', 'E']
3 | ['C']
4 | []
5 | ['D']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G', 'F', 'E']
```

```
3 | []
4 | []
5 | ['D']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['G', 'F', 'E']
3 | []
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['G', 'F']
3 | []
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['G']
3 | []
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | []
5 | []
6 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 7 4
```

Initial State:

```
1 | ['C', 'G']
2 | ['F', 'D']
3 | ['E', 'B']
4 | ['A']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 11 Depth= 1
Iter= 3 Queue= 19 Depth= 1
Iter= 4 Queue= 27 Depth= 2
Iter= 5 Queue= 32 Depth= 3
Iter= 6 Queue= 37 Depth= 4
Iter= 7 Queue= 42 Depth= 5
Iter= 8 Queue= 47 Depth= 6
```

```
Iter= 9  Queue= 55  Depth= 7
Iter= 10  Queue= 63  Depth= 8
Iter= 11  Queue= 68  Depth= 9
Iter= 12  Queue= 70  Depth= 10
```

```
GOAL REACHED, SUCCESS!
Number of iterations are :12
Frontier size is :70
Run time (in seconds) :0.56500005722
Depth of goal state is 10
```

Initial State:

```
1 | ['C', 'G']
2 | ['F', 'D']
3 | ['E', 'B']
4 | ['A']
```

Solution path is:

Next move:

```
1 | ['C']
2 | ['F', 'D', 'G']
3 | ['E', 'B']
4 | ['A']
```

Next move:

```
1 | []
2 | ['F', 'D', 'G', 'C']
3 | ['E', 'B']
4 | ['A']
```

Next move:

```
1 | ['A']
2 | ['F', 'D', 'G', 'C']
3 | ['E', 'B']
4 | []
```

Next move:

```
1 | ['A', 'B']
2 | ['F', 'D', 'G', 'C']
3 | ['E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['F', 'D', 'G']
3 | ['E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['F', 'D']
3 | ['E']
```

```
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
```

```
2 | ['F']
```

```
3 | ['E']
```

```
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
```

```
2 | ['F']
```

```
3 | []
```

```
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
```

```
2 | []
```

```
3 | []
```

```
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
```

```
2 | []
```

```
3 | []
```

```
4 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 73
```

Error, Give the input in this format: 'python blocksworld.py <number of blocks> <number of stacks>'

Traceback (most recent call last):

File "blocksworld.py", line 221, in <module>

numOfBlocks, numOfStacks = int(sys.argv[1]), int(sys.argv[2])

IndexError: list index out of range

```
e:\Users\Dell\Desktop>python blocksworld.py 7 8
```

Initial State:

```
1 | ['E']
```

```
2 | ['F']
```

```
3 | ['A']
```

```
4 | ['D']
```

```
5 | ['C']
```

```
6 | ['G']
```

```
7 | ['B']
```

```
8 | []
```

Iter= 1 Queue= 0 Depth= 0

Iter= 2 Queue= 48 Depth= 1

Iter= 3 Queue= 82 Depth= 2

Iter= 4 Queue= 116 Depth= 3

Iter= 5 Queue= 143 Depth= 4

```
Iter= 6 Queue= 163 Depth= 5
Iter= 7 Queue= 176 Depth= 6
Iter= 8 Queue= 189 Depth= 7
Iter= 9 Queue= 195 Depth= 8
```

```
GOAL REACHED, SUCCESS!
Number of iterations are :9
Frontier size is :195
Run time (in seconds) :0.352999925613
Depth of goal state is 8
```

Initial State:

```
1 | ['E']
2 | ['F']
3 | ['A']
4 | ['D']
5 | ['C']
6 | ['G']
7 | ['B']
8 | []
```

Solution path is:

Next move:

```
1 | []
2 | ['F', 'E']
3 | ['A']
4 | ['D']
5 | ['C']
6 | ['G']
7 | ['B']
8 | []
```

Next move:

```
1 | ['A']
2 | ['F', 'E']
3 | []
4 | ['D']
5 | ['C']
6 | ['G']
7 | ['B']
8 | []
```

Next move:

```
1 | ['A', 'B']
2 | ['F', 'E']
3 | []
4 | ['D']
5 | ['C']
6 | ['G']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['F', 'E']
3 | []
4 | ['D']
5 | []
6 | ['G']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['F', 'E']
3 | []
4 | []
5 | []
6 | ['G']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['F']
3 | []
4 | []
5 | []
6 | ['G']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | []
4 | []
5 | []
6 | ['G']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | []
5 | []
6 | []
7 | []
8 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 8 4

Initial State:


```
1 | ['F', 'A']
2 | ['G', 'C']
3 | ['B', 'E']
4 | ['D', 'H']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 11 Depth= 1
Iter= 3 Queue= 19 Depth= 1
Iter= 4 Queue= 27 Depth= 1
Iter= 5 Queue= 35 Depth= 1
Iter= 6 Queue= 42 Depth= 1
Iter= 7 Queue= 49 Depth= 1
Iter= 8 Queue= 56 Depth= 1
Iter= 9 Queue= 63 Depth= 1
Iter= 10 Queue= 70 Depth= 1
Iter= 11 Queue= 77 Depth= 2
Iter= 12 Queue= 81 Depth= 3
Iter= 13 Queue= 89 Depth= 4
Iter= 14 Queue= 95 Depth= 5
Iter= 15 Queue= 103 Depth= 5
Iter= 16 Queue= 111 Depth= 6
Iter= 17 Queue= 115 Depth= 7
Iter= 18 Queue= 123 Depth= 8
Iter= 19 Queue= 131 Depth= 9
Iter= 20 Queue= 139 Depth= 10
Iter= 21 Queue= 147 Depth= 11
Iter= 22 Queue= 152 Depth= 12
Iter= 23 Queue= 160 Depth= 13
Iter= 24 Queue= 168 Depth= 14
Iter= 25 Queue= 173 Depth= 15
Iter= 26 Queue= 175 Depth= 16
```

GOAL REACHED, SUCCESS!
Number of iterations are :26
Frontier size is :175
Run time (in seconds) :1.03400015831
Depth of goal state is 16

Initial State:

```
1 | ['F', 'A']
2 | ['G', 'C']
3 | ['B', 'E']
4 | ['D', 'H']
```

Solution path is:

Next move:

```
1 | ['F']
2 | ['G', 'C', 'A']
3 | ['B', 'E']
4 | ['D', 'H']
```

Next move:

```
1 | []
2 | ['G', 'C', 'A']
3 | ['B', 'E', 'F']
4 | ['D', 'H']
```

Next move:

```
1 | ['A']
2 | ['G', 'C']
3 | ['B', 'E', 'F']
4 | ['D', 'H']
```

Next move:

```
1 | ['A']
2 | ['G', 'C', 'F']
3 | ['B', 'E']
4 | ['D', 'H']
```

Next move:

```
1 | ['A']
2 | ['G', 'C', 'F']
3 | ['B']
4 | ['D', 'H', 'E']
```

Next move:

```
1 | ['A', 'B']
2 | ['G', 'C', 'F']
3 | []
4 | ['D', 'H', 'E']
```

Next move:

```
1 | ['A', 'B']
2 | ['G', 'C']
3 | ['F']
4 | ['D', 'H', 'E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G']
3 | ['F']
4 | ['D', 'H', 'E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G', 'E']
3 | ['F']
4 | ['D', 'H']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G', 'E', 'H']
3 | ['F']
4 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['G', 'E', 'H']
3 | ['F']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['G', 'E']
3 | ['F']
4 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['G']
3 | ['F']
4 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['G']
3 | []
4 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | []
4 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 8 3

Initial State:

```
1 | ['G', 'A', 'F']
2 | ['C', 'H', 'E']
3 | ['B', 'D']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 5 Depth= 1
Iter= 3 Queue= 8 Depth= 1
Iter= 4 Queue= 11 Depth= 2
Iter= 5 Queue= 14 Depth= 2
Iter= 6 Queue= 17 Depth= 2
Iter= 7 Queue= 20 Depth= 2
Iter= 8 Queue= 23 Depth= 2
Iter= 9 Queue= 26 Depth= 2
Iter= 10 Queue= 29 Depth= 3
```

Iter= 11	Queue= 30	Depth= 3
Iter= 12	Queue= 31	Depth= 4
Iter= 13	Queue= 33	Depth= 5
Iter= 14	Queue= 36	Depth= 6
Iter= 15	Queue= 39	Depth= 6
Iter= 16	Queue= 42	Depth= 7
Iter= 17	Queue= 43	Depth= 3
Iter= 18	Queue= 44	Depth= 4
Iter= 19	Queue= 47	Depth= 5
Iter= 20	Queue= 49	Depth= 6
Iter= 21	Queue= 52	Depth= 6
Iter= 22	Queue= 55	Depth= 7
Iter= 23	Queue= 56	Depth= 3
Iter= 24	Queue= 55	Depth= 5
Iter= 25	Queue= 57	Depth= 6
Iter= 26	Queue= 60	Depth= 7
Iter= 27	Queue= 63	Depth= 5
Iter= 28	Queue= 65	Depth= 6
Iter= 29	Queue= 68	Depth= 7
Iter= 30	Queue= 71	Depth= 7
Iter= 31	Queue= 73	Depth= 8
Iter= 32	Queue= 74	Depth= 7
Iter= 33	Queue= 76	Depth= 8
Iter= 34	Queue= 77	Depth= 1
Iter= 35	Queue= 80	Depth= 2
Iter= 36	Queue= 83	Depth= 2
Iter= 37	Queue= 86	Depth= 1
Iter= 38	Queue= 89	Depth= 2
Iter= 39	Queue= 92	Depth= 2
Iter= 40	Queue= 95	Depth= 3
Iter= 41	Queue= 98	Depth= 3
Iter= 42	Queue= 101	Depth= 3
Iter= 43	Queue= 104	Depth= 3
Iter= 44	Queue= 106	Depth= 3
Iter= 45	Queue= 108	Depth= 4
Iter= 46	Queue= 109	Depth= 4
Iter= 47	Queue= 110	Depth= 4
Iter= 48	Queue= 111	Depth= 7
Iter= 49	Queue= 112	Depth= 7
Iter= 50	Queue= 113	Depth= 8
Iter= 51	Queue= 116	Depth= 9
Iter= 52	Queue= 119	Depth= 4
Iter= 53	Queue= 120	Depth= 6
Iter= 54	Queue= 123	Depth= 7
Iter= 55	Queue= 124	Depth= 7
Iter= 56	Queue= 125	Depth= 8
Iter= 57	Queue= 128	Depth= 9
Iter= 58	Queue= 131	Depth= 4
Iter= 59	Queue= 132	Depth= 7
Iter= 60	Queue= 133	Depth= 7
Iter= 61	Queue= 134	Depth= 8
Iter= 62	Queue= 137	Depth= 9
Iter= 63	Queue= 140	Depth= 6

Iter=	64	Queue=	143	Depth=	7
Iter=	65	Queue=	144	Depth=	7
Iter=	66	Queue=	145	Depth=	8
Iter=	67	Queue=	148	Depth=	9
Iter=	68	Queue=	151	Depth=	3
Iter=	69	Queue=	154	Depth=	3
Iter=	70	Queue=	157	Depth=	3
Iter=	71	Queue=	160	Depth=	3
Iter=	72	Queue=	163	Depth=	3
Iter=	73	Queue=	166	Depth=	3
Iter=	74	Queue=	169	Depth=	3
Iter=	75	Queue=	172	Depth=	3
Iter=	76	Queue=	175	Depth=	3
Iter=	77	Queue=	178	Depth=	3
Iter=	78	Queue=	181	Depth=	3
Iter=	79	Queue=	184	Depth=	4
Iter=	80	Queue=	185	Depth=	4
Iter=	81	Queue=	186	Depth=	4
Iter=	82	Queue=	185	Depth=	4
Iter=	83	Queue=	184	Depth=	8
Iter=	84	Queue=	186	Depth=	8
Iter=	85	Queue=	188	Depth=	8
Iter=	86	Queue=	190	Depth=	8
Iter=	87	Queue=	192	Depth=	4
Iter=	88	Queue=	193	Depth=	4
Iter=	89	Queue=	194	Depth=	5
Iter=	90	Queue=	196	Depth=	6
Iter=	91	Queue=	199	Depth=	7
Iter=	92	Queue=	202	Depth=	7
Iter=	93	Queue=	205	Depth=	8
Iter=	94	Queue=	206	Depth=	4
Iter=	95	Queue=	207	Depth=	4
Iter=	96	Queue=	208	Depth=	4
Iter=	97	Queue=	209	Depth=	5
Iter=	98	Queue=	212	Depth=	6
Iter=	99	Queue=	214	Depth=	6
Iter=	100	Queue=	217	Depth=	7
Iter=	101	Queue=	218	Depth=	4
Iter=	102	Queue=	217	Depth=	4
Iter=	103	Queue=	218	Depth=	5
Iter=	104	Queue=	220	Depth=	6
Iter=	105	Queue=	222	Depth=	7
Iter=	106	Queue=	225	Depth=	7
Iter=	107	Queue=	227	Depth=	8
Iter=	108	Queue=	228	Depth=	4
Iter=	109	Queue=	227	Depth=	6
Iter=	110	Queue=	230	Depth=	7
Iter=	111	Queue=	233	Depth=	8
Iter=	112	Queue=	236	Depth=	6
Iter=	113	Queue=	236	Depth=	6
Iter=	114	Queue=	239	Depth=	7
Iter=	115	Queue=	240	Depth=	7
Iter=	116	Queue=	241	Depth=	8

Iter=	117	Queue=	244	Depth=	9
Iter=	118	Queue=	247	Depth=	6
Iter=	119	Queue=	247	Depth=	8
Iter=	120	Queue=	249	Depth=	9
Iter=	121	Queue=	250	Depth=	8
Iter=	122	Queue=	253	Depth=	2
Iter=	123	Queue=	255	Depth=	2
Iter=	124	Queue=	257	Depth=	3
Iter=	125	Queue=	258	Depth=	3
Iter=	126	Queue=	259	Depth=	3
Iter=	127	Queue=	260	Depth=	3
Iter=	128	Queue=	261	Depth=	3
Iter=	129	Queue=	262	Depth=	5
Iter=	130	Queue=	263	Depth=	7
Iter=	131	Queue=	266	Depth=	7
Iter=	132	Queue=	266	Depth=	5
Iter=	133	Queue=	267	Depth=	5
Iter=	134	Queue=	270	Depth=	7
Iter=	135	Queue=	272	Depth=	7
Iter=	136	Queue=	271	Depth=	2
Iter=	137	Queue=	274	Depth=	3
Iter=	138	Queue=	277	Depth=	3
Iter=	139	Queue=	280	Depth=	3
Iter=	140	Queue=	281	Depth=	4
Iter=	141	Queue=	284	Depth=	4
Iter=	142	Queue=	287	Depth=	8
Iter=	143	Queue=	288	Depth=	8
Iter=	144	Queue=	289	Depth=	8
Iter=	145	Queue=	290	Depth=	8
Iter=	146	Queue=	291	Depth=	4
Iter=	147	Queue=	294	Depth=	4
Iter=	148	Queue=	297	Depth=	4
Iter=	149	Queue=	300	Depth=	4
Iter=	150	Queue=	303	Depth=	4
Iter=	151	Queue=	306	Depth=	4
Iter=	152	Queue=	309	Depth=	4
Iter=	153	Queue=	312	Depth=	4
Iter=	154	Queue=	315	Depth=	5
Iter=	155	Queue=	316	Depth=	5
Iter=	156	Queue=	317	Depth=	6
Iter=	157	Queue=	320	Depth=	7
Iter=	158	Queue=	323	Depth=	8
Iter=	159	Queue=	326	Depth=	8
Iter=	160	Queue=	329	Depth=	9
Iter=	161	Queue=	330	Depth=	5
Iter=	162	Queue=	331	Depth=	5
Iter=	163	Queue=	332	Depth=	5
Iter=	164	Queue=	333	Depth=	9
Iter=	165	Queue=	335	Depth=	10
Iter=	166	Queue=	338	Depth=	9
Iter=	167	Queue=	339	Depth=	9
Iter=	168	Queue=	342	Depth=	9
Iter=	169	Queue=	344	Depth=	10

Iter=	170	Queue=	347	Depth=	9
Iter=	171	Queue=	348	Depth=	9
Iter=	172	Queue=	351	Depth=	9
Iter=	173	Queue=	353	Depth=	10
Iter=	174	Queue=	356	Depth=	9
Iter=	175	Queue=	357	Depth=	9
Iter=	176	Queue=	360	Depth=	9
Iter=	177	Queue=	362	Depth=	10
Iter=	178	Queue=	365	Depth=	9
Iter=	179	Queue=	366	Depth=	9
Iter=	180	Queue=	369	Depth=	5
Iter=	181	Queue=	370	Depth=	5
Iter=	182	Queue=	371	Depth=	5
Iter=	183	Queue=	372	Depth=	8
Iter=	184	Queue=	373	Depth=	8
Iter=	185	Queue=	374	Depth=	9
Iter=	186	Queue=	377	Depth=	10
Iter=	187	Queue=	380	Depth=	5
Iter=	188	Queue=	381	Depth=	5
Iter=	189	Queue=	383	Depth=	6
Iter=	190	Queue=	386	Depth=	7
Iter=	191	Queue=	389	Depth=	8
Iter=	192	Queue=	392	Depth=	8
Iter=	193	Queue=	395	Depth=	9
Iter=	194	Queue=	396	Depth=	5
Iter=	195	Queue=	397	Depth=	5
Iter=	196	Queue=	398	Depth=	7
Iter=	197	Queue=	400	Depth=	5
Iter=	198	Queue=	401	Depth=	5
Iter=	199	Queue=	402	Depth=	8
Iter=	200	Queue=	403	Depth=	8
Iter=	201	Queue=	404	Depth=	9
Iter=	202	Queue=	407	Depth=	10
Iter=	203	Queue=	409	Depth=	5
Iter=	204	Queue=	410	Depth=	7
Iter=	205	Queue=	413	Depth=	8
Iter=	206	Queue=	414	Depth=	8
Iter=	207	Queue=	415	Depth=	9
Iter=	208	Queue=	418	Depth=	10
Iter=	209	Queue=	421	Depth=	7
Iter=	210	Queue=	423	Depth=	8
Iter=	211	Queue=	424	Depth=	9
Iter=	212	Queue=	426	Depth=	10
Iter=	213	Queue=	429	Depth=	9
Iter=	214	Queue=	430	Depth=	9
Iter=	215	Queue=	433	Depth=	4
Iter=	216	Queue=	435	Depth=	4
Iter=	217	Queue=	438	Depth=	4
Iter=	218	Queue=	441	Depth=	4
Iter=	219	Queue=	444	Depth=	4
Iter=	220	Queue=	447	Depth=	4
Iter=	221	Queue=	450	Depth=	4
Iter=	222	Queue=	452	Depth=	5

Iter=	223	Queue=	453	Depth=	5
Iter=	224	Queue=	454	Depth=	5
Iter=	225	Queue=	455	Depth=	6
Iter=	226	Queue=	457	Depth=	7
Iter=	227	Queue=	459	Depth=	8
Iter=	228	Queue=	462	Depth=	8
Iter=	229	Queue=	465	Depth=	9
Iter=	230	Queue=	466	Depth=	5
Iter=	231	Queue=	465	Depth=	5
Iter=	232	Queue=	466	Depth=	5
Iter=	233	Queue=	467	Depth=	5
Iter=	234	Queue=	468	Depth=	5
Iter=	235	Queue=	468	Depth=	6
Iter=	236	Queue=	467	Depth=	7
Iter=	237	Queue=	469	Depth=	8
Iter=	238	Queue=	472	Depth=	9
Iter=	239	Queue=	475	Depth=	11
Iter=	240	Queue=	477	Depth=	11
Iter=	241	Queue=	480	Depth=	11
Iter=	242	Queue=	482	Depth=	11
Iter=	243	Queue=	484	Depth=	9
Iter=	244	Queue=	486	Depth=	7
Iter=	245	Queue=	488	Depth=	8
Iter=	246	Queue=	491	Depth=	9
Iter=	247	Queue=	494	Depth=	9
Iter=	248	Queue=	496	Depth=	9
Iter=	249	Queue=	498	Depth=	11
Iter=	250	Queue=	500	Depth=	5
Iter=	251	Queue=	499	Depth=	5
Iter=	252	Queue=	500	Depth=	5
Iter=	253	Queue=	501	Depth=	5
Iter=	254	Queue=	502	Depth=	5
Iter=	255	Queue=	503	Depth=	5
Iter=	256	Queue=	502	Depth=	7
Iter=	257	Queue=	504	Depth=	8
Iter=	258	Queue=	507	Depth=	9
Iter=	259	Queue=	510	Depth=	9
Iter=	260	Queue=	512	Depth=	10
Iter=	261	Queue=	513	Depth=	9
Iter=	262	Queue=	515	Depth=	10
Iter=	263	Queue=	516	Depth=	9
Iter=	264	Queue=	518	Depth=	10
Iter=	265	Queue=	519	Depth=	1
Iter=	266	Queue=	522	Depth=	1
Iter=	267	Queue=	525	Depth=	3
Iter=	268	Queue=	527	Depth=	3
Iter=	269	Queue=	530	Depth=	3
Iter=	270	Queue=	532	Depth=	3
Iter=	271	Queue=	535	Depth=	3
Iter=	272	Queue=	538	Depth=	3
Iter=	273	Queue=	540	Depth=	3
Iter=	274	Queue=	543	Depth=	3
Iter=	275	Queue=	544	Depth=	3


```
Iter= 276 Queue= 547 Depth= 6
Iter= 277 Queue= 548 Depth= 6
Iter= 278 Queue= 548 Depth= 6
Iter= 279 Queue= 549 Depth= 6
Iter= 280 Queue= 550 Depth= 8
Iter= 281 Queue= 552 Depth= 3
Iter= 282 Queue= 553 Depth= 3
Iter= 283 Queue= 555 Depth= 2
Iter= 284 Queue= 556 Depth= 3
Iter= 285 Queue= 559 Depth= 3
Iter= 286 Queue= 560 Depth= 4
Iter= 287 Queue= 562 Depth= 4
Iter= 288 Queue= 565 Depth= 4
Iter= 289 Queue= 568 Depth= 4
Iter= 290 Queue= 571 Depth= 5
Iter= 291 Queue= 570 Depth= 5
Iter= 292 Queue= 570 Depth= 6
Iter= 293 Queue= 571 Depth= 5
Iter= 294 Queue= 572 Depth= 6
Iter= 295 Queue= 572 Depth= 7
Iter= 296 Queue= 574 Depth= 8
Iter= 297 Queue= 577 Depth= 9
Iter= 298 Queue= 579 Depth= 8
Iter= 299 Queue= 578 Depth= 9
Iter= 300 Queue= 580 Depth= 10
Iter= 301 Queue= 583 Depth= 11
Iter= 302 Queue= 586 Depth= 12
Iter= 303 Queue= 589 Depth= 13
Iter= 304 Queue= 590 Depth= 14
Iter= 305 Queue= 593 Depth= 15
Iter= 306 Queue= 596 Depth= 16
Iter= 307 Queue= 599 Depth= 17
Iter= 308 Queue= 602 Depth= 18
Iter= 309 Queue= 605 Depth= 19
Iter= 310 Queue= 606 Depth= 20
```

GOAL REACHED, SUCCESS!

Number of iterations are :310

Frontier size is :606

Run time (in seconds) :10.3430001736

Depth of goal state is 20

Initial State:

1 | ['G', 'A', 'F']

2 | ['C', 'H', 'E']

3 | ['B', 'D']

Solution path is:

Next move:

1 | ['G', 'A', 'F']

2 | ['C', 'H', 'E', 'D']

3 | ['B']

Next move:

```
1 | ['G', 'A', 'F']
2 | ['C', 'H', 'E', 'D', 'B']
3 | []
```

Next move:

```
1 | ['G', 'A']
2 | ['C', 'H', 'E', 'D', 'B', 'F']
3 | []
```

Next move:

```
1 | ['G']
2 | ['C', 'H', 'E', 'D', 'B', 'F']
3 | ['A']
```

Next move:

```
1 | []
2 | ['C', 'H', 'E', 'D', 'B', 'F', 'G']
3 | ['A']
```

Next move:

```
1 | ['A']
2 | ['C', 'H', 'E', 'D', 'B', 'F', 'G']
3 | []
```

Next move:

```
1 | ['A']
2 | ['C', 'H', 'E', 'D', 'B', 'F']
3 | ['G']
```

Next move:

```
1 | ['A']
2 | ['C', 'H', 'E', 'D', 'B']
3 | ['G', 'F']
```

Next move:

```
1 | ['A', 'B']
2 | ['C', 'H', 'E', 'D']
3 | ['G', 'F']
```

Next move:

```
1 | ['A', 'B']
2 | ['C', 'H', 'E']
3 | ['G', 'F', 'D']
```

Next move:

```
1 | ['A', 'B']
2 | ['C', 'H']
3 | ['G', 'F', 'D', 'E']
```

Next move:

```
1 | ['A', 'B']
```

```
2 | ['C']
3 | ['G', 'F', 'D', 'E', 'H']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | []
3 | ['G', 'F', 'D', 'E', 'H']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['H']
3 | ['G', 'F', 'D', 'E']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['H', 'E']
3 | ['G', 'F', 'D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['H', 'E']
3 | ['G', 'F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H']
3 | ['G', 'F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H']
3 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 9 4

Initial State:

```
1 | ['D', 'B', 'I']
2 | ['E', 'A']
3 | ['H', 'F']
4 | ['G', 'C']
```

Iter= 1 Queue= 0 Depth= 0

Iter= 2 Queue= 11 Depth= 1

```
Iter= 3 Queue= 19 Depth= 2
Iter= 4 Queue= 27 Depth= 2
Iter= 5 Queue= 35 Depth= 3
Iter= 6 Queue= 40 Depth= 4
Iter= 7 Queue= 48 Depth= 5
Iter= 8 Queue= 56 Depth= 6
Iter= 9 Queue= 64 Depth= 7
Iter= 10 Queue= 72 Depth= 8
Iter= 11 Queue= 80 Depth= 9
Iter= 12 Queue= 85 Depth= 10
Iter= 13 Queue= 93 Depth= 11
Iter= 14 Queue= 101 Depth= 12
Iter= 15 Queue= 106 Depth= 13
Iter= 16 Queue= 108 Depth= 14
```

GOAL REACHED, SUCCESS!

Number of iterations are :16

Frontier size is :108

Run time (in seconds) :0.641999959946

Depth of goal state is 14

Initial State:

```
1 | ['D', 'B', 'I']
2 | ['E', 'A']
3 | ['H', 'F']
4 | ['G', 'C']
```

Solution path is:

Next move:

```
1 | ['D', 'B']
2 | ['E', 'A']
3 | ['H', 'F', 'I']
4 | ['G', 'C']
```

Next move:

```
1 | ['D']
2 | ['E', 'A']
3 | ['H', 'F', 'I', 'B']
4 | ['G', 'C']
```

Next move:

```
1 | []
2 | ['E', 'A']
3 | ['H', 'F', 'I', 'B', 'D']
4 | ['G', 'C']
```

Next move:

```
1 | ['A']
2 | ['E']
3 | ['H', 'F', 'I', 'B', 'D']
4 | ['G', 'C']
```

Next move:

```
1 | ['A']
2 | ['E', 'D']
3 | ['H', 'F', 'I', 'B']
4 | ['G', 'C']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'D']
3 | ['H', 'F', 'I']
4 | ['G', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E', 'D']
3 | ['H', 'F', 'I']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | ['H', 'F', 'I']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | ['H', 'F', 'I']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['I']
3 | ['H', 'F']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['I']
3 | ['H']
4 | ['G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['I']
3 | ['H']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['I']
3 | []
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | []
3 | []
4 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 9 5

Initial State:

```
1 | ['G', 'I']
2 | ['B', 'H']
3 | ['F', 'E']
4 | ['A', 'D']
5 | ['C']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 19  Depth= 1
Iter= 3  Queue= 34  Depth= 2
Iter= 4  Queue= 49  Depth= 2
Iter= 5  Queue= 63  Depth= 2
Iter= 6  Queue= 77  Depth= 3
Iter= 7  Queue= 88  Depth= 3
Iter= 8  Queue= 97  Depth= 3
Iter= 9  Queue= 106 Depth= 3
Iter= 10 Queue= 115 Depth= 3
Iter= 11 Queue= 126 Depth= 3
Iter= 12 Queue= 133 Depth= 3
Iter= 13 Queue= 140 Depth= 3
Iter= 14 Queue= 147 Depth= 3
Iter= 15 Queue= 158 Depth= 4
Iter= 16 Queue= 167 Depth= 5
Iter= 17 Queue= 182 Depth= 6
Iter= 18 Queue= 197 Depth= 7
Iter= 19 Queue= 208 Depth= 8
Iter= 20 Queue= 223 Depth= 9
Iter= 21 Queue= 233 Depth= 10
Iter= 22 Queue= 248 Depth= 11
Iter= 23 Queue= 263 Depth= 12
Iter= 24 Queue= 278 Depth= 13
Iter= 25 Queue= 289 Depth= 14
Iter= 26 Queue= 296 Depth= 15
Iter= 27 Queue= 299 Depth= 16
```

GOAL REACHED, SUCCESS!

Number of iterations are :27

Frontier size is :299

Run time (in seconds) :1.24199986458

Depth of goal state is 16

Initial State:

```
1 | ['G', 'I']
2 | ['B', 'H']
```

```
3 | ['F', 'E']
4 | ['A', 'D']
5 | ['C']
```

Solution path is:

Next move:

```
1 | ['G']
2 | ['B', 'H', 'I']
3 | ['F', 'E']
4 | ['A', 'D']
5 | ['C']
```

Next move:

```
1 | ['G']
2 | ['B', 'H', 'I']
3 | ['F', 'E', 'D']
4 | ['A']
5 | ['C']
```

Next move:

```
1 | []
2 | ['B', 'H', 'I']
3 | ['F', 'E', 'D', 'G']
4 | ['A']
5 | ['C']
```

Next move:

```
1 | ['A']
2 | ['B', 'H', 'I']
3 | ['F', 'E', 'D', 'G']
4 | []
5 | ['C']
```

Next move:

```
1 | ['A']
2 | ['B', 'H']
3 | ['F', 'E', 'D', 'G']
4 | ['I']
5 | ['C']
```

Next move:

```
1 | ['A']
2 | ['B']
3 | ['F', 'E', 'D', 'G', 'H']
4 | ['I']
5 | ['C']
```

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['F', 'E', 'D', 'G', 'H']
4 | ['I']
```

5 | ['C']

Next move:

1 | ['A', 'B']

2 | ['H']

3 | ['F', 'E', 'D', 'G']

4 | ['I']

5 | ['C']

Next move:

1 | ['A', 'B', 'C']

2 | ['H']

3 | ['F', 'E', 'D', 'G']

4 | ['I']

5 | []

Next move:

1 | ['A', 'B', 'C']

2 | ['H']

3 | ['F', 'E', 'D']

4 | ['I']

5 | ['G']

Next move:

1 | ['A', 'B', 'C', 'D']

2 | ['H']

3 | ['F', 'E']

4 | ['I']

5 | ['G']

Next move:

1 | ['A', 'B', 'C', 'D', 'E']

2 | ['H']

3 | ['F']

4 | ['I']

5 | ['G']

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F']

2 | ['H']

3 | []

4 | ['I']

5 | ['G']

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']

2 | ['H']

3 | []

4 | ['I']

5 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']


```
2 | []
3 | []
4 | ['I']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | []
3 | []
4 | []
5 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 10 5

Initial State:

```
1 | ['J', 'I']
2 | ['H', 'B']
3 | ['G', 'E']
4 | ['D', 'F']
5 | ['C', 'A']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 19  Depth= 1
Iter= 3  Queue= 34  Depth= 1
Iter= 4  Queue= 49  Depth= 1
Iter= 5  Queue= 64  Depth= 2
Iter= 6  Queue= 75  Depth= 3
Iter= 7  Queue= 90  Depth= 4
Iter= 8  Queue= 104  Depth= 5
Iter= 9  Queue= 119  Depth= 6
Iter= 10  Queue= 134  Depth= 7
Iter= 11  Queue= 145  Depth= 8
Iter= 12  Queue= 160  Depth= 8
Iter= 13  Queue= 170  Depth= 8
Iter= 14  Queue= 180  Depth= 9
Iter= 15  Queue= 194  Depth= 10
Iter= 16  Queue= 204  Depth= 11
Iter= 17  Queue= 219  Depth= 12
Iter= 18  Queue= 234  Depth= 13
Iter= 19  Queue= 245  Depth= 14
Iter= 20  Queue= 252  Depth= 15
Iter= 21  Queue= 263  Depth= 16
Iter= 22  Queue= 270  Depth= 17
Iter= 23  Queue= 273  Depth= 18
```

GOAL REACHED, SUCCESS!

Number of iterations are :23

Frontier size is :273

Run time (in seconds) :0.743000030518

Depth of goal state is 18

Initial State:

```
1 | ['J', 'I']
```

```
2 | ['H', 'B']
3 | ['G', 'E']
4 | ['D', 'F']
5 | ['C', 'A']
```

Solution path is:

Next move:

```
1 | ['J']
2 | ['H', 'B', 'I']
3 | ['G', 'E']
4 | ['D', 'F']
5 | ['C', 'A']
```

Next move:

```
1 | []
2 | ['H', 'B', 'I', 'J']
3 | ['G', 'E']
4 | ['D', 'F']
5 | ['C', 'A']
```

Next move:

```
1 | ['A']
2 | ['H', 'B', 'I', 'J']
3 | ['G', 'E']
4 | ['D', 'F']
5 | ['C']
```

Next move:

```
1 | ['A']
2 | ['H', 'B', 'I']
3 | ['G', 'E', 'J']
4 | ['D', 'F']
5 | ['C']
```

Next move:

```
1 | ['A']
2 | ['H', 'B']
3 | ['G', 'E', 'J', 'I']
4 | ['D', 'F']
5 | ['C']
```

Next move:

```
1 | ['A', 'B']
2 | ['H']
3 | ['G', 'E', 'J', 'I']
4 | ['D', 'F']
5 | ['C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['H']
3 | ['G', 'E', 'J', 'I']
```

```
4 | ['D', 'F']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['H']
3 | ['G', 'E', 'J', 'I']
4 | ['D']
5 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['H', 'I']
3 | ['G', 'E', 'J']
4 | ['D']
5 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['H', 'I']
3 | ['G', 'E', 'J']
4 | []
5 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['H', 'I']
3 | ['G', 'E']
4 | ['J']
5 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'I']
3 | ['G']
4 | ['J']
5 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'I']
3 | ['G']
4 | ['J']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H', 'I']
3 | []
4 | ['J']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H']
3 | ['I']
4 | ['J']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | ['I']
4 | ['J']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | []
3 | []
4 | ['J']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
2 | []
3 | []
4 | []
5 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 11 5
```

Initial State:

```
1 | ['F', 'I', 'B']
2 | ['G', 'K']
3 | ['E', 'H']
4 | ['C', 'J']
5 | ['D', 'A']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 19  Depth= 1
Iter= 3  Queue= 34  Depth= 2
Iter= 4  Queue= 49  Depth= 2
Iter= 5  Queue= 64  Depth= 2
Iter= 6  Queue= 79  Depth= 3
Iter= 7  Queue= 90  Depth= 4
Iter= 8  Queue= 105  Depth= 5
Iter= 9  Queue= 119  Depth= 6
Iter= 10  Queue= 134  Depth= 7
Iter= 11  Queue= 149  Depth= 8
Iter= 12  Queue= 164  Depth= 9
Iter= 13  Queue= 175  Depth= 10
Iter= 14  Queue= 190  Depth= 10
Iter= 15  Queue= 205  Depth= 10
Iter= 16  Queue= 215  Depth= 10
Iter= 17  Queue= 225  Depth= 10
```

```
Iter= 18 Queue= 234 Depth= 11
Iter= 19 Queue= 249 Depth= 11
Iter= 20 Queue= 264 Depth= 11
Iter= 21 Queue= 279 Depth= 11
Iter= 22 Queue= 294 Depth= 11
Iter= 23 Queue= 308 Depth= 11
Iter= 24 Queue= 323 Depth= 11
Iter= 25 Queue= 338 Depth= 12
Iter= 26 Queue= 348 Depth= 13
Iter= 27 Queue= 363 Depth= 14
Iter= 28 Queue= 374 Depth= 15
Iter= 29 Queue= 385 Depth= 16
Iter= 30 Queue= 400 Depth= 17
Iter= 31 Queue= 415 Depth= 18
Iter= 32 Queue= 426 Depth= 19
Iter= 33 Queue= 433 Depth= 20
Iter= 34 Queue= 436 Depth= 21
Iter= 35 Queue= 442 Depth= 22
Iter= 36 Queue= 445 Depth= 23
```

GOAL REACHED, SUCCESS!

Number of iterations are :36

Frontier size is :445

Run time (in seconds) :1.02100014687

Depth of goal state is 23

Initial State:

```
1 | ['F', 'I', 'B']
2 | ['G', 'K']
3 | ['E', 'H']
4 | ['C', 'J']
5 | ['D', 'A']
```

Solution path is:

Next move:

```
1 | ['F', 'I']
2 | ['G', 'K', 'B']
3 | ['E', 'H']
4 | ['C', 'J']
5 | ['D', 'A']
```

Next move:

```
1 | ['F']
2 | ['G', 'K', 'B', 'I']
3 | ['E', 'H']
4 | ['C', 'J']
5 | ['D', 'A']
```

Next move:

```
1 | []
2 | ['G', 'K', 'B', 'I', 'F']
3 | ['E', 'H']
```

```
4 | ['C', 'J']
5 | ['D', 'A']
```

Next move:

```
1 | ['A']
2 | ['G', 'K', 'B', 'I', 'F']
3 | ['E', 'H']
4 | ['C', 'J']
5 | ['D']
```

Next move:

```
1 | ['A']
2 | ['G', 'K', 'B', 'I']
3 | ['E', 'H', 'F']
4 | ['C', 'J']
5 | ['D']
```

Next move:

```
1 | ['A']
2 | ['G', 'K', 'B']
3 | ['E', 'H', 'F', 'I']
4 | ['C', 'J']
5 | ['D']
```

Next move:

```
1 | ['A', 'B']
2 | ['G', 'K']
3 | ['E', 'H', 'F', 'I']
4 | ['C', 'J']
5 | ['D']
```

Next move:

```
1 | ['A', 'B']
2 | ['G', 'K', 'J']
3 | ['E', 'H', 'F', 'I']
4 | ['C']
5 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G', 'K', 'J']
3 | ['E', 'H', 'F', 'I']
4 | []
5 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G', 'K', 'J']
3 | ['E', 'H', 'F']
4 | ['I']
5 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['G', 'K', 'J', 'F']
3 | ['E', 'H']
4 | ['I']
5 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['G', 'K', 'J', 'F']
3 | ['E', 'H']
4 | ['I']
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['G', 'K', 'J', 'F']
3 | ['E']
4 | ['I']
5 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['G', 'K', 'J', 'F']
3 | []
4 | ['I']
5 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['G', 'K', 'J']
3 | []
4 | ['I']
5 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['G', 'K']
3 | ['J']
4 | ['I']
5 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['G']
3 | ['J', 'K']
4 | ['I']
5 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | ['J', 'K']
4 | ['I']
```

```
5 | ['H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
```

```
2 | []
```

```
3 | ['J', 'K']
```

```
4 | ['I']
```

```
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
```

```
2 | []
```

```
3 | ['J', 'K']
```

```
4 | []
```

```
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
```

```
2 | ['K']
```

```
3 | ['J']
```

```
4 | []
```

```
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
```

```
2 | ['K']
```

```
3 | []
```

```
4 | []
```

```
5 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K']
```

```
2 | []
```

```
3 | []
```

```
4 | []
```

```
5 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 11 4
```

Initial State:

```
1 | ['K', 'H', 'B']
```

```
2 | ['E', 'F', 'C']
```

```
3 | ['G', 'I', 'J']
```

```
4 | ['D', 'A']
```

```
Iter= 1 Queue= 0 Depth= 0
```

```
Iter= 2 Queue= 11 Depth= 1
```

```
Iter= 3 Queue= 19 Depth= 2
```

```
Iter= 4 Queue= 27 Depth= 2
```

```
Iter= 5 Queue= 35 Depth= 3
```

```
Iter= 6 Queue= 40 Depth= 4
```

```
Iter= 7 Queue= 48 Depth= 5
```

```
Iter= 8 Queue= 55 Depth= 6
```



```
Iter= 9  Queue= 63  Depth= 7
Iter= 10  Queue= 71  Depth= 8
Iter= 11  Queue= 79  Depth= 9
Iter= 12  Queue= 84  Depth= 10
Iter= 13  Queue= 92  Depth= 11
Iter= 14  Queue= 97  Depth= 12
Iter= 15  Queue= 105  Depth= 12
Iter= 16  Queue= 110  Depth= 13
Iter= 17  Queue= 118  Depth= 13
Iter= 18  Queue= 126  Depth= 12
Iter= 19  Queue= 127  Depth= 13
Iter= 20  Queue= 132  Depth= 13
Iter= 21  Queue= 136  Depth= 14
Iter= 22  Queue= 144  Depth= 15
Iter= 23  Queue= 148  Depth= 16
Iter= 24  Queue= 156  Depth= 16
Iter= 25  Queue= 160  Depth= 17
Iter= 26  Queue= 168  Depth= 18
Iter= 27  Queue= 172  Depth= 19
Iter= 28  Queue= 180  Depth= 20
Iter= 29  Queue= 185  Depth= 21
Iter= 30  Queue= 193  Depth= 22
Iter= 31  Queue= 198  Depth= 23
Iter= 32  Queue= 200  Depth= 24
```

GOAL REACHED, SUCCESS!

Number of iterations are :32

Frontier size is :200

Run time (in seconds) :0.9359998703

Depth of goal state is 24

Initial State:

```
1 | ['K', 'H', 'B']
2 | ['E', 'F', 'C']
3 | ['G', 'I', 'J']
4 | ['D', 'A']
```

Solution path is:

Next move:

```
1 | ['K', 'H']
2 | ['E', 'F', 'C', 'B']
3 | ['G', 'I', 'J']
4 | ['D', 'A']
```

Next move:

```
1 | ['K']
2 | ['E', 'F', 'C', 'B', 'H']
3 | ['G', 'I', 'J']
4 | ['D', 'A']
```

Next move:

```
1 | []
```

```
2 | ['E', 'F', 'C', 'B', 'H', 'K']
3 | ['G', 'I', 'J']
4 | ['D', 'A']
```

Next move:

```
1 | ['A']
2 | ['E', 'F', 'C', 'B', 'H', 'K']
3 | ['G', 'I', 'J']
4 | ['D']
```

Next move:

```
1 | ['A']
2 | ['E', 'F', 'C', 'B', 'H']
3 | ['G', 'I', 'J', 'K']
4 | ['D']
```

Next move:

```
1 | ['A']
2 | ['E', 'F', 'C', 'B']
3 | ['G', 'I', 'J', 'K', 'H']
4 | ['D']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'F', 'C']
3 | ['G', 'I', 'J', 'K', 'H']
4 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E', 'F']
3 | ['G', 'I', 'J', 'K', 'H']
4 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E', 'F']
3 | ['G', 'I', 'J', 'K', 'H']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | ['G', 'I', 'J', 'K', 'H']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | ['G', 'I', 'J', 'K', 'H']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H']
3 | ['G', 'I', 'J', 'K']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'K']
3 | ['G', 'I', 'J']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'K', 'J']
3 | ['G', 'I']
4 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'K', 'J']
3 | ['G', 'I']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'K', 'J']
3 | ['G']
4 | ['I']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'K']
3 | ['G']
4 | ['I', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H', 'K']
3 | []
4 | ['I', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H']
3 | ['K']
4 | ['I', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | ['K']
4 | ['I', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['J']
3 | ['K']
4 | ['I']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | ['J']
3 | ['K']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
2 | []
3 | ['K']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K']
2 | []
3 | []
4 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 12 3

Initial State:

```
1 | ['J', 'B', 'A', 'G']
2 | ['E', 'C', 'D', 'H']
3 | ['F', 'I', 'K', 'L']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 5  Depth= 1
Iter= 3  Queue= 8  Depth= 1
Iter= 4  Queue= 11  Depth= 2
Iter= 5  Queue= 14  Depth= 3
Iter= 6  Queue= 17  Depth= 4
Iter= 7  Queue= 18  Depth= 5
Iter= 8  Queue= 21  Depth= 6
Iter= 9  Queue= 24  Depth= 7
Iter= 10  Queue= 27  Depth= 6
Iter= 11  Queue= 30  Depth= 7
Iter= 12  Queue= 33  Depth= 8
Iter= 13  Queue= 36  Depth= 9
Iter= 14  Queue= 39  Depth= 10
Iter= 15  Queue= 42  Depth= 11
Iter= 16  Queue= 45  Depth= 12
Iter= 17  Queue= 48  Depth= 13
Iter= 18  Queue= 49  Depth= 13
Iter= 19  Queue= 52  Depth= 13
Iter= 20  Queue= 55  Depth= 12
Iter= 21  Queue= 58  Depth= 14
Iter= 22  Queue= 59  Depth= 14
```

Iter=	23	Queue=	60	Depth=	15
Iter=	24	Queue=	63	Depth=	16
Iter=	25	Queue=	66	Depth=	15
Iter=	26	Queue=	69	Depth=	14
Iter=	27	Queue=	72	Depth=	14
Iter=	28	Queue=	75	Depth=	15
Iter=	29	Queue=	78	Depth=	16
Iter=	30	Queue=	81	Depth=	14
Iter=	31	Queue=	83	Depth=	15
Iter=	32	Queue=	84	Depth=	14
Iter=	33	Queue=	87	Depth=	15
Iter=	34	Queue=	88	Depth=	16
Iter=	35	Queue=	91	Depth=	17
Iter=	36	Queue=	94	Depth=	16
Iter=	37	Queue=	96	Depth=	17
Iter=	38	Queue=	99	Depth=	16
Iter=	39	Queue=	102	Depth=	17
Iter=	40	Queue=	103	Depth=	18
Iter=	41	Queue=	105	Depth=	18
Iter=	42	Queue=	108	Depth=	14
Iter=	43	Queue=	111	Depth=	14
Iter=	44	Queue=	114	Depth=	14
Iter=	45	Queue=	117	Depth=	17
Iter=	46	Queue=	120	Depth=	17
Iter=	47	Queue=	123	Depth=	15
Iter=	48	Queue=	126	Depth=	15
Iter=	49	Queue=	129	Depth=	16
Iter=	50	Queue=	129	Depth=	16
Iter=	51	Queue=	128	Depth=	17
Iter=	52	Queue=	131	Depth=	17
Iter=	53	Queue=	134	Depth=	17
Iter=	54	Queue=	137	Depth=	18
Iter=	55	Queue=	140	Depth=	17
Iter=	56	Queue=	143	Depth=	18
Iter=	57	Queue=	146	Depth=	17
Iter=	58	Queue=	149	Depth=	17
Iter=	59	Queue=	150	Depth=	19
Iter=	60	Queue=	153	Depth=	19
Iter=	61	Queue=	156	Depth=	12
Iter=	62	Queue=	156	Depth=	12
Iter=	63	Queue=	157	Depth=	14
Iter=	64	Queue=	158	Depth=	13
Iter=	65	Queue=	160	Depth=	13
Iter=	66	Queue=	163	Depth=	15
Iter=	67	Queue=	164	Depth=	16
Iter=	68	Queue=	167	Depth=	15
Iter=	69	Queue=	168	Depth=	15
Iter=	70	Queue=	167	Depth=	15
Iter=	71	Queue=	170	Depth=	15
Iter=	72	Queue=	173	Depth=	18
Iter=	73	Queue=	174	Depth=	19
Iter=	74	Queue=	177	Depth=	17
Iter=	75	Queue=	178	Depth=	18

Iter=	76	Queue=	181	Depth=	18
Iter=	77	Queue=	184	Depth=	19
Iter=	78	Queue=	186	Depth=	20
Iter=	79	Queue=	189	Depth=	21
Iter=	80	Queue=	192	Depth=	22
Iter=	81	Queue=	195	Depth=	22
Iter=	82	Queue=	198	Depth=	23
Iter=	83	Queue=	199	Depth=	18
Iter=	84	Queue=	202	Depth=	19
Iter=	85	Queue=	205	Depth=	18
Iter=	86	Queue=	208	Depth=	19
Iter=	87	Queue=	211	Depth=	20
Iter=	88	Queue=	213	Depth=	21
Iter=	89	Queue=	216	Depth=	22
Iter=	90	Queue=	219	Depth=	22
Iter=	91	Queue=	222	Depth=	23
Iter=	92	Queue=	223	Depth=	18
Iter=	93	Queue=	226	Depth=	18
Iter=	94	Queue=	229	Depth=	13
Iter=	95	Queue=	230	Depth=	16
Iter=	96	Queue=	233	Depth=	17
Iter=	97	Queue=	236	Depth=	17
Iter=	98	Queue=	238	Depth=	16
Iter=	99	Queue=	241	Depth=	20
Iter=	100	Queue=	244	Depth=	21
Iter=	101	Queue=	247	Depth=	22
Iter=	102	Queue=	250	Depth=	23
Iter=	103	Queue=	253	Depth=	20
Iter=	104	Queue=	256	Depth=	20
Iter=	105	Queue=	259	Depth=	21
Iter=	106	Queue=	262	Depth=	22
Iter=	107	Queue=	265	Depth=	23
Iter=	108	Queue=	268	Depth=	18
Iter=	109	Queue=	271	Depth=	19
Iter=	110	Queue=	274	Depth=	18
Iter=	111	Queue=	276	Depth=	19
Iter=	112	Queue=	279	Depth=	18
Iter=	113	Queue=	282	Depth=	18
Iter=	114	Queue=	284	Depth=	19
Iter=	115	Queue=	287	Depth=	18
Iter=	116	Queue=	290	Depth=	19
Iter=	117	Queue=	293	Depth=	23
Iter=	118	Queue=	295	Depth=	24
Iter=	119	Queue=	296	Depth=	23
Iter=	120	Queue=	298	Depth=	24
Iter=	121	Queue=	299	Depth=	20
Iter=	122	Queue=	302	Depth=	20
Iter=	123	Queue=	305	Depth=	20
Iter=	124	Queue=	308	Depth=	20
Iter=	125	Queue=	311	Depth=	11
Iter=	126	Queue=	314	Depth=	13
Iter=	127	Queue=	314	Depth=	14
Iter=	128	Queue=	314	Depth=	15

```
Iter= 129 Queue= 315 Depth= 16
Iter= 130 Queue= 318 Depth= 17
Iter= 131 Queue= 321 Depth= 18
Iter= 132 Queue= 324 Depth= 19
Iter= 133 Queue= 327 Depth= 19
Iter= 134 Queue= 330 Depth= 20
Iter= 135 Queue= 331 Depth= 17
Iter= 136 Queue= 334 Depth= 17
Iter= 137 Queue= 337 Depth= 18
Iter= 138 Queue= 340 Depth= 19
Iter= 139 Queue= 343 Depth= 20
Iter= 140 Queue= 346 Depth= 20
Iter= 141 Queue= 347 Depth= 21
Iter= 142 Queue= 350 Depth= 22
Iter= 143 Queue= 353 Depth= 23
Iter= 144 Queue= 356 Depth= 24
Iter= 145 Queue= 359 Depth= 25
Iter= 146 Queue= 362 Depth= 25
Iter= 147 Queue= 365 Depth= 26
Iter= 148 Queue= 366 Depth= 26
Iter= 149 Queue= 367 Depth= 27
Iter= 150 Queue= 370 Depth= 28
Iter= 151 Queue= 373 Depth= 29
Iter= 152 Queue= 376 Depth= 30
Iter= 153 Queue= 377 Depth= 31
Iter= 154 Queue= 380 Depth= 32
Iter= 155 Queue= 383 Depth= 33
Iter= 156 Queue= 384 Depth= 34
Iter= 157 Queue= 387 Depth= 35
Iter= 158 Queue= 388 Depth= 36
```

GOAL REACHED, SUCCESS!

Number of iterations are :158

Frontier size is :388

Run time (in seconds) :0.583999872208

Depth of goal state is 36

Initial State:

```
1 | ['J', 'B', 'A', 'G']
2 | ['E', 'C', 'D', 'H']
3 | ['F', 'I', 'K', 'L']
```

Solution path is:

Next move:

```
1 | ['J', 'B', 'A']
2 | ['E', 'C', 'D', 'H']
3 | ['F', 'I', 'K', 'L', 'G']
```

Next move:

```
1 | ['J', 'B']
2 | ['E', 'C', 'D', 'H', 'A']
3 | ['F', 'I', 'K', 'L', 'G']
```

Next move:

```
1 | ['J']
2 | ['E', 'C', 'D', 'H', 'A']
3 | ['F', 'I', 'K', 'L', 'G', 'B']
```

Next move:

```
1 | []
2 | ['E', 'C', 'D', 'H', 'A']
3 | ['F', 'I', 'K', 'L', 'G', 'B', 'J']
```

Next move:

```
1 | ['A']
2 | ['E', 'C', 'D', 'H']
3 | ['F', 'I', 'K', 'L', 'G', 'B', 'J']
```

Next move:

```
1 | ['A']
2 | ['E', 'C', 'D', 'H', 'J']
3 | ['F', 'I', 'K', 'L', 'G', 'B']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'C', 'D', 'H', 'J']
3 | ['F', 'I', 'K', 'L', 'G']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'C', 'D', 'H']
3 | ['F', 'I', 'K', 'L', 'G', 'J']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'C', 'D']
3 | ['F', 'I', 'K', 'L', 'G', 'J', 'H']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'C']
3 | ['F', 'I', 'K', 'L', 'G', 'J', 'H', 'D']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E']
3 | ['F', 'I', 'K', 'L', 'G', 'J', 'H', 'D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | ['F', 'I', 'K', 'L', 'G', 'J', 'H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
```



```
2 | []
3 | ['F', 'I', 'K', 'L', 'G', 'J', 'H']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H']
3 | ['F', 'I', 'K', 'L', 'G', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'J']
3 | ['F', 'I', 'K', 'L', 'G']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'J', 'G']
3 | ['F', 'I', 'K', 'L']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'J', 'G', 'L']
3 | ['F', 'I', 'K']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'J', 'G', 'L', 'K']
3 | ['F', 'I']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['H', 'J', 'G', 'L', 'K', 'I']
3 | ['F']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'J', 'G', 'L', 'K', 'I']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'J', 'G', 'L', 'K']
3 | ['I']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'J', 'G', 'L']
3 | ['I', 'K']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['H', 'J', 'G']
3 | ['I', 'K', 'L']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H', 'J']
3 | ['I', 'K', 'L']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['H']
3 | ['I', 'K', 'L', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | ['I', 'K', 'L', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['J']
3 | ['I', 'K', 'L']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['J', 'L']
3 | ['I', 'K']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['J', 'L', 'K']
3 | ['I']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | ['J', 'L', 'K']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | ['J', 'L']
3 | ['K']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | ['J']
3 | ['K', 'L']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
2 | []
3 | ['K', 'L']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
2 | ['L']
```

```
3 | ['K']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K']
```

```
2 | ['L']
```

```
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L']
```

```
2 | []
```

```
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 14 6
```

Initial State:

```
1 | ['A', 'F', 'C']
```

```
2 | ['M', 'D', 'G']
```

```
3 | ['B', 'I']
```

```
4 | ['E', 'K']
```

```
5 | ['L', 'H']
```

```
6 | ['N', 'J']
```

```
Iter= 1 Queue= 0 Depth= 0
```

```
Iter= 2 Queue= 29 Depth= 1
```

```
Iter= 3 Queue= 53 Depth= 2
```

```
Iter= 4 Queue= 77 Depth= 3
```

```
Iter= 5 Queue= 101 Depth= 3
```

```
Iter= 6 Queue= 124 Depth= 4
```

```
Iter= 7 Queue= 142 Depth= 5
```

```
Iter= 8 Queue= 166 Depth= 6
```

```
Iter= 9 Queue= 190 Depth= 7
```

```
Iter= 10 Queue= 214 Depth= 7
```

```
Iter= 11 Queue= 238 Depth= 7
```

```
Iter= 12 Queue= 262 Depth= 7
```

```
Iter= 13 Queue= 286 Depth= 8
```

```
Iter= 14 Queue= 307 Depth= 9
```

```
Iter= 15 Queue= 331 Depth= 10
```

```
Iter= 16 Queue= 355 Depth= 11
```

```
Iter= 17 Queue= 374 Depth= 12
```

```
Iter= 18 Queue= 398 Depth= 13
```

```
Iter= 19 Queue= 417 Depth= 14
```

```
Iter= 20 Queue= 431 Depth= 15
```

```
Iter= 21 Queue= 445 Depth= 16
```

```
Iter= 22 Queue= 463 Depth= 17
```

```
Iter= 23 Queue= 482 Depth= 18
```

```
Iter= 24 Queue= 501 Depth= 19
```

```
Iter= 25 Queue= 515 Depth= 20
```

```
Iter= 26 Queue= 524 Depth= 21
```

```
Iter= 27 Queue= 528 Depth= 22
```

GOAL REACHED, SUCCESS!

Number of iterations are :27

Frontier size is :528

Run time (in seconds) :0.290999889374
Depth of goal state is 22

Initial State:

```
1 | ['A', 'F', 'C']
2 | ['M', 'D', 'G']
3 | ['B', 'I']
4 | ['E', 'K']
5 | ['L', 'H']
6 | ['N', 'J']
```

Solution path is:

Next move:

```
1 | ['A', 'F']
2 | ['M', 'D', 'G', 'C']
3 | ['B', 'I']
4 | ['E', 'K']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A']
2 | ['M', 'D', 'G', 'C', 'F']
3 | ['B', 'I']
4 | ['E', 'K']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A']
2 | ['M', 'D', 'G', 'C', 'F']
3 | ['B']
4 | ['E', 'K', 'I']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B']
2 | ['M', 'D', 'G', 'C', 'F']
3 | []
4 | ['E', 'K', 'I']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B']
2 | ['M', 'D', 'G', 'C']
3 | ['F']
4 | ['E', 'K', 'I']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['M', 'D', 'G']
3 | ['F']
4 | ['E', 'K', 'I']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['M', 'D']
3 | ['F', 'G']
4 | ['E', 'K', 'I']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['M']
3 | ['F', 'G']
4 | ['E', 'K', 'I']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['M', 'I']
3 | ['F', 'G']
4 | ['E', 'K']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['M', 'I', 'K']
3 | ['F', 'G']
4 | ['E']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['M', 'I', 'K']
3 | ['F', 'G']
4 | []
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['M', 'I', 'K']
3 | ['F']
4 | ['G']
```

```
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['M', 'I', 'K']
3 | []
4 | ['G']
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['M', 'I', 'K']
3 | []
4 | []
5 | ['L', 'H']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['M', 'I', 'K']
3 | []
4 | []
5 | ['L']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['M', 'I']
3 | ['K']
4 | []
5 | ['L']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | ['M']
3 | ['K']
4 | []
5 | ['L']
6 | ['N', 'J']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
2 | ['M']
3 | ['K']
4 | []
5 | ['L']
6 | ['N']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K']
```

```
2 | ['M']
3 | []
4 | []
5 | ['L']
6 | ['N']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L']
2 | ['M']
3 | []
4 | []
5 | []
6 | ['N']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M']
2 | []
3 | []
4 | []
5 | []
6 | ['N']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N']
2 | []
3 | []
4 | []
5 | []
6 | []
```

```
5 | []
6 | ['O']
7 | ['M']
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M']
2 | []
3 | []
4 | ['N']
5 | []
6 | ['O']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N']
2 | []
3 | []
4 | []
5 | []
6 | ['O']
```

```
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N',
'O']
2 | []
3 | []
4 | []
5 | []
6 | []
7 | []
8 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 16 8
```

Initial State:

```
1 | ['L', 'J']
2 | ['P', 'O']
3 | ['G', 'E']
4 | ['D', 'A']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['B', 'H']
8 | ['C', 'F']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 55  Depth= 1
Iter= 3  Queue= 103  Depth= 1
Iter= 4  Queue= 151  Depth= 1
Iter= 5  Queue= 199  Depth= 1
Iter= 6  Queue= 247  Depth= 1
Iter= 7  Queue= 295  Depth= 1
Iter= 8  Queue= 343  Depth= 2
Iter= 9  Queue= 384  Depth= 3
Iter= 10  Queue= 432  Depth= 4
Iter= 11  Queue= 479  Depth= 5
Iter= 12  Queue= 520  Depth= 6
Iter= 13  Queue= 568  Depth= 7
Iter= 14  Queue= 609  Depth= 8
Iter= 15  Queue= 643  Depth= 9
Iter= 16  Queue= 677  Depth= 10
Iter= 17  Queue= 704  Depth= 11
Iter= 18  Queue= 724  Depth= 12
Iter= 19  Queue= 744  Depth= 13
Iter= 20  Queue= 770  Depth= 14
Iter= 21  Queue= 790  Depth= 15
Iter= 22  Queue= 809  Depth= 16
Iter= 23  Queue= 829  Depth= 17
Iter= 24  Queue= 849  Depth= 18
Iter= 25  Queue= 862  Depth= 19
Iter= 26  Queue= 875  Depth= 20
Iter= 27  Queue= 888  Depth= 21
```


Iter= 28 Queue= 894 Depth= 22
Iter= 29 Queue= 900 Depth= 23

GOAL REACHED, SUCCESS!
Number of iterations are :29
Frontier size is :900
Run time (in seconds) :0.460000038147
Depth of goal state is 23

Initial State:

1 | ['L', 'J']
2 | ['P', 'O']
3 | ['G', 'E']
4 | ['D', 'A']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['B', 'H']
8 | ['C', 'F']

Solution path is:

Next move:

1 | ['L']
2 | ['P', 'O', 'J']
3 | ['G', 'E']
4 | ['D', 'A']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['B', 'H']
8 | ['C', 'F']

Next move:

1 | []
2 | ['P', 'O', 'J', 'L']
3 | ['G', 'E']
4 | ['D', 'A']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['B', 'H']
8 | ['C', 'F']

Next move:

1 | ['A']
2 | ['P', 'O', 'J', 'L']
3 | ['G', 'E']
4 | ['D']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['B', 'H']
8 | ['C', 'F']

Next move:

1 | ['A']

```
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G', 'E']
4 | ['D']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['B']
8 | ['C', 'F']
```

Next move:

```
1 | ['A', 'B']
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G', 'E']
4 | ['D']
5 | ['K', 'M']
6 | ['I', 'N']
7 | []
8 | ['C', 'F']
```

Next move:

```
1 | ['A', 'B']
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G', 'E']
4 | ['D']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['F']
8 | ['C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G', 'E']
4 | ['D']
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['F']
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G', 'E']
4 | []
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['F']
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G']
4 | []
```

```
5 | ['K', 'M']
6 | ['I', 'N']
7 | ['F']
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['P', 'O', 'J', 'L', 'H']
3 | ['G']
4 | []
5 | ['K', 'M']
6 | ['I', 'N']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['P', 'O', 'J', 'L', 'H']
3 | []
4 | []
5 | ['K', 'M']
6 | ['I', 'N']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['P', 'O', 'J', 'L']
3 | []
4 | []
5 | ['K', 'M']
6 | ['I', 'N']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['P', 'O', 'J', 'L']
3 | ['N']
4 | []
5 | ['K', 'M']
6 | ['I']
7 | []
8 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | ['P', 'O', 'J', 'L']
3 | ['N']
4 | []
5 | ['K', 'M']
6 | []
7 | []
```

8 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']

2 | ['P', 'O', 'J']

3 | ['N', 'L']

4 | []

5 | ['K', 'M']

6 | []

7 | []

8 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']

2 | ['P', 'O']

3 | ['N', 'L']

4 | []

5 | ['K', 'M']

6 | []

7 | []

8 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']

2 | ['P', 'O', 'M']

3 | ['N', 'L']

4 | []

5 | ['K']

6 | []

7 | []

8 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K']

2 | ['P', 'O', 'M']

3 | ['N', 'L']

4 | []

5 | []

6 | []

7 | []

8 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L']

2 | ['P', 'O', 'M']

3 | ['N']

4 | []

5 | []

6 | []

7 | []

8 | []

Next move:

```

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M']
2 | ['P', 'O']
3 | ['N']
4 | []
5 | []
6 | []
7 | []
8 | []

```

Next move:

```

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N']
2 | ['P', 'O']
3 | []
4 | []
5 | []
6 | []
7 | []
8 | []

```

Next move:

```

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N',
'O']
2 | ['P']
3 | []
4 | []
5 | []
6 | []
7 | []
8 | []

```

Next move:

```

1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N',
'O', 'P']
2 | []
3 | []
4 | []
5 | []
6 | []
7 | []
8 | []

```

Heuristic no. 2: Explanation in ‘Heuristics_Development.pdf’ file

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

```
Initial State:
```

```
1 | ['C', 'E']
```

```
2 | ['B', 'D']
```

```
3 | ['A']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 5  Depth= 1
Iter= 3  Queue= 8  Depth= 1
Iter= 4  Queue= 11  Depth= 2
Iter= 5  Queue= 12  Depth= 2
Iter= 6  Queue= 13  Depth= 2
Iter= 7  Queue= 14  Depth= 2
Iter= 8  Queue= 15  Depth= 3
Iter= 9  Queue= 16  Depth= 1
Iter= 10  Queue= 19  Depth= 1
Iter= 11  Queue= 20  Depth= 2
Iter= 12  Queue= 23  Depth= 2
Iter= 13  Queue= 24  Depth= 3
Iter= 14  Queue= 25  Depth= 3
Iter= 15  Queue= 26  Depth= 3
Iter= 16  Queue= 25  Depth= 3
Iter= 17  Queue= 26  Depth= 4
Iter= 18  Queue= 28  Depth= 2
Iter= 19  Queue= 31  Depth= 2
Iter= 20  Queue= 34  Depth= 2
Iter= 21  Queue= 35  Depth= 2
Iter= 22  Queue= 38  Depth= 3
Iter= 23  Queue= 39  Depth= 3
Iter= 24  Queue= 40  Depth= 3
Iter= 25  Queue= 39  Depth= 3
Iter= 26  Queue= 38  Depth= 4
Iter= 27  Queue= 39  Depth= 3
Iter= 28  Queue= 40  Depth= 3
Iter= 29  Queue= 41  Depth= 3
Iter= 30  Queue= 42  Depth= 3
Iter= 31  Queue= 43  Depth= 3
Iter= 32  Queue= 42  Depth= 3
Iter= 33  Queue= 43  Depth= 3
Iter= 34  Queue= 44  Depth= 3
Iter= 35  Queue= 45  Depth= 4
Iter= 36  Queue= 47  Depth= 1
Iter= 37  Queue= 50  Depth= 1
Iter= 38  Queue= 51  Depth= 2
Iter= 39  Queue= 53  Depth= 2
Iter= 40  Queue= 53  Depth= 3
Iter= 41  Queue= 55  Depth= 3
Iter= 42  Queue= 57  Depth= 3
Iter= 43  Queue= 58  Depth= 4
Iter= 44  Queue= 58  Depth= 2
Iter= 45  Queue= 59  Depth= 3
```

Iter=	46	Queue=	60	Depth=	4
Iter=	47	Queue=	59	Depth=	4
Iter=	48	Queue=	58	Depth=	4
Iter=	49	Queue=	59	Depth=	5
Iter=	50	Queue=	61	Depth=	3
Iter=	51	Queue=	64	Depth=	3
Iter=	52	Queue=	65	Depth=	3
Iter=	53	Queue=	68	Depth=	4
Iter=	54	Queue=	69	Depth=	4
Iter=	55	Queue=	68	Depth=	4
Iter=	56	Queue=	69	Depth=	5
Iter=	57	Queue=	69	Depth=	4
Iter=	58	Queue=	70	Depth=	4
Iter=	59	Queue=	71	Depth=	4
Iter=	60	Queue=	72	Depth=	4
Iter=	61	Queue=	71	Depth=	4
Iter=	62	Queue=	70	Depth=	4
Iter=	63	Queue=	69	Depth=	4
Iter=	64	Queue=	70	Depth=	5
Iter=	65	Queue=	73	Depth=	3
Iter=	66	Queue=	76	Depth=	3
Iter=	67	Queue=	77	Depth=	4
Iter=	68	Queue=	78	Depth=	4
Iter=	69	Queue=	77	Depth=	4
Iter=	70	Queue=	78	Depth=	5
Iter=	71	Queue=	79	Depth=	4
Iter=	72	Queue=	80	Depth=	4
Iter=	73	Queue=	81	Depth=	4
Iter=	74	Queue=	80	Depth=	4
Iter=	75	Queue=	79	Depth=	4
Iter=	76	Queue=	80	Depth=	5
Iter=	77	Queue=	81	Depth=	6
Iter=	78	Queue=	82	Depth=	4
Iter=	79	Queue=	83	Depth=	4
Iter=	80	Queue=	84	Depth=	4
Iter=	81	Queue=	85	Depth=	4
Iter=	82	Queue=	84	Depth=	2
Iter=	83	Queue=	85	Depth=	3
Iter=	84	Queue=	86	Depth=	5
Iter=	85	Queue=	85	Depth=	4
Iter=	86	Queue=	86	Depth=	4
Iter=	87	Queue=	88	Depth=	5
Iter=	88	Queue=	88	Depth=	5
Iter=	89	Queue=	89	Depth=	3
Iter=	90	Queue=	90	Depth=	3
Iter=	91	Queue=	90	Depth=	3
Iter=	92	Queue=	91	Depth=	4
Iter=	93	Queue=	91	Depth=	4
Iter=	94	Queue=	91	Depth=	6
Iter=	95	Queue=	94	Depth=	4
Iter=	96	Queue=	96	Depth=	4
Iter=	97	Queue=	98	Depth=	4
Iter=	98	Queue=	98	Depth=	4

Iter= 99	Queue= 98	Depth= 4
Iter= 100	Queue= 99	Depth= 4
Iter= 101	Queue= 98	Depth= 5
Iter= 102	Queue= 101	Depth= 5
Iter= 103	Queue= 102	Depth= 2
Iter= 104	Queue= 103	Depth= 2
Iter= 105	Queue= 104	Depth= 2
Iter= 106	Queue= 106	Depth= 3
Iter= 107	Queue= 107	Depth= 4
Iter= 108	Queue= 107	Depth= 4
Iter= 109	Queue= 108	Depth= 4
Iter= 110	Queue= 110	Depth= 5
Iter= 111	Queue= 111	Depth= 6
Iter= 112	Queue= 114	Depth= 4
Iter= 113	Queue= 115	Depth= 5
Iter= 114	Queue= 114	Depth= 4
Iter= 115	Queue= 117	Depth= 5
Iter= 116	Queue= 118	Depth= 5
Iter= 117	Queue= 119	Depth= 5
Iter= 118	Queue= 120	Depth= 5
Iter= 119	Queue= 121	Depth= 5
Iter= 120	Queue= 120	Depth= 5
Iter= 121	Queue= 119	Depth= 5
Iter= 122	Queue= 120	Depth= 6
Iter= 123	Queue= 121	Depth= 5
Iter= 124	Queue= 122	Depth= 6
Iter= 125	Queue= 123	Depth= 4
Iter= 126	Queue= 126	Depth= 5
Iter= 127	Queue= 127	Depth= 5
Iter= 128	Queue= 126	Depth= 6
Iter= 129	Queue= 128	Depth= 5
Iter= 130	Queue= 127	Depth= 5
Iter= 131	Queue= 128	Depth= 5
Iter= 132	Queue= 129	Depth= 7
Iter= 133	Queue= 132	Depth= 5
Iter= 134	Queue= 133	Depth= 5
Iter= 135	Queue= 132	Depth= 5
Iter= 136	Queue= 133	Depth= 3
Iter= 137	Queue= 135	Depth= 3
Iter= 138	Queue= 136	Depth= 3
Iter= 139	Queue= 137	Depth= 3
Iter= 140	Queue= 138	Depth= 3
Iter= 141	Queue= 141	Depth= 4
Iter= 142	Queue= 143	Depth= 4
Iter= 143	Queue= 144	Depth= 5
Iter= 144	Queue= 143	Depth= 5
Iter= 145	Queue= 143	Depth= 5
Iter= 146	Queue= 142	Depth= 5
Iter= 147	Queue= 143	Depth= 7
Iter= 148	Queue= 144	Depth= 5
Iter= 149	Queue= 143	Depth= 5
Iter= 150	Queue= 142	Depth= 6
Iter= 151	Queue= 143	Depth= 5


```
Iter= 152 Queue= 144 Depth= 5
Iter= 153 Queue= 145 Depth= 8
Iter= 154 Queue= 148 Depth= 4
Iter= 155 Queue= 151 Depth= 4
Iter= 156 Queue= 154 Depth= 4
Iter= 157 Queue= 157 Depth= 4
Iter= 158 Queue= 158 Depth= 4
Iter= 159 Queue= 159 Depth= 4
Iter= 160 Queue= 162 Depth= 4
Iter= 161 Queue= 165 Depth= 4
Iter= 162 Queue= 168 Depth= 4
Iter= 163 Queue= 170 Depth= 4
Iter= 164 Queue= 173 Depth= 5
Iter= 165 Queue= 174 Depth= 5
Iter= 166 Queue= 175 Depth= 5
Iter= 167 Queue= 176 Depth= 5
Iter= 168 Queue= 175 Depth= 9
Iter= 169 Queue= 176 Depth= 10
```

GOAL REACHED, SUCCESS!

Number of iterations are :169

Frontier size is :176

Run time (in seconds) :0.798000097275

Depth of goal state is 10

Initial State:

```
1 | ['C', 'E']
2 | ['B', 'D']
3 | ['A']
```

Solution path is:

Next move:

```
1 | ['C', 'E']
2 | ['B', 'D', 'A']
3 | []
```

Next move:

```
1 | ['C']
2 | ['B', 'D', 'A']
3 | ['E']
```

Next move:

```
1 | []
2 | ['B', 'D', 'A']
3 | ['E', 'C']
```

Next move:

```
1 | ['A']
2 | ['B', 'D']
3 | ['E', 'C']
```

Next move:

```
1 | ['A']
2 | ['B']
3 | ['E', 'C', 'D']
```

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['E', 'C', 'D']
```

Next move:

```
1 | ['A', 'B']
2 | ['D']
3 | ['E', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D']
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

Initial State:

```
1 | ['B', 'D']
2 | ['A', 'E']
3 | ['C']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 5  Depth= 1
Iter= 3  Queue= 8  Depth= 1
Iter= 4  Queue= 11  Depth= 2
Iter= 5  Queue= 12  Depth= 2
Iter= 6  Queue= 13  Depth= 2
Iter= 7  Queue= 14  Depth= 2
Iter= 8  Queue= 15  Depth= 1
Iter= 9  Queue= 18  Depth= 1
Iter= 10  Queue= 19  Depth= 2
Iter= 11  Queue= 22  Depth= 2
Iter= 12  Queue= 23  Depth= 3
Iter= 13  Queue= 24  Depth= 3
Iter= 14  Queue= 25  Depth= 3
Iter= 15  Queue= 24  Depth= 3
Iter= 16  Queue= 25  Depth= 2
Iter= 17  Queue= 28  Depth= 2
```

Iter= 18	Queue= 31	Depth= 2
Iter= 19	Queue= 32	Depth= 2
Iter= 20	Queue= 35	Depth= 3
Iter= 21	Queue= 36	Depth= 3
Iter= 22	Queue= 37	Depth= 3
Iter= 23	Queue= 36	Depth= 3
Iter= 24	Queue= 37	Depth= 4
Iter= 25	Queue= 38	Depth= 3
Iter= 26	Queue= 39	Depth= 3
Iter= 27	Queue= 40	Depth= 3
Iter= 28	Queue= 41	Depth= 3
Iter= 29	Queue= 42	Depth= 3
Iter= 30	Queue= 41	Depth= 3
Iter= 31	Queue= 42	Depth= 3
Iter= 32	Queue= 43	Depth= 3
Iter= 33	Queue= 44	Depth= 4
Iter= 34	Queue= 45	Depth= 4
Iter= 35	Queue= 46	Depth= 5
Iter= 36	Queue= 47	Depth= 5
Iter= 37	Queue= 48	Depth= 1
Iter= 38	Queue= 51	Depth= 1
Iter= 39	Queue= 52	Depth= 2
Iter= 40	Queue= 54	Depth= 2
Iter= 41	Queue= 54	Depth= 3
Iter= 42	Queue= 56	Depth= 3
Iter= 43	Queue= 58	Depth= 3
Iter= 44	Queue= 58	Depth= 3
Iter= 45	Queue= 59	Depth= 2
Iter= 46	Queue= 60	Depth= 3
Iter= 47	Queue= 61	Depth= 4
Iter= 48	Queue= 60	Depth= 4
Iter= 49	Queue= 59	Depth= 4
Iter= 50	Queue= 60	Depth= 5
Iter= 51	Queue= 61	Depth= 3
Iter= 52	Queue= 64	Depth= 3
Iter= 53	Queue= 65	Depth= 3
Iter= 54	Queue= 68	Depth= 4
Iter= 55	Queue= 69	Depth= 4
Iter= 56	Queue= 68	Depth= 4
Iter= 57	Queue= 69	Depth= 5
Iter= 58	Queue= 71	Depth= 4
Iter= 59	Queue= 72	Depth= 4
Iter= 60	Queue= 73	Depth= 4
Iter= 61	Queue= 74	Depth= 4
Iter= 62	Queue= 73	Depth= 4
Iter= 63	Queue= 74	Depth= 4
Iter= 64	Queue= 73	Depth= 4
Iter= 65	Queue= 74	Depth= 5
Iter= 66	Queue= 76	Depth= 5
Iter= 67	Queue= 78	Depth= 6
Iter= 68	Queue= 79	Depth= 6
Iter= 69	Queue= 82	Depth= 3
Iter= 70	Queue= 85	Depth= 3

Iter=	71	Queue=	86	Depth=	4
Iter=	72	Queue=	85	Depth=	4
Iter=	73	Queue=	84	Depth=	4
Iter=	74	Queue=	85	Depth=	4
Iter=	75	Queue=	86	Depth=	4
Iter=	76	Queue=	85	Depth=	4
Iter=	77	Queue=	84	Depth=	4
Iter=	78	Queue=	85	Depth=	4
Iter=	79	Queue=	86	Depth=	5
Iter=	80	Queue=	86	Depth=	4
Iter=	81	Queue=	86	Depth=	4
Iter=	82	Queue=	87	Depth=	4
Iter=	83	Queue=	88	Depth=	4
Iter=	84	Queue=	87	Depth=	5
Iter=	85	Queue=	88	Depth=	2
Iter=	86	Queue=	89	Depth=	3
Iter=	87	Queue=	90	Depth=	4
Iter=	88	Queue=	90	Depth=	5
Iter=	89	Queue=	89	Depth=	4
Iter=	90	Queue=	91	Depth=	3
Iter=	91	Queue=	92	Depth=	3
Iter=	92	Queue=	92	Depth=	3
Iter=	93	Queue=	93	Depth=	4
Iter=	94	Queue=	93	Depth=	4
Iter=	95	Queue=	93	Depth=	5
Iter=	96	Queue=	93	Depth=	4
Iter=	97	Queue=	95	Depth=	4
Iter=	98	Queue=	97	Depth=	4
Iter=	99	Queue=	97	Depth=	4
Iter=	100	Queue=	98	Depth=	4
Iter=	101	Queue=	97	Depth=	4
Iter=	102	Queue=	99	Depth=	6
Iter=	103	Queue=	99	Depth=	6
Iter=	104	Queue=	99	Depth=	2
Iter=	105	Queue=	100	Depth=	2
Iter=	106	Queue=	101	Depth=	2
Iter=	107	Queue=	103	Depth=	3
Iter=	108	Queue=	104	Depth=	4
Iter=	109	Queue=	104	Depth=	4
Iter=	110	Queue=	104	Depth=	4
Iter=	111	Queue=	106	Depth=	6
Iter=	112	Queue=	109	Depth=	4
Iter=	113	Queue=	110	Depth=	4
Iter=	114	Queue=	113	Depth=	5
Iter=	115	Queue=	114	Depth=	5
Iter=	116	Queue=	115	Depth=	6
Iter=	117	Queue=	118	Depth=	5
Iter=	118	Queue=	117	Depth=	5
Iter=	119	Queue=	116	Depth=	5
Iter=	120	Queue=	117	Depth=	5
Iter=	121	Queue=	118	Depth=	5
Iter=	122	Queue=	119	Depth=	5
Iter=	123	Queue=	118	Depth=	6

Iter=	124	Queue=	121	Depth=	5
Iter=	125	Queue=	120	Depth=	6
Iter=	126	Queue=	122	Depth=	7
Iter=	127	Queue=	124	Depth=	7
Iter=	128	Queue=	127	Depth=	4
Iter=	129	Queue=	130	Depth=	5
Iter=	130	Queue=	131	Depth=	5
Iter=	131	Queue=	130	Depth=	5
Iter=	132	Queue=	131	Depth=	5
Iter=	133	Queue=	132	Depth=	6
Iter=	134	Queue=	132	Depth=	5
Iter=	135	Queue=	133	Depth=	5
Iter=	136	Queue=	132	Depth=	5
Iter=	137	Queue=	131	Depth=	6
Iter=	138	Queue=	134	Depth=	3
Iter=	139	Queue=	136	Depth=	3
Iter=	140	Queue=	137	Depth=	3
Iter=	141	Queue=	138	Depth=	3
Iter=	142	Queue=	139	Depth=	3
Iter=	143	Queue=	142	Depth=	4
Iter=	144	Queue=	143	Depth=	4
Iter=	145	Queue=	144	Depth=	5
Iter=	146	Queue=	143	Depth=	5
Iter=	147	Queue=	142	Depth=	5
Iter=	148	Queue=	141	Depth=	5
Iter=	149	Queue=	142	Depth=	6
Iter=	150	Queue=	143	Depth=	5
Iter=	151	Queue=	142	Depth=	5
Iter=	152	Queue=	143	Depth=	5
Iter=	153	Queue=	144	Depth=	5
Iter=	154	Queue=	145	Depth=	6
Iter=	155	Queue=	146	Depth=	8
Iter=	156	Queue=	147	Depth=	8
Iter=	157	Queue=	148	Depth=	5
Iter=	158	Queue=	149	Depth=	5
Iter=	159	Queue=	148	Depth=	6
Iter=	160	Queue=	149	Depth=	4
Iter=	161	Queue=	152	Depth=	4
Iter=	162	Queue=	155	Depth=	4
Iter=	163	Queue=	158	Depth=	4
Iter=	164	Queue=	159	Depth=	4
Iter=	165	Queue=	160	Depth=	4
Iter=	166	Queue=	163	Depth=	4
Iter=	167	Queue=	166	Depth=	4
Iter=	168	Queue=	169	Depth=	4
Iter=	169	Queue=	172	Depth=	4
Iter=	170	Queue=	175	Depth=	5
Iter=	171	Queue=	174	Depth=	5
Iter=	172	Queue=	175	Depth=	5
Iter=	173	Queue=	175	Depth=	5
Iter=	174	Queue=	174	Depth=	6
Iter=	175	Queue=	175	Depth=	7
Iter=	176	Queue=	176	Depth=	9

```
Iter= 177 Queue= 177 Depth= 5
Iter= 178 Queue= 177 Depth= 5
Iter= 179 Queue= 178 Depth= 5
Iter= 180 Queue= 179 Depth= 5
Iter= 181 Queue= 180 Depth= 5
Iter= 182 Queue= 180 Depth= 5
Iter= 183 Queue= 181 Depth= 5
Iter= 184 Queue= 182 Depth= 5
Iter= 185 Queue= 181 Depth= 5
Iter= 186 Queue= 180 Depth= 5
Iter= 187 Queue= 181 Depth= 5
Iter= 188 Queue= 182 Depth= 5
Iter= 189 Queue= 183 Depth= 5
Iter= 190 Queue= 184 Depth= 5
Iter= 191 Queue= 185 Depth= 5
Iter= 192 Queue= 186 Depth= 5
Iter= 193 Queue= 187 Depth= 5
Iter= 194 Queue= 188 Depth= 5
Iter= 195 Queue= 189 Depth= 5
Iter= 196 Queue= 190 Depth= 5
Iter= 197 Queue= 191 Depth= 10
```

GOAL REACHED, SUCCESS!

Number of iterations are :197

Frontier size is :191

Run time (in seconds) :0.871000051498

Depth of goal state is 10

Initial State:

```
1 | ['B', 'D']
2 | ['A', 'E']
3 | ['C']
```

Solution path is:

Next move:

```
1 | ['B']
2 | ['A', 'E']
3 | ['C', 'D']
```

Next move:

```
1 | ['B']
2 | ['A']
3 | ['C', 'D', 'E']
```

Next move:

```
1 | []
2 | ['A']
3 | ['C', 'D', 'E', 'B']
```

Next move:

```
1 | ['A']
2 | []
```

```
3 | ['C', 'D', 'E', 'B']
```

Next move:

```
1 | ['A', 'B']
```

```
2 | []
```

```
3 | ['C', 'D', 'E']
```

Next move:

```
1 | ['A', 'B']
```

```
2 | ['E']
```

```
3 | ['C', 'D']
```

Next move:

```
1 | ['A', 'B']
```

```
2 | ['E', 'D']
```

```
3 | ['C']
```

Next move:

```
1 | ['A', 'B', 'C']
```

```
2 | ['E', 'D']
```

```
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
```

```
2 | ['E']
```

```
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
```

```
2 | []
```

```
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 4
```

Initial State:

```
1 | ['E', 'A']
```

```
2 | ['C']
```

```
3 | ['D']
```

```
4 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0
```

```
Iter= 2 Queue= 11 Depth= 1
```

```
Iter= 3 Queue= 19 Depth= 1
```

```
Iter= 4 Queue= 27 Depth= 1
```

```
Iter= 5 Queue= 35 Depth= 2
```

```
Iter= 6 Queue= 40 Depth= 2
```

```
Iter= 7 Queue= 44 Depth= 2
```

```
Iter= 8 Queue= 48 Depth= 2
```

```
Iter= 9 Queue= 52 Depth= 2
```

```
Iter= 10 Queue= 57 Depth= 2
```

```
Iter= 11 Queue= 59 Depth= 2
```

```
Iter= 12 Queue= 61 Depth= 2
```

```
Iter= 13 Queue= 63 Depth= 2
```

Iter= 14	Queue= 68	Depth= 3
Iter= 15	Queue= 74	Depth= 3
Iter= 16	Queue= 79	Depth= 3
Iter= 17	Queue= 84	Depth= 4
Iter= 18	Queue= 88	Depth= 4
Iter= 19	Queue= 90	Depth= 5
Iter= 20	Queue= 92	Depth= 1
Iter= 21	Queue= 96	Depth= 1
Iter= 22	Queue= 100	Depth= 1
Iter= 23	Queue= 104	Depth= 1
Iter= 24	Queue= 108	Depth= 1
Iter= 25	Queue= 112	Depth= 1
Iter= 26	Queue= 116	Depth= 2
Iter= 27	Queue= 120	Depth= 2
Iter= 28	Queue= 121	Depth= 2
Iter= 29	Queue= 125	Depth= 2
Iter= 30	Queue= 126	Depth= 2
Iter= 31	Queue= 130	Depth= 2
Iter= 32	Queue= 131	Depth= 2
Iter= 33	Queue= 132	Depth= 2
Iter= 34	Queue= 136	Depth= 2
Iter= 35	Queue= 137	Depth= 2
Iter= 36	Queue= 141	Depth= 2
Iter= 37	Queue= 142	Depth= 2
Iter= 38	Queue= 146	Depth= 3
Iter= 39	Queue= 148	Depth= 3
Iter= 40	Queue= 147	Depth= 3
Iter= 41	Queue= 149	Depth= 3
Iter= 42	Queue= 148	Depth= 3
Iter= 43	Queue= 153	Depth= 3
Iter= 44	Queue= 152	Depth= 3
Iter= 45	Queue= 153	Depth= 3
Iter= 46	Queue= 158	Depth= 3
Iter= 47	Queue= 157	Depth= 3
Iter= 48	Queue= 158	Depth= 3
Iter= 49	Queue= 163	Depth= 3
Iter= 50	Queue= 164	Depth= 3
Iter= 51	Queue= 163	Depth= 3
Iter= 52	Queue= 165	Depth= 3
Iter= 53	Queue= 164	Depth= 3
Iter= 54	Queue= 163	Depth= 3
Iter= 55	Queue= 165	Depth= 3
Iter= 56	Queue= 164	Depth= 3
Iter= 57	Queue= 165	Depth= 3
Iter= 58	Queue= 166	Depth= 3
Iter= 59	Queue= 165	Depth= 3
Iter= 60	Queue= 166	Depth= 3
Iter= 61	Queue= 165	Depth= 3
Iter= 62	Queue= 164	Depth= 3
Iter= 63	Queue= 166	Depth= 3
Iter= 64	Queue= 165	Depth= 3
Iter= 65	Queue= 167	Depth= 4
Iter= 66	Queue= 168	Depth= 4

Iter=	67	Queue=	172	Depth=	4
Iter=	68	Queue=	176	Depth=	4
Iter=	69	Queue=	178	Depth=	4
Iter=	70	Queue=	182	Depth=	4
Iter=	71	Queue=	184	Depth=	4
Iter=	72	Queue=	188	Depth=	4
Iter=	73	Queue=	190	Depth=	4
Iter=	74	Queue=	191	Depth=	4
Iter=	75	Queue=	195	Depth=	4
Iter=	76	Queue=	197	Depth=	4
Iter=	77	Queue=	201	Depth=	5
Iter=	78	Queue=	200	Depth=	5
Iter=	79	Queue=	204	Depth=	5
Iter=	80	Queue=	209	Depth=	5
Iter=	81	Queue=	208	Depth=	5
Iter=	82	Queue=	212	Depth=	6
Iter=	83	Queue=	216	Depth=	6
Iter=	84	Queue=	218	Depth=	2
Iter=	85	Queue=	224	Depth=	2
Iter=	86	Queue=	228	Depth=	2
Iter=	87	Queue=	232	Depth=	2
Iter=	88	Queue=	236	Depth=	2
Iter=	89	Queue=	240	Depth=	2
Iter=	90	Queue=	246	Depth=	2
Iter=	91	Queue=	250	Depth=	2
Iter=	92	Queue=	254	Depth=	2
Iter=	93	Queue=	258	Depth=	2
Iter=	94	Queue=	264	Depth=	2
Iter=	95	Queue=	268	Depth=	2
Iter=	96	Queue=	272	Depth=	3
Iter=	97	Queue=	274	Depth=	3
Iter=	98	Queue=	278	Depth=	3
Iter=	99	Queue=	278	Depth=	3
Iter=	100	Queue=	278	Depth=	3
Iter=	101	Queue=	280	Depth=	3
Iter=	102	Queue=	284	Depth=	3
Iter=	103	Queue=	284	Depth=	3
Iter=	104	Queue=	284	Depth=	3
Iter=	105	Queue=	288	Depth=	3
Iter=	106	Queue=	290	Depth=	3
Iter=	107	Queue=	290	Depth=	3
Iter=	108	Queue=	290	Depth=	3
Iter=	109	Queue=	290	Depth=	3
Iter=	110	Queue=	292	Depth=	3
Iter=	111	Queue=	294	Depth=	3
Iter=	112	Queue=	296	Depth=	3
Iter=	113	Queue=	298	Depth=	3
Iter=	114	Queue=	298	Depth=	3
Iter=	115	Queue=	300	Depth=	3
Iter=	116	Queue=	302	Depth=	3
Iter=	117	Queue=	302	Depth=	3
Iter=	118	Queue=	304	Depth=	3
Iter=	119	Queue=	306	Depth=	3

Iter= 120	Queue= 308	Depth= 3
Iter= 121	Queue= 310	Depth= 3
Iter= 122	Queue= 312	Depth= 7
Iter= 123	Queue= 313	Depth= 7
Iter= 124	Queue= 312	Depth= 3
Iter= 125	Queue= 316	Depth= 3
Iter= 126	Queue= 318	Depth= 3
Iter= 127	Queue= 319	Depth= 3
Iter= 128	Queue= 321	Depth= 3
Iter= 129	Queue= 323	Depth= 3
Iter= 130	Queue= 322	Depth= 3
Iter= 131	Queue= 324	Depth= 3
Iter= 132	Queue= 325	Depth= 3
Iter= 133	Queue= 327	Depth= 3
Iter= 134	Queue= 326	Depth= 3
Iter= 135	Queue= 328	Depth= 3
Iter= 136	Queue= 330	Depth= 3
Iter= 137	Queue= 332	Depth= 3
Iter= 138	Queue= 331	Depth= 3
Iter= 139	Queue= 333	Depth= 3
Iter= 140	Queue= 337	Depth= 3
Iter= 141	Queue= 338	Depth= 3
Iter= 142	Queue= 339	Depth= 3
Iter= 143	Queue= 341	Depth= 3
Iter= 144	Queue= 343	Depth= 3
Iter= 145	Queue= 342	Depth= 3
Iter= 146	Queue= 344	Depth= 3
Iter= 147	Queue= 346	Depth= 3
Iter= 148	Queue= 348	Depth= 3
Iter= 149	Queue= 347	Depth= 3
Iter= 150	Queue= 349	Depth= 3
Iter= 151	Queue= 350	Depth= 3
Iter= 152	Queue= 354	Depth= 3
Iter= 153	Queue= 353	Depth= 3
Iter= 154	Queue= 355	Depth= 3
Iter= 155	Queue= 357	Depth= 3
Iter= 156	Queue= 358	Depth= 3
Iter= 157	Queue= 360	Depth= 3
Iter= 158	Queue= 362	Depth= 4
Iter= 159	Queue= 366	Depth= 4
Iter= 160	Queue= 368	Depth= 4
Iter= 161	Queue= 370	Depth= 4
Iter= 162	Queue= 372	Depth= 4
Iter= 163	Queue= 376	Depth= 4
Iter= 164	Queue= 378	Depth= 4
Iter= 165	Queue= 380	Depth= 4
Iter= 166	Queue= 382	Depth= 4
Iter= 167	Queue= 383	Depth= 4
Iter= 168	Queue= 385	Depth= 5
Iter= 169	Queue= 385	Depth= 4
Iter= 170	Queue= 387	Depth= 4
Iter= 171	Queue= 389	Depth= 8

GOAL REACHED, SUCCESS!
Number of iterations are :171
Frontier size is :389
Run time (in seconds) :1.2009999752
Depth of goal state is 8

Initial State:

```
1 | ['E', 'A']
2 | ['C']
3 | ['D']
4 | ['B']
```

Solution path is:

Next move:

```
1 | ['E']
2 | ['C', 'A']
3 | ['D']
4 | ['B']
```

Next move:

```
1 | []
2 | ['C', 'A']
3 | ['D', 'E']
4 | ['B']
```

Next move:

```
1 | ['A']
2 | ['C']
3 | ['D', 'E']
4 | ['B']
```

Next move:

```
1 | ['A', 'B']
2 | ['C']
3 | ['D', 'E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | []
3 | ['D', 'E']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E']
3 | ['D']
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
```

```
3 | []  
4 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']  
2 | []  
3 | []  
4 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 6 4
```

Initial State:

```
1 | ['F', 'D']  
2 | ['E', 'C']  
3 | ['A']  
4 | ['B']
```

```
Iter= 1  Queue= 0  Depth= 0  
Iter= 2  Queue= 11  Depth= 1  
Iter= 3  Queue= 19  Depth= 1  
Iter= 4  Queue= 27  Depth= 1  
Iter= 5  Queue= 35  Depth= 2  
Iter= 6  Queue= 40  Depth= 2  
Iter= 7  Queue= 44  Depth= 2  
Iter= 8  Queue= 48  Depth= 2  
Iter= 9  Queue= 52  Depth= 2  
Iter= 10  Queue= 57  Depth= 2  
Iter= 11  Queue= 59  Depth= 2  
Iter= 12  Queue= 61  Depth= 2  
Iter= 13  Queue= 63  Depth= 2  
Iter= 14  Queue= 68  Depth= 3  
Iter= 15  Queue= 72  Depth= 3  
Iter= 16  Queue= 74  Depth= 3  
Iter= 17  Queue= 78  Depth= 3  
Iter= 18  Queue= 80  Depth= 4  
Iter= 19  Queue= 82  Depth= 1  
Iter= 20  Queue= 89  Depth= 1  
Iter= 21  Queue= 96  Depth= 1  
Iter= 22  Queue= 100  Depth= 1  
Iter= 23  Queue= 104  Depth= 1  
Iter= 24  Queue= 108  Depth= 1  
Iter= 25  Queue= 112  Depth= 2  
Iter= 26  Queue= 116  Depth= 2  
Iter= 27  Queue= 117  Depth= 2  
Iter= 28  Queue= 121  Depth= 2  
Iter= 29  Queue= 122  Depth= 2  
Iter= 30  Queue= 129  Depth= 2  
Iter= 31  Queue= 133  Depth= 2  
Iter= 32  Queue= 134  Depth= 2  
Iter= 33  Queue= 138  Depth= 2  
Iter= 34  Queue= 142  Depth= 2  
Iter= 35  Queue= 149  Depth= 2  
Iter= 36  Queue= 150  Depth= 2
```

Iter=	37	Queue=	154	Depth=	3
Iter=	38	Queue=	156	Depth=	3
Iter=	39	Queue=	155	Depth=	3
Iter=	40	Queue=	156	Depth=	3
Iter=	41	Queue=	155	Depth=	3
Iter=	42	Queue=	160	Depth=	3
Iter=	43	Queue=	159	Depth=	3
Iter=	44	Queue=	161	Depth=	3
Iter=	45	Queue=	165	Depth=	3
Iter=	46	Queue=	164	Depth=	3
Iter=	47	Queue=	166	Depth=	3
Iter=	48	Queue=	170	Depth=	3
Iter=	49	Queue=	172	Depth=	3
Iter=	50	Queue=	171	Depth=	3
Iter=	51	Queue=	176	Depth=	3
Iter=	52	Queue=	178	Depth=	3
Iter=	53	Queue=	177	Depth=	3
Iter=	54	Queue=	179	Depth=	3
Iter=	55	Queue=	181	Depth=	3
Iter=	56	Queue=	186	Depth=	3
Iter=	57	Queue=	188	Depth=	3
Iter=	58	Queue=	187	Depth=	3
Iter=	59	Queue=	192	Depth=	3
Iter=	60	Queue=	194	Depth=	3
Iter=	61	Queue=	196	Depth=	3
Iter=	62	Queue=	200	Depth=	3
Iter=	63	Queue=	199	Depth=	3
Iter=	64	Queue=	201	Depth=	4
Iter=	65	Queue=	205	Depth=	4
Iter=	66	Queue=	204	Depth=	4
Iter=	67	Queue=	208	Depth=	4
Iter=	68	Queue=	214	Depth=	4
Iter=	69	Queue=	216	Depth=	4
Iter=	70	Queue=	219	Depth=	4
Iter=	71	Queue=	221	Depth=	4
Iter=	72	Queue=	225	Depth=	4
Iter=	73	Queue=	232	Depth=	4
Iter=	74	Queue=	234	Depth=	5
Iter=	75	Queue=	236	Depth=	5
Iter=	76	Queue=	240	Depth=	2
Iter=	77	Queue=	247	Depth=	2
Iter=	78	Queue=	255	Depth=	2
Iter=	79	Queue=	260	Depth=	2
Iter=	80	Queue=	268	Depth=	2
Iter=	81	Queue=	273	Depth=	2
Iter=	82	Queue=	279	Depth=	2
Iter=	83	Queue=	283	Depth=	2
Iter=	84	Queue=	288	Depth=	2
Iter=	85	Queue=	293	Depth=	2
Iter=	86	Queue=	300	Depth=	2
Iter=	87	Queue=	305	Depth=	2
Iter=	88	Queue=	310	Depth=	3
Iter=	89	Queue=	312	Depth=	3

Iter= 90	Queue= 314	Depth= 3
Iter= 91	Queue= 315	Depth= 3
Iter= 92	Queue= 316	Depth= 3
Iter= 93	Queue= 318	Depth= 3
Iter= 94	Queue= 321	Depth= 3
Iter= 95	Queue= 322	Depth= 3
Iter= 96	Queue= 323	Depth= 3
Iter= 97	Queue= 327	Depth= 3
Iter= 98	Queue= 332	Depth= 3
Iter= 99	Queue= 333	Depth= 3
Iter= 100	Queue= 337	Depth= 3
Iter= 101	Queue= 338	Depth= 3
Iter= 102	Queue= 341	Depth= 3
Iter= 103	Queue= 343	Depth= 3
Iter= 104	Queue= 345	Depth= 3
Iter= 105	Queue= 348	Depth= 3
Iter= 106	Queue= 352	Depth= 3
Iter= 107	Queue= 354	Depth= 3
Iter= 108	Queue= 359	Depth= 3
Iter= 109	Queue= 360	Depth= 3
Iter= 110	Queue= 361	Depth= 3
Iter= 111	Queue= 363	Depth= 3
Iter= 112	Queue= 365	Depth= 5
Iter= 113	Queue= 366	Depth= 5
Iter= 114	Queue= 367	Depth= 3
Iter= 115	Queue= 371	Depth= 3
Iter= 116	Queue= 373	Depth= 3
Iter= 117	Queue= 375	Depth= 3
Iter= 118	Queue= 377	Depth= 3
Iter= 119	Queue= 382	Depth= 3
Iter= 120	Queue= 384	Depth= 3
Iter= 121	Queue= 386	Depth= 3
Iter= 122	Queue= 388	Depth= 3
Iter= 123	Queue= 390	Depth= 3
Iter= 124	Queue= 392	Depth= 3
Iter= 125	Queue= 394	Depth= 3
Iter= 126	Queue= 399	Depth= 3
Iter= 127	Queue= 401	Depth= 3
Iter= 128	Queue= 403	Depth= 3
Iter= 129	Queue= 403	Depth= 3
Iter= 130	Queue= 405	Depth= 3
Iter= 131	Queue= 408	Depth= 3
Iter= 132	Queue= 407	Depth= 3
Iter= 133	Queue= 407	Depth= 3
Iter= 134	Queue= 409	Depth= 3
Iter= 135	Queue= 411	Depth= 3
Iter= 136	Queue= 410	Depth= 3
Iter= 137	Queue= 412	Depth= 3
Iter= 138	Queue= 414	Depth= 3
Iter= 139	Queue= 416	Depth= 3
Iter= 140	Queue= 416	Depth= 3
Iter= 141	Queue= 418	Depth= 3
Iter= 142	Queue= 420	Depth= 3

Iter=	143	Queue=	421	Depth=	3
Iter=	144	Queue=	425	Depth=	3
Iter=	145	Queue=	425	Depth=	3
Iter=	146	Queue=	427	Depth=	3
Iter=	147	Queue=	429	Depth=	3
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Iter=	639	Queue=	1482	Depth=	4
Iter=	640	Queue=	1484	Depth=	4
Iter=	641	Queue=	1486	Depth=	4
Iter=	642	Queue=	1488	Depth=	4
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Iter=	645	Queue=	1491	Depth=	4
Iter=	646	Queue=	1493	Depth=	4
Iter=	647	Queue=	1495	Depth=	4
Iter=	648	Queue=	1494	Depth=	4
Iter=	649	Queue=	1496	Depth=	4
Iter=	650	Queue=	1498	Depth=	4
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Iter=	660	Queue=	1512	Depth=	4
Iter=	661	Queue=	1514	Depth=	4
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Iter=	663	Queue=	1520	Depth=	4
Iter=	664	Queue=	1522	Depth=	4
Iter=	665	Queue=	1524	Depth=	4
Iter=	666	Queue=	1526	Depth=	4
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Iter=	668	Queue=	1527	Depth=	4
Iter=	669	Queue=	1529	Depth=	4
Iter=	670	Queue=	1531	Depth=	4
Iter=	671	Queue=	1533	Depth=	4
Iter=	672	Queue=	1532	Depth=	4

Iter=	673	Queue=	1534	Depth=	5
Iter=	674	Queue=	1535	Depth=	4
Iter=	675	Queue=	1537	Depth=	4
Iter=	676	Queue=	1539	Depth=	4
Iter=	677	Queue=	1539	Depth=	4
Iter=	678	Queue=	1541	Depth=	4
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Iter=	699	Queue=	1549	Depth=	5
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Iter=	701	Queue=	1552	Depth=	4
Iter=	702	Queue=	1553	Depth=	4
Iter=	703	Queue=	1558	Depth=	5
Iter=	704	Queue=	1564	Depth=	4
Iter=	705	Queue=	1566	Depth=	4
Iter=	706	Queue=	1565	Depth=	4
Iter=	707	Queue=	1567	Depth=	4
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Iter=	709	Queue=	1565	Depth=	4
Iter=	710	Queue=	1567	Depth=	4
Iter=	711	Queue=	1569	Depth=	4
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Iter=	713	Queue=	1567	Depth=	4
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Iter=	719	Queue=	1565	Depth=	4
Iter=	720	Queue=	1564	Depth=	4
Iter=	721	Queue=	1566	Depth=	4
Iter=	722	Queue=	1568	Depth=	4
Iter=	723	Queue=	1568	Depth=	4
Iter=	724	Queue=	1567	Depth=	4
Iter=	725	Queue=	1569	Depth=	4

```
Iter= 726 Queue= 1568 Depth= 4
Iter= 727 Queue= 1570 Depth= 4
Iter= 728 Queue= 1572 Depth= 4
Iter= 729 Queue= 1573 Depth= 4
Iter= 730 Queue= 1575 Depth= 4
Iter= 731 Queue= 1577 Depth= 4
Iter= 732 Queue= 1579 Depth= 4
Iter= 733 Queue= 1581 Depth= 4
Iter= 734 Queue= 1586 Depth= 5
Iter= 735 Queue= 1588 Depth= 5
Iter= 736 Queue= 1587 Depth= 5
Iter= 737 Queue= 1589 Depth= 5
Iter= 738 Queue= 1591 Depth= 5
Iter= 739 Queue= 1590 Depth= 5
Iter= 740 Queue= 1592 Depth= 5
Iter= 741 Queue= 1594 Depth= 5
Iter= 742 Queue= 1595 Depth= 5
Iter= 743 Queue= 1600 Depth= 5
Iter= 744 Queue= 1602 Depth= 7
Iter= 745 Queue= 1602 Depth= 9
Iter= 746 Queue= 1603 Depth= 9
Iter= 747 Queue= 1602 Depth= 5
Iter= 748 Queue= 1606 Depth= 5
Iter= 749 Queue= 1608 Depth= 5
Iter= 750 Queue= 1610 Depth= 5
Iter= 751 Queue= 1613 Depth= 5
Iter= 752 Queue= 1615 Depth= 5
Iter= 753 Queue= 1617 Depth= 6
Iter= 754 Queue= 1618 Depth= 5
Iter= 755 Queue= 1620 Depth= 6
Iter= 756 Queue= 1624 Depth= 6
Iter= 757 Queue= 1626 Depth= 6
Iter= 758 Queue= 1626 Depth= 6
Iter= 759 Queue= 1628 Depth= 10
```

GOAL REACHED, SUCCESS!

Number of iterations are :759

Frontier size is :1628

Run time (in seconds) :9.32699990273

Depth of goal state is 10

Initial State:

1 | ['F', 'D']

2 | ['E', 'C']

3 | ['A']

4 | ['B']

Solution path is:

Next move:

1 | ['F', 'D']

2 | ['E', 'C', 'A']

3 | []

4 | ['B']

Next move:

1 | ['F']

2 | ['E', 'C', 'A']

3 | ['D']

4 | ['B']

Next move:

1 | []

2 | ['E', 'C', 'A']

3 | ['D', 'F']

4 | ['B']

Next move:

1 | ['A']

2 | ['E', 'C']

3 | ['D', 'F']

4 | ['B']

Next move:

1 | ['A', 'B']

2 | ['E', 'C']

3 | ['D', 'F']

4 | []

Next move:

1 | ['A', 'B', 'C']

2 | ['E']

3 | ['D', 'F']

4 | []

Next move:

1 | ['A', 'B', 'C']

2 | ['E']

3 | ['D']

4 | ['F']

Next move:

1 | ['A', 'B', 'C', 'D']

2 | ['E']

3 | []

4 | ['F']

Next move:

1 | ['A', 'B', 'C', 'D', 'E']

2 | []

3 | []

4 | ['F']

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F']

2 | []

```
3 | []  
4 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 8 6
```

Initial State:

```
1 | ['B', 'A']  
2 | ['E', 'G']  
3 | ['F']  
4 | ['D']  
5 | ['H']  
6 | ['C']
```

```
Iter= 1  Queue= 0  Depth= 0  
Iter= 2  Queue= 29  Depth= 1  
Iter= 3  Queue= 53  Depth= 1  
Iter= 4  Queue= 77  Depth= 1  
Iter= 5  Queue= 101  Depth= 1  
Iter= 6  Queue= 125  Depth= 1  
Iter= 7  Queue= 149  Depth= 2  
Iter= 8  Queue= 168  Depth= 2  
Iter= 9  Queue= 184  Depth= 2  
Iter= 10  Queue= 200  Depth= 2  
Iter= 11  Queue= 216  Depth= 2  
Iter= 12  Queue= 232  Depth= 2  
Iter= 13  Queue= 248  Depth= 2  
Iter= 14  Queue= 267  Depth= 2  
Iter= 15  Queue= 281  Depth= 2  
Iter= 16  Queue= 295  Depth= 2  
Iter= 17  Queue= 309  Depth= 2  
Iter= 18  Queue= 323  Depth= 2  
Iter= 19  Queue= 337  Depth= 2  
Iter= 20  Queue= 356  Depth= 2  
Iter= 21  Queue= 370  Depth= 2  
Iter= 22  Queue= 384  Depth= 2  
Iter= 23  Queue= 398  Depth= 2  
Iter= 24  Queue= 412  Depth= 2  
Iter= 25  Queue= 426  Depth= 2  
Iter= 26  Queue= 445  Depth= 2  
Iter= 27  Queue= 459  Depth= 2  
Iter= 28  Queue= 473  Depth= 2  
Iter= 29  Queue= 487  Depth= 2  
Iter= 30  Queue= 501  Depth= 2  
Iter= 31  Queue= 515  Depth= 2  
Iter= 32  Queue= 534  Depth= 3  
Iter= 33  Queue= 554  Depth= 3  
Iter= 34  Queue= 573  Depth= 3  
Iter= 35  Queue= 592  Depth= 3  
Iter= 36  Queue= 611  Depth= 3  
Iter= 37  Queue= 630  Depth= 4  
Iter= 38  Queue= 654  Depth= 5  
Iter= 39  Queue= 673  Depth= 6  
Iter= 40  Queue= 687  Depth= 1
```

Iter=	41	Queue=	708	Depth=	1
Iter=	42	Queue=	729	Depth=	1
Iter=	43	Queue=	750	Depth=	1
Iter=	44	Queue=	771	Depth=	1
Iter=	45	Queue=	787	Depth=	1
Iter=	46	Queue=	801	Depth=	1
Iter=	47	Queue=	815	Depth=	1
Iter=	48	Queue=	829	Depth=	1
Iter=	49	Queue=	843	Depth=	1
Iter=	50	Queue=	857	Depth=	1
Iter=	51	Queue=	869	Depth=	1
Iter=	52	Queue=	881	Depth=	1
Iter=	53	Queue=	893	Depth=	1
Iter=	54	Queue=	905	Depth=	1
Iter=	55	Queue=	917	Depth=	1
Iter=	56	Queue=	927	Depth=	1
Iter=	57	Queue=	937	Depth=	1
Iter=	58	Queue=	947	Depth=	1
Iter=	59	Queue=	957	Depth=	1
Iter=	60	Queue=	967	Depth=	2
Iter=	61	Queue=	983	Depth=	2
Iter=	62	Queue=	994	Depth=	2
Iter=	63	Queue=	1005	Depth=	2
Iter=	64	Queue=	1016	Depth=	2
Iter=	65	Queue=	1030	Depth=	2
Iter=	66	Queue=	1041	Depth=	2
Iter=	67	Queue=	1050	Depth=	2
Iter=	68	Queue=	1059	Depth=	2
Iter=	69	Queue=	1071	Depth=	2
Iter=	70	Queue=	1080	Depth=	2
Iter=	71	Queue=	1089	Depth=	2
Iter=	72	Queue=	1096	Depth=	2
Iter=	73	Queue=	1106	Depth=	2
Iter=	74	Queue=	1113	Depth=	2
Iter=	75	Queue=	1120	Depth=	2
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Iter=	78	Queue=	1164	Depth=	2
Iter=	79	Queue=	1180	Depth=	2
Iter=	80	Queue=	1196	Depth=	2
Iter=	81	Queue=	1207	Depth=	2
Iter=	82	Queue=	1221	Depth=	2
Iter=	83	Queue=	1230	Depth=	2
Iter=	84	Queue=	1239	Depth=	2
Iter=	85	Queue=	1248	Depth=	2
Iter=	86	Queue=	1260	Depth=	2
Iter=	87	Queue=	1269	Depth=	2
Iter=	88	Queue=	1276	Depth=	2
Iter=	89	Queue=	1283	Depth=	2
Iter=	90	Queue=	1293	Depth=	2
Iter=	91	Queue=	1300	Depth=	2
Iter=	92	Queue=	1307	Depth=	2
Iter=	93	Queue=	1323	Depth=	2

Iter=	94	Queue=	1344	Depth=	2
Iter=	95	Queue=	1360	Depth=	2
Iter=	96	Queue=	1376	Depth=	2
Iter=	97	Queue=	1387	Depth=	2
Iter=	98	Queue=	1401	Depth=	2
Iter=	99	Queue=	1410	Depth=	2
Iter=	100	Queue=	1419	Depth=	2
Iter=	101	Queue=	1428	Depth=	2
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Iter=	106	Queue=	1470	Depth=	2
Iter=	107	Queue=	1480	Depth=	2
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Iter=	143	Queue=	1879	Depth=	3
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Iter=	145	Queue=	1900	Depth=	3
Iter=	146	Queue=	1909	Depth=	3

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Iter=	149	Queue=	1933	Depth=	3
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Iter=	152	Queue=	1952	Depth=	3
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Iter=	154	Queue=	1965	Depth=	3
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Iter=	156	Queue=	1975	Depth=	3
Iter=	157	Queue=	1994	Depth=	3
Iter=	158	Queue=	2003	Depth=	3
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Iter=	171	Queue=	2100	Depth=	3
Iter=	172	Queue=	2111	Depth=	3
Iter=	173	Queue=	2117	Depth=	3
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Iter=	176	Queue=	2136	Depth=	3
Iter=	177	Queue=	2145	Depth=	3
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Iter=	195	Queue=	2266	Depth=	3
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Iter=	197	Queue=	2294	Depth=	3
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Iter=	199	Queue=	2306	Depth=	3

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Iter=	202	Queue=	2330	Depth=	3
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Iter=	252	Queue=	2739	Depth=	3

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Iter=	257	Queue=	2772	Depth=	3
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Iter=	293	Queue=	3022	Depth=	3
Iter=	294	Queue=	3026	Depth=	3
Iter=	295	Queue=	3031	Depth=	3
Iter=	296	Queue=	3036	Depth=	3
Iter=	297	Queue=	3038	Depth=	3
Iter=	298	Queue=	3052	Depth=	3
Iter=	299	Queue=	3071	Depth=	3
Iter=	300	Queue=	3085	Depth=	3
Iter=	301	Queue=	3099	Depth=	3
Iter=	302	Queue=	3108	Depth=	3
Iter=	303	Queue=	3120	Depth=	3
Iter=	304	Queue=	3127	Depth=	3
Iter=	305	Queue=	3134	Depth=	3

Iter=	306	Queue=	3141	Depth=	3
Iter=	307	Queue=	3148	Depth=	3
Iter=	308	Queue=	3158	Depth=	3
Iter=	309	Queue=	3163	Depth=	3
Iter=	310	Queue=	3168	Depth=	3
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Iter= 817	Queue= 8277	Depth= 3
Iter= 818	Queue= 8291	Depth= 3
Iter= 819	Queue= 8300	Depth= 3
Iter= 820	Queue= 8311	Depth= 3
Iter= 821	Queue= 8325	Depth= 3
Iter= 822	Queue= 8344	Depth= 3
Iter= 823	Queue= 8358	Depth= 3
Iter= 824	Queue= 8372	Depth= 3
Iter= 825	Queue= 8381	Depth= 3
Iter= 826	Queue= 8392	Depth= 3
Iter= 827	Queue= 8401	Depth= 3
Iter= 828	Queue= 8415	Depth= 3
Iter= 829	Queue= 8429	Depth= 3
Iter= 830	Queue= 8440	Depth= 3
Iter= 831	Queue= 8449	Depth= 3
Iter= 832	Queue= 8463	Depth= 3
Iter= 833	Queue= 8477	Depth= 3
Iter= 834	Queue= 8486	Depth= 3
Iter= 835	Queue= 8497	Depth= 3

Iter=	836	Queue=	8511	Depth=	3
Iter=	837	Queue=	8530	Depth=	3
Iter=	838	Queue=	8541	Depth=	3
Iter=	839	Queue=	8555	Depth=	3
Iter=	840	Queue=	8569	Depth=	3
Iter=	841	Queue=	8583	Depth=	3
Iter=	842	Queue=	8592	Depth=	3
Iter=	843	Queue=	8601	Depth=	3
Iter=	844	Queue=	8615	Depth=	3
Iter=	845	Queue=	8626	Depth=	3
Iter=	846	Queue=	8635	Depth=	3
Iter=	847	Queue=	8644	Depth=	3
Iter=	848	Queue=	8655	Depth=	3
Iter=	849	Queue=	8666	Depth=	3
Iter=	850	Queue=	8680	Depth=	3
Iter=	851	Queue=	8689	Depth=	3
Iter=	852	Queue=	8698	Depth=	3
Iter=	853	Queue=	8707	Depth=	3
Iter=	854	Queue=	8721	Depth=	3
Iter=	855	Queue=	8730	Depth=	3
Iter=	856	Queue=	8739	Depth=	8
Iter=	857	Queue=	8745	Depth=	8
Iter=	858	Queue=	8754	Depth=	8
Iter=	859	Queue=	8758	Depth=	8
Iter=	860	Queue=	8767	Depth=	3
Iter=	861	Queue=	8783	Depth=	3
Iter=	862	Queue=	8797	Depth=	3
Iter=	863	Queue=	8806	Depth=	3
Iter=	864	Queue=	8815	Depth=	3
Iter=	865	Queue=	8829	Depth=	3
Iter=	866	Queue=	8848	Depth=	3
Iter=	867	Queue=	8862	Depth=	3
Iter=	868	Queue=	8876	Depth=	3
Iter=	869	Queue=	8890	Depth=	3
Iter=	870	Queue=	8901	Depth=	3
Iter=	871	Queue=	8910	Depth=	3
Iter=	872	Queue=	8924	Depth=	3
Iter=	873	Queue=	8938	Depth=	3
Iter=	874	Queue=	8957	Depth=	3
Iter=	875	Queue=	8971	Depth=	3
Iter=	876	Queue=	8985	Depth=	3
Iter=	877	Queue=	8994	Depth=	3
Iter=	878	Queue=	9003	Depth=	3
Iter=	879	Queue=	9017	Depth=	3
Iter=	880	Queue=	9031	Depth=	3
Iter=	881	Queue=	9045	Depth=	3
Iter=	882	Queue=	9059	Depth=	3
Iter=	883	Queue=	9073	Depth=	3
Iter=	884	Queue=	9082	Depth=	3
Iter=	885	Queue=	9096	Depth=	3
Iter=	886	Queue=	9110	Depth=	3
Iter=	887	Queue=	9124	Depth=	3
Iter=	888	Queue=	9138	Depth=	3

Iter=	889	Queue=	9152	Depth=	3
Iter=	890	Queue=	9161	Depth=	3
Iter=	891	Queue=	9175	Depth=	3
Iter=	892	Queue=	9191	Depth=	3
Iter=	893	Queue=	9202	Depth=	3
Iter=	894	Queue=	9211	Depth=	3
Iter=	895	Queue=	9222	Depth=	3
Iter=	896	Queue=	9236	Depth=	3
Iter=	897	Queue=	9250	Depth=	3
Iter=	898	Queue=	9259	Depth=	3
Iter=	899	Queue=	9268	Depth=	3
Iter=	900	Queue=	9282	Depth=	3
Iter=	901	Queue=	9296	Depth=	3
Iter=	902	Queue=	9305	Depth=	3
Iter=	903	Queue=	9314	Depth=	3
Iter=	904	Queue=	9328	Depth=	3
Iter=	905	Queue=	9337	Depth=	3
Iter=	906	Queue=	9346	Depth=	3
Iter=	907	Queue=	9355	Depth=	3
Iter=	908	Queue=	9369	Depth=	3
Iter=	909	Queue=	9378	Depth=	3
Iter=	910	Queue=	9387	Depth=	3
Iter=	911	Queue=	9396	Depth=	3
Iter=	912	Queue=	9410	Depth=	3
Iter=	913	Queue=	9419	Depth=	3
Iter=	914	Queue=	9428	Depth=	3
Iter=	915	Queue=	9442	Depth=	3
Iter=	916	Queue=	9451	Depth=	3
Iter=	917	Queue=	9465	Depth=	3
Iter=	918	Queue=	9474	Depth=	3
Iter=	919	Queue=	9483	Depth=	3
Iter=	920	Queue=	9497	Depth=	3
Iter=	921	Queue=	9508	Depth=	3
Iter=	922	Queue=	9522	Depth=	3
Iter=	923	Queue=	9533	Depth=	3
Iter=	924	Queue=	9542	Depth=	3
Iter=	925	Queue=	9556	Depth=	3
Iter=	926	Queue=	9570	Depth=	3
Iter=	927	Queue=	9579	Depth=	3
Iter=	928	Queue=	9590	Depth=	3
Iter=	929	Queue=	9604	Depth=	3
Iter=	930	Queue=	9618	Depth=	3
Iter=	931	Queue=	9627	Depth=	3
Iter=	932	Queue=	9636	Depth=	3
Iter=	933	Queue=	9645	Depth=	3
Iter=	934	Queue=	9659	Depth=	3
Iter=	935	Queue=	9668	Depth=	3
Iter=	936	Queue=	9677	Depth=	3
Iter=	937	Queue=	9686	Depth=	3
Iter=	938	Queue=	9700	Depth=	3
Iter=	939	Queue=	9709	Depth=	3
Iter=	940	Queue=	9718	Depth=	3
Iter=	941	Queue=	9727	Depth=	3

Iter=	942	Queue=	9736	Depth=	3
Iter=	943	Queue=	9745	Depth=	3
Iter=	944	Queue=	9754	Depth=	3
Iter=	945	Queue=	9763	Depth=	3
Iter=	946	Queue=	9777	Depth=	3
Iter=	947	Queue=	9786	Depth=	3
Iter=	948	Queue=	9795	Depth=	3
Iter=	949	Queue=	9809	Depth=	3
Iter=	950	Queue=	9820	Depth=	3
Iter=	951	Queue=	9829	Depth=	3
Iter=	952	Queue=	9840	Depth=	3
Iter=	953	Queue=	9849	Depth=	3
Iter=	954	Queue=	9863	Depth=	3
Iter=	955	Queue=	9872	Depth=	3
Iter=	956	Queue=	9881	Depth=	3
Iter=	957	Queue=	9892	Depth=	3
Iter=	958	Queue=	9906	Depth=	3
Iter=	959	Queue=	9915	Depth=	3
Iter=	960	Queue=	9924	Depth=	3
Iter=	961	Queue=	9933	Depth=	3
Iter=	962	Queue=	9942	Depth=	3
Iter=	963	Queue=	9956	Depth=	3
Iter=	964	Queue=	9965	Depth=	3
Iter=	965	Queue=	9974	Depth=	3
Iter=	966	Queue=	9983	Depth=	3
Iter=	967	Queue=	9997	Depth=	3
Iter=	968	Queue=	10006	Depth=	3
Iter=	969	Queue=	10015	Depth=	3
Iter=	970	Queue=	10024	Depth=	3
Iter=	971	Queue=	10038	Depth=	3
Iter=	972	Queue=	10047	Depth=	3
Iter=	973	Queue=	10056	Depth=	3
Iter=	974	Queue=	10070	Depth=	3
Iter=	975	Queue=	10084	Depth=	3
Iter=	976	Queue=	10093	Depth=	3
Iter=	977	Queue=	10107	Depth=	3
Iter=	978	Queue=	10118	Depth=	3
Iter=	979	Queue=	10127	Depth=	3
Iter=	980	Queue=	10136	Depth=	3
Iter=	981	Queue=	10150	Depth=	3
Iter=	982	Queue=	10159	Depth=	3
Iter=	983	Queue=	10170	Depth=	3
Iter=	984	Queue=	10184	Depth=	3
Iter=	985	Queue=	10193	Depth=	3
Iter=	986	Queue=	10202	Depth=	3
Iter=	987	Queue=	10211	Depth=	3
Iter=	988	Queue=	10220	Depth=	3
Iter=	989	Queue=	10229	Depth=	3
Iter=	990	Queue=	10238	Depth=	3
Iter=	991	Queue=	10247	Depth=	3
Iter=	992	Queue=	10256	Depth=	3
Iter=	993	Queue=	10265	Depth=	3
Iter=	994	Queue=	10279	Depth=	3

```
Iter= 995 Queue= 10288 Depth= 3
Iter= 996 Queue= 10297 Depth= 3
Iter= 997 Queue= 10311 Depth= 4
Iter= 998 Queue= 10327 Depth= 4
Iter= 999 Queue= 10341 Depth= 4
Iter= 1000 Queue= 10355 Depth= 4
Iter= 1001 Queue= 10369 Depth= 4
Iter= 1002 Queue= 10383 Depth= 4
Iter= 1003 Queue= 10397 Depth= 4
Iter= 1004 Queue= 10411 Depth= 4
Iter= 1005 Queue= 10427 Depth= 4
Iter= 1006 Queue= 10441 Depth= 4
Iter= 1007 Queue= 10455 Depth= 4
Iter= 1008 Queue= 10469 Depth= 4
Iter= 1009 Queue= 10483 Depth= 4
Iter= 1010 Queue= 10497 Depth= 4
Iter= 1011 Queue= 10513 Depth= 4
Iter= 1012 Queue= 10527 Depth= 4
Iter= 1013 Queue= 10541 Depth= 4
Iter= 1014 Queue= 10555 Depth= 4
Iter= 1015 Queue= 10569 Depth= 4
Iter= 1016 Queue= 10583 Depth= 4
Iter= 1017 Queue= 10599 Depth= 4
Iter= 1018 Queue= 10613 Depth= 4
Iter= 1019 Queue= 10627 Depth= 4
Iter= 1020 Queue= 10641 Depth= 4
Iter= 1021 Queue= 10655 Depth= 4
Iter= 1022 Queue= 10671 Depth= 4
Iter= 1023 Queue= 10690 Depth= 4
Iter= 1024 Queue= 10704 Depth= 4
Iter= 1025 Queue= 10723 Depth= 4
Iter= 1026 Queue= 10737 Depth= 4
Iter= 1027 Queue= 10756 Depth= 4
Iter= 1028 Queue= 10770 Depth= 4
Iter= 1029 Queue= 10784 Depth= 4
Iter= 1030 Queue= 10798 Depth= 4
Iter= 1031 Queue= 10812 Depth= 4
Iter= 1032 Queue= 10826 Depth= 4
Iter= 1033 Queue= 10840 Depth= 4
Iter= 1034 Queue= 10854 Depth= 4
Iter= 1035 Queue= 10873 Depth= 4
Iter= 1036 Queue= 10887 Depth= 4
Iter= 1037 Queue= 10901 Depth= 9
Iter= 1038 Queue= 10908 Depth= 9
Iter= 1039 Queue= 10907 Depth= 9
Iter= 1040 Queue= 10911 Depth= 10
Iter= 1041 Queue= 10915 Depth= 11
```

GOAL REACHED, SUCCESS!

Number of iterations are :1041

Frontier size is :10915

Run time (in seconds) :33.243999958

Depth of goal state is 11

Initial State:

```
1 | ['B', 'A']
2 | ['E', 'G']
3 | ['F']
4 | ['D']
5 | ['H']
6 | ['C']
```

Solution path is:

Next move:

```
1 | ['B']
2 | ['E', 'G', 'A']
3 | ['F']
4 | ['D']
5 | ['H']
6 | ['C']
```

Next move:

```
1 | []
2 | ['E', 'G', 'A']
3 | ['F', 'B']
4 | ['D']
5 | ['H']
6 | ['C']
```

Next move:

```
1 | ['A']
2 | ['E', 'G']
3 | ['F', 'B']
4 | ['D']
5 | ['H']
6 | ['C']
```

Next move:

```
1 | ['A', 'B']
2 | ['E', 'G']
3 | ['F']
4 | ['D']
5 | ['H']
6 | ['C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E', 'G']
3 | ['F']
4 | ['D']
5 | ['H']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
```



```
2 | ['E', 'G']
3 | ['F']
4 | []
5 | ['H']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | ['F']
4 | ['G']
5 | ['H']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | ['F']
4 | ['G']
5 | ['H']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | []
4 | ['G']
5 | ['H']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | []
5 | ['H']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | []
4 | []
5 | []
6 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 9 6
```

Initial State:

```
1 | ['H', 'A']
2 | ['F', 'E']
3 | ['G', 'D']
```

```
4 | ['I']  
5 | ['C']  
6 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0  
Iter= 2 Queue= 29 Depth= 1  
Iter= 3 Queue= 53 Depth= 1  
Iter= 4 Queue= 77 Depth= 1  
Iter= 5 Queue= 101 Depth= 1  
Iter= 6 Queue= 125 Depth= 1  
Iter= 7 Queue= 149 Depth= 2  
Iter= 8 Queue= 168 Depth= 2  
Iter= 9 Queue= 184 Depth= 2  
Iter= 10 Queue= 200 Depth= 2  
Iter= 11 Queue= 216 Depth= 2  
Iter= 12 Queue= 232 Depth= 2  
Iter= 13 Queue= 248 Depth= 2  
Iter= 14 Queue= 267 Depth= 2  
Iter= 15 Queue= 281 Depth= 2  
Iter= 16 Queue= 295 Depth= 2  
Iter= 17 Queue= 309 Depth= 2  
Iter= 18 Queue= 323 Depth= 2  
Iter= 19 Queue= 337 Depth= 2  
Iter= 20 Queue= 356 Depth= 2  
Iter= 21 Queue= 370 Depth= 2  
Iter= 22 Queue= 384 Depth= 2  
Iter= 23 Queue= 398 Depth= 2  
Iter= 24 Queue= 412 Depth= 2  
Iter= 25 Queue= 426 Depth= 2  
Iter= 26 Queue= 445 Depth= 2  
Iter= 27 Queue= 459 Depth= 2  
Iter= 28 Queue= 473 Depth= 2  
Iter= 29 Queue= 487 Depth= 2  
Iter= 30 Queue= 501 Depth= 2  
Iter= 31 Queue= 515 Depth= 2  
Iter= 32 Queue= 534 Depth= 3  
Iter= 33 Queue= 554 Depth= 3  
Iter= 34 Queue= 573 Depth= 3  
Iter= 35 Queue= 592 Depth= 3  
Iter= 36 Queue= 611 Depth= 3  
Iter= 37 Queue= 630 Depth= 4  
Iter= 38 Queue= 646 Depth= 4  
Iter= 39 Queue= 660 Depth= 4  
Iter= 40 Queue= 674 Depth= 4  
Iter= 41 Queue= 688 Depth= 5  
Iter= 42 Queue= 700 Depth= 5  
Iter= 43 Queue= 709 Depth= 5  
Iter= 44 Queue= 718 Depth= 6  
Iter= 45 Queue= 731 Depth= 6  
Iter= 46 Queue= 740 Depth= 7  
Iter= 47 Queue= 754 Depth= 8  
Iter= 48 Queue= 763 Depth= 9  
Iter= 49 Queue= 767 Depth= 10
```

```
Iter= 50  Queue= 771  Depth= 11

GOAL REACHED, SUCCESS!
Number of iterations are :50
Frontier size is :771
Run time (in seconds) :0.591000080109
Depth of goal state is 11

Initial State:
1 | ['H', 'A']
2 | ['F', 'E']
3 | ['G', 'D']
4 | ['I']
5 | ['C']
6 | ['B']

Solution path is:

Next move:
1 | ['H']
2 | ['F', 'E', 'A']
3 | ['G', 'D']
4 | ['I']
5 | ['C']
6 | ['B']

Next move:
1 | []
2 | ['F', 'E', 'A']
3 | ['G', 'D']
4 | ['I', 'H']
5 | ['C']
6 | ['B']

Next move:
1 | ['A']
2 | ['F', 'E']
3 | ['G', 'D']
4 | ['I', 'H']
5 | ['C']
6 | ['B']

Next move:
1 | ['A', 'B']
2 | ['F', 'E']
3 | ['G', 'D']
4 | ['I', 'H']
5 | ['C']
6 | []

Next move:
1 | ['A', 'B', 'C']
2 | ['F', 'E']
```

```
3 | ['G', 'D']
4 | ['I', 'H']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['F', 'E']
3 | ['G']
4 | ['I', 'H']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['F']
3 | ['G']
4 | ['I', 'H']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | []
3 | ['G']
4 | ['I', 'H']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | []
3 | []
4 | ['I', 'H']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | []
3 | []
4 | ['I']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | []
3 | []
4 | []
5 | []
6 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 10 6
```

```
Initial State:
```

```
1 | ['E', 'A']
2 | ['I', 'H']
3 | ['J', 'C']
4 | ['G', 'D']
5 | ['F']
6 | ['B']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 29  Depth= 1
Iter= 3  Queue= 53  Depth= 1
Iter= 4  Queue= 77  Depth= 1
Iter= 5  Queue= 101  Depth= 1
Iter= 6  Queue= 125  Depth= 1
Iter= 7  Queue= 149  Depth= 2
Iter= 8  Queue= 168  Depth= 2
Iter= 9  Queue= 184  Depth= 2
Iter= 10  Queue= 200  Depth= 2
Iter= 11  Queue= 216  Depth= 2
Iter= 12  Queue= 232  Depth= 2
Iter= 13  Queue= 248  Depth= 2
Iter= 14  Queue= 267  Depth= 2
Iter= 15  Queue= 281  Depth= 2
Iter= 16  Queue= 295  Depth= 2
Iter= 17  Queue= 309  Depth= 2
Iter= 18  Queue= 323  Depth= 2
Iter= 19  Queue= 337  Depth= 2
Iter= 20  Queue= 356  Depth= 2
Iter= 21  Queue= 370  Depth= 2
Iter= 22  Queue= 384  Depth= 2
Iter= 23  Queue= 398  Depth= 2
Iter= 24  Queue= 412  Depth= 2
Iter= 25  Queue= 426  Depth= 2
Iter= 26  Queue= 445  Depth= 2
Iter= 27  Queue= 459  Depth= 2
Iter= 28  Queue= 473  Depth= 2
Iter= 29  Queue= 487  Depth= 2
Iter= 30  Queue= 501  Depth= 2
Iter= 31  Queue= 515  Depth= 2
Iter= 32  Queue= 534  Depth= 3
Iter= 33  Queue= 554  Depth= 3
Iter= 34  Queue= 573  Depth= 3
Iter= 35  Queue= 592  Depth= 3
Iter= 36  Queue= 611  Depth= 3
Iter= 37  Queue= 630  Depth= 4
Iter= 38  Queue= 646  Depth= 4
Iter= 39  Queue= 660  Depth= 4
Iter= 40  Queue= 674  Depth= 4
Iter= 41  Queue= 688  Depth= 5
Iter= 42  Queue= 705  Depth= 5
```

```
Iter= 43  Queue= 719  Depth= 5
Iter= 44  Queue= 733  Depth= 6
Iter= 45  Queue= 751  Depth= 6
Iter= 46  Queue= 765  Depth= 7
Iter= 47  Queue= 784  Depth= 8
Iter= 48  Queue= 798  Depth= 9
Iter= 49  Queue= 807  Depth= 10
Iter= 50  Queue= 816  Depth= 11
Iter= 51  Queue= 820  Depth= 12
```

GOAL REACHED, SUCCESS!

Number of iterations are :51

Frontier size is :820

Run time (in seconds) :0.680999994278

Depth of goal state is 12

Initial State:

```
1 | ['E', 'A']
2 | ['I', 'H']
3 | ['J', 'C']
4 | ['G', 'D']
5 | ['F']
6 | ['B']
```

Solution path is:

Next move:

```
1 | ['E']
2 | ['I', 'H', 'A']
3 | ['J', 'C']
4 | ['G', 'D']
5 | ['F']
6 | ['B']
```

Next move:

```
1 | []
2 | ['I', 'H', 'A']
3 | ['J', 'C']
4 | ['G', 'D']
5 | ['F', 'E']
6 | ['B']
```

Next move:

```
1 | ['A']
2 | ['I', 'H']
3 | ['J', 'C']
4 | ['G', 'D']
5 | ['F', 'E']
6 | ['B']
```

Next move:

```
1 | ['A', 'B']
2 | ['I', 'H']
```

```
3 | ['J', 'C']
4 | ['G', 'D']
5 | ['F', 'E']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['I', 'H']
3 | ['J']
4 | ['G', 'D']
5 | ['F', 'E']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['I', 'H']
3 | ['J']
4 | ['G']
5 | ['F', 'E']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | ['I', 'H']
3 | ['J']
4 | ['G']
5 | ['F']
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F']
2 | ['I', 'H']
3 | ['J']
4 | ['G']
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G']
2 | ['I', 'H']
3 | ['J']
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H']
2 | ['I']
3 | ['J']
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I']
2 | []
3 | ['J']
4 | []
5 | []
6 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J']
2 | []
3 | []
4 | []
5 | []
6 | []
```

Heuristic no. 1: Number of blocks out of place

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

Initial State:

```
1 | ['A', 'C']
2 | ['B', 'D']
3 | ['E']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 5 Depth= 1
Iter= 3 Queue= 8 Depth= 1
Iter= 4 Queue= 11 Depth= 1
Iter= 5 Queue= 14 Depth= 1
Iter= 6 Queue= 17 Depth= 1
Iter= 7 Queue= 18 Depth= 1
Iter= 8 Queue= 19 Depth= 2
Iter= 9 Queue= 22 Depth= 2
Iter= 10 Queue= 25 Depth= 2
Iter= 11 Queue= 26 Depth= 2
Iter= 12 Queue= 27 Depth= 2
Iter= 13 Queue= 28 Depth= 2
Iter= 14 Queue= 29 Depth= 2
Iter= 15 Queue= 30 Depth= 2
Iter= 16 Queue= 31 Depth= 2
Iter= 17 Queue= 33 Depth= 2
Iter= 18 Queue= 36 Depth= 2
Iter= 19 Queue= 37 Depth= 2
Iter= 20 Queue= 38 Depth= 2
Iter= 21 Queue= 39 Depth= 2
Iter= 22 Queue= 41 Depth= 2
Iter= 23 Queue= 42 Depth= 2
Iter= 24 Queue= 44 Depth= 3
```



```
Iter= 25  Queue= 45  Depth= 3
Iter= 26  Queue= 46  Depth= 4
Iter= 27  Queue= 47  Depth= 5
Iter= 28  Queue= 48  Depth= 6

GOAL REACHED, SUCCESS!
Number of iterations are :28
Frontier size is :48
Run time (in seconds) :0.0220000743866
Depth of goal state is 6
```

Initial State:

```
1 | ['A', 'C']
2 | ['B', 'D']
3 | ['E']
```

Solution path is:

Next move:

```
1 | ['A', 'C']
2 | ['B']
3 | ['E', 'D']
```

Next move:

```
1 | ['A']
2 | ['B']
3 | ['E', 'D', 'C']
```

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['E', 'D', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | []
3 | ['E', 'D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

Initial State:

```
1 | ['A', 'D']
2 | ['B', 'C']
```

3 | ['E']

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 5 Depth= 1
Iter= 3 Queue= 8 Depth= 1
Iter= 4 Queue= 11 Depth= 1
Iter= 5 Queue= 14 Depth= 1
Iter= 6 Queue= 17 Depth= 1
Iter= 7 Queue= 18 Depth= 1
Iter= 8 Queue= 19 Depth= 2
Iter= 9 Queue= 22 Depth= 2
Iter= 10 Queue= 25 Depth= 2
Iter= 11 Queue= 26 Depth= 2
Iter= 12 Queue= 27 Depth= 2
Iter= 13 Queue= 28 Depth= 2
Iter= 14 Queue= 29 Depth= 2
Iter= 15 Queue= 30 Depth= 2
Iter= 16 Queue= 31 Depth= 2
Iter= 17 Queue= 33 Depth= 2
Iter= 18 Queue= 36 Depth= 2
Iter= 19 Queue= 37 Depth= 2
Iter= 20 Queue= 38 Depth= 2
Iter= 21 Queue= 39 Depth= 2
Iter= 22 Queue= 41 Depth= 2
Iter= 23 Queue= 42 Depth= 2
Iter= 24 Queue= 44 Depth= 3
Iter= 25 Queue= 45 Depth= 3
Iter= 26 Queue= 46 Depth= 4
Iter= 27 Queue= 47 Depth= 5
Iter= 28 Queue= 48 Depth= 6
```

GOAL REACHED, SUCCESS!

Number of iterations are :28

Frontier size is :48

Run time (in seconds) :0.77999997139

Depth of goal state is 6

Initial State:

1 | ['A', 'D']

2 | ['B', 'C']

3 | ['E']

Solution path is:

Next move:

1 | ['A']

2 | ['B', 'C']

3 | ['E', 'D']

Next move:

1 | ['A']

2 | ['B']

3 | ['E', 'D', 'C']

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['E', 'D', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | []
3 | ['E', 'D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | []
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

e:\Users\Dell\Desktop>python blocksworld.py 5 3

Initial State:

```
1 | ['D', 'B']
2 | ['A', 'C']
3 | ['E']
```

```
Iter= 1  Queue= 0  Depth= 0
Iter= 2  Queue= 5  Depth= 1
Iter= 3  Queue= 8  Depth= 1
Iter= 4  Queue= 11  Depth= 1
Iter= 5  Queue= 14  Depth= 1
Iter= 6  Queue= 17  Depth= 1
Iter= 7  Queue= 18  Depth= 1
Iter= 8  Queue= 19  Depth= 2
Iter= 9  Queue= 20  Depth= 2
Iter= 10  Queue= 21  Depth= 2
Iter= 11  Queue= 24  Depth= 2
Iter= 12  Queue= 27  Depth= 2
Iter= 13  Queue= 28  Depth= 2
Iter= 14  Queue= 29  Depth= 2
Iter= 15  Queue= 30  Depth= 2
Iter= 16  Queue= 31  Depth= 2
Iter= 17  Queue= 32  Depth= 2
Iter= 18  Queue= 33  Depth= 2
Iter= 19  Queue= 34  Depth= 2
Iter= 20  Queue= 35  Depth= 2
Iter= 21  Queue= 37  Depth= 2
Iter= 22  Queue= 40  Depth= 2
Iter= 23  Queue= 41  Depth= 2
Iter= 24  Queue= 42  Depth= 2
Iter= 25  Queue= 43  Depth= 2
```

Iter= 26	Queue= 45	Depth= 2
Iter= 27	Queue= 46	Depth= 2
Iter= 28	Queue= 48	Depth= 3
Iter= 29	Queue= 50	Depth= 3
Iter= 30	Queue= 51	Depth= 3
Iter= 31	Queue= 54	Depth= 3
Iter= 32	Queue= 55	Depth= 3
Iter= 33	Queue= 56	Depth= 3
Iter= 34	Queue= 57	Depth= 3
Iter= 35	Queue= 60	Depth= 3
Iter= 36	Queue= 61	Depth= 3
Iter= 37	Queue= 61	Depth= 3
Iter= 38	Queue= 62	Depth= 3
Iter= 39	Queue= 63	Depth= 3
Iter= 40	Queue= 64	Depth= 3
Iter= 41	Queue= 65	Depth= 3
Iter= 42	Queue= 64	Depth= 3
Iter= 43	Queue= 65	Depth= 3
Iter= 44	Queue= 66	Depth= 3
Iter= 45	Queue= 67	Depth= 3
Iter= 46	Queue= 68	Depth= 3
Iter= 47	Queue= 67	Depth= 3
Iter= 48	Queue= 67	Depth= 3
Iter= 49	Queue= 66	Depth= 3
Iter= 50	Queue= 67	Depth= 3
Iter= 51	Queue= 69	Depth= 3
Iter= 52	Queue= 70	Depth= 3
Iter= 53	Queue= 69	Depth= 3
Iter= 54	Queue= 69	Depth= 3
Iter= 55	Queue= 70	Depth= 3
Iter= 56	Queue= 71	Depth= 3
Iter= 57	Queue= 72	Depth= 3
Iter= 58	Queue= 73	Depth= 3
Iter= 59	Queue= 76	Depth= 3
Iter= 60	Queue= 77	Depth= 3
Iter= 61	Queue= 78	Depth= 3
Iter= 62	Queue= 79	Depth= 3
Iter= 63	Queue= 80	Depth= 3
Iter= 64	Queue= 81	Depth= 3
Iter= 65	Queue= 82	Depth= 3
Iter= 66	Queue= 84	Depth= 3
Iter= 67	Queue= 85	Depth= 3
Iter= 68	Queue= 84	Depth= 3
Iter= 69	Queue= 85	Depth= 3
Iter= 70	Queue= 88	Depth= 3
Iter= 71	Queue= 89	Depth= 3
Iter= 72	Queue= 90	Depth= 3
Iter= 73	Queue= 89	Depth= 3
Iter= 74	Queue= 90	Depth= 3
Iter= 75	Queue= 91	Depth= 3
Iter= 76	Queue= 92	Depth= 3
Iter= 77	Queue= 95	Depth= 4
Iter= 78	Queue= 96	Depth= 4

Iter= 79	Queue= 97	Depth= 4
Iter= 80	Queue= 98	Depth= 4
Iter= 81	Queue= 99	Depth= 4
Iter= 82	Queue= 102	Depth= 4
Iter= 83	Queue= 103	Depth= 4
Iter= 84	Queue= 104	Depth= 4
Iter= 85	Queue= 105	Depth= 4
Iter= 86	Queue= 104	Depth= 4
Iter= 87	Queue= 105	Depth= 4
Iter= 88	Queue= 106	Depth= 4
Iter= 89	Queue= 109	Depth= 4
Iter= 90	Queue= 110	Depth= 4
Iter= 91	Queue= 109	Depth= 4
Iter= 92	Queue= 110	Depth= 4
Iter= 93	Queue= 113	Depth= 4
Iter= 94	Queue= 115	Depth= 4
Iter= 95	Queue= 116	Depth= 4
Iter= 96	Queue= 117	Depth= 4
Iter= 97	Queue= 117	Depth= 4
Iter= 98	Queue= 118	Depth= 4
Iter= 99	Queue= 119	Depth= 4
Iter= 100	Queue= 120	Depth= 4
Iter= 101	Queue= 121	Depth= 4
Iter= 102	Queue= 122	Depth= 4
Iter= 103	Queue= 121	Depth= 4
Iter= 104	Queue= 122	Depth= 4
Iter= 105	Queue= 123	Depth= 4
Iter= 106	Queue= 123	Depth= 4
Iter= 107	Queue= 122	Depth= 4
Iter= 108	Queue= 123	Depth= 4
Iter= 109	Queue= 124	Depth= 4
Iter= 110	Queue= 127	Depth= 4
Iter= 111	Queue= 130	Depth= 4
Iter= 112	Queue= 133	Depth= 4
Iter= 113	Queue= 134	Depth= 4
Iter= 114	Queue= 135	Depth= 4
Iter= 115	Queue= 138	Depth= 4
Iter= 116	Queue= 141	Depth= 4
Iter= 117	Queue= 144	Depth= 4
Iter= 118	Queue= 145	Depth= 4
Iter= 119	Queue= 146	Depth= 4
Iter= 120	Queue= 148	Depth= 4
Iter= 121	Queue= 150	Depth= 4
Iter= 122	Queue= 152	Depth= 4
Iter= 123	Queue= 154	Depth= 4
Iter= 124	Queue= 155	Depth= 4
Iter= 125	Queue= 156	Depth= 4
Iter= 126	Queue= 157	Depth= 4
Iter= 127	Queue= 158	Depth= 4
Iter= 128	Queue= 160	Depth= 4
Iter= 129	Queue= 162	Depth= 4
Iter= 130	Queue= 163	Depth= 4
Iter= 131	Queue= 164	Depth= 4

Iter=	132	Queue=	165	Depth=	4
Iter=	133	Queue=	166	Depth=	4
Iter=	134	Queue=	167	Depth=	4
Iter=	135	Queue=	166	Depth=	4
Iter=	136	Queue=	165	Depth=	4
Iter=	137	Queue=	166	Depth=	4
Iter=	138	Queue=	165	Depth=	4
Iter=	139	Queue=	165	Depth=	4
Iter=	140	Queue=	164	Depth=	4
Iter=	141	Queue=	164	Depth=	4
Iter=	142	Queue=	164	Depth=	4
Iter=	143	Queue=	164	Depth=	4
Iter=	144	Queue=	163	Depth=	4
Iter=	145	Queue=	162	Depth=	4
Iter=	146	Queue=	163	Depth=	4
Iter=	147	Queue=	164	Depth=	4
Iter=	148	Queue=	165	Depth=	4
Iter=	149	Queue=	166	Depth=	4
Iter=	150	Queue=	167	Depth=	4
Iter=	151	Queue=	169	Depth=	4
Iter=	152	Queue=	170	Depth=	4
Iter=	153	Queue=	169	Depth=	4
Iter=	154	Queue=	168	Depth=	4
Iter=	155	Queue=	168	Depth=	4
Iter=	156	Queue=	169	Depth=	4
Iter=	157	Queue=	172	Depth=	4
Iter=	158	Queue=	171	Depth=	4
Iter=	159	Queue=	172	Depth=	4
Iter=	160	Queue=	171	Depth=	4
Iter=	161	Queue=	170	Depth=	4
Iter=	162	Queue=	171	Depth=	4
Iter=	163	Queue=	172	Depth=	4
Iter=	164	Queue=	171	Depth=	4
Iter=	165	Queue=	171	Depth=	4
Iter=	166	Queue=	170	Depth=	4
Iter=	167	Queue=	169	Depth=	4
Iter=	168	Queue=	170	Depth=	4
Iter=	169	Queue=	171	Depth=	4
Iter=	170	Queue=	170	Depth=	4
Iter=	171	Queue=	171	Depth=	4
Iter=	172	Queue=	172	Depth=	4
Iter=	173	Queue=	175	Depth=	5
Iter=	174	Queue=	176	Depth=	5
Iter=	175	Queue=	178	Depth=	5
Iter=	176	Queue=	178	Depth=	5
Iter=	177	Queue=	178	Depth=	5
Iter=	178	Queue=	179	Depth=	5
Iter=	179	Queue=	180	Depth=	5
Iter=	180	Queue=	181	Depth=	5
Iter=	181	Queue=	182	Depth=	5
Iter=	182	Queue=	183	Depth=	6
Iter=	183	Queue=	185	Depth=	6
Iter=	184	Queue=	184	Depth=	7

```
Iter= 185  Queue= 187  Depth= 8
Iter= 186  Queue= 188  Depth= 9

GOAL REACHED, SUCCESS!
Number of iterations are :186
Frontier size is :188
Run time (in seconds) :4.77399992943
Depth of goal state is 9
```

Initial State:

```
1 | ['D', 'B']
2 | ['A', 'C']
3 | ['E']
```

Solution path is:

Next move:

```
1 | ['D', 'B']
2 | ['A']
3 | ['E', 'C']
```

Next move:

```
1 | ['D']
2 | ['A']
3 | ['E', 'C', 'B']
```

Next move:

```
1 | []
2 | ['A']
3 | ['E', 'C', 'B', 'D']
```

Next move:

```
1 | ['A']
2 | []
3 | ['E', 'C', 'B', 'D']
```

Next move:

```
1 | ['A']
2 | ['D']
3 | ['E', 'C', 'B']
```

Next move:

```
1 | ['A', 'B']
2 | ['D']
3 | ['E', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['D']
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
```

```
2 | []
3 | ['E']
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 5 3
```

Initial State:

```
1 | ['C', 'D']
2 | ['B', 'E']
3 | ['A']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 5 Depth= 1
Iter= 3 Queue= 8 Depth= 1
Iter= 4 Queue= 11 Depth= 1
Iter= 5 Queue= 14 Depth= 1
Iter= 6 Queue= 17 Depth= 1
Iter= 7 Queue= 18 Depth= 1
Iter= 8 Queue= 19 Depth= 2
Iter= 9 Queue= 20 Depth= 2
Iter= 10 Queue= 21 Depth= 2
Iter= 11 Queue= 24 Depth= 2
Iter= 12 Queue= 27 Depth= 2
Iter= 13 Queue= 28 Depth= 2
Iter= 14 Queue= 29 Depth= 2
Iter= 15 Queue= 30 Depth= 2
Iter= 16 Queue= 31 Depth= 2
Iter= 17 Queue= 32 Depth= 2
Iter= 18 Queue= 33 Depth= 2
Iter= 19 Queue= 34 Depth= 2
Iter= 20 Queue= 35 Depth= 2
Iter= 21 Queue= 37 Depth= 2
Iter= 22 Queue= 40 Depth= 2
Iter= 23 Queue= 41 Depth= 2
Iter= 24 Queue= 42 Depth= 2
Iter= 25 Queue= 43 Depth= 2
Iter= 26 Queue= 45 Depth= 2
Iter= 27 Queue= 46 Depth= 2
Iter= 28 Queue= 48 Depth= 3
Iter= 29 Queue= 49 Depth= 3
Iter= 30 Queue= 51 Depth= 3
Iter= 31 Queue= 52 Depth= 3
Iter= 32 Queue= 55 Depth= 3
Iter= 33 Queue= 56 Depth= 3
Iter= 34 Queue= 57 Depth= 3
Iter= 35 Queue= 58 Depth= 3
Iter= 36 Queue= 61 Depth= 3
Iter= 37 Queue= 62 Depth= 3
Iter= 38 Queue= 62 Depth= 3
```


Iter=	39	Queue=	63	Depth=	3
Iter=	40	Queue=	64	Depth=	3
Iter=	41	Queue=	65	Depth=	3
Iter=	42	Queue=	64	Depth=	3
Iter=	43	Queue=	65	Depth=	3
Iter=	44	Queue=	66	Depth=	3
Iter=	45	Queue=	67	Depth=	3
Iter=	46	Queue=	68	Depth=	3
Iter=	47	Queue=	67	Depth=	3
Iter=	48	Queue=	67	Depth=	3
Iter=	49	Queue=	66	Depth=	3
Iter=	50	Queue=	67	Depth=	3
Iter=	51	Queue=	69	Depth=	3
Iter=	52	Queue=	70	Depth=	3
Iter=	53	Queue=	69	Depth=	3
Iter=	54	Queue=	69	Depth=	3
Iter=	55	Queue=	70	Depth=	3
Iter=	56	Queue=	71	Depth=	3
Iter=	57	Queue=	72	Depth=	3
Iter=	58	Queue=	73	Depth=	3
Iter=	59	Queue=	76	Depth=	3
Iter=	60	Queue=	77	Depth=	3
Iter=	61	Queue=	78	Depth=	3
Iter=	62	Queue=	79	Depth=	3
Iter=	63	Queue=	80	Depth=	3
Iter=	64	Queue=	81	Depth=	3
Iter=	65	Queue=	82	Depth=	3
Iter=	66	Queue=	84	Depth=	3
Iter=	67	Queue=	85	Depth=	3
Iter=	68	Queue=	84	Depth=	3
Iter=	69	Queue=	85	Depth=	3
Iter=	70	Queue=	88	Depth=	3
Iter=	71	Queue=	89	Depth=	3
Iter=	72	Queue=	90	Depth=	3
Iter=	73	Queue=	89	Depth=	3
Iter=	74	Queue=	90	Depth=	3
Iter=	75	Queue=	91	Depth=	3
Iter=	76	Queue=	92	Depth=	3
Iter=	77	Queue=	95	Depth=	4
Iter=	78	Queue=	96	Depth=	4
Iter=	79	Queue=	97	Depth=	4
Iter=	80	Queue=	98	Depth=	4
Iter=	81	Queue=	99	Depth=	4
Iter=	82	Queue=	100	Depth=	4
Iter=	83	Queue=	103	Depth=	4
Iter=	84	Queue=	104	Depth=	4
Iter=	85	Queue=	105	Depth=	4
Iter=	86	Queue=	104	Depth=	4
Iter=	87	Queue=	105	Depth=	4
Iter=	88	Queue=	106	Depth=	4
Iter=	89	Queue=	109	Depth=	4
Iter=	90	Queue=	110	Depth=	4
Iter=	91	Queue=	111	Depth=	4

Iter=	92	Queue=	110	Depth=	4
Iter=	93	Queue=	111	Depth=	4
Iter=	94	Queue=	114	Depth=	4
Iter=	95	Queue=	116	Depth=	4
Iter=	96	Queue=	117	Depth=	4
Iter=	97	Queue=	118	Depth=	4
Iter=	98	Queue=	118	Depth=	4
Iter=	99	Queue=	119	Depth=	4
Iter=	100	Queue=	120	Depth=	4
Iter=	101	Queue=	121	Depth=	4
Iter=	102	Queue=	122	Depth=	4
Iter=	103	Queue=	123	Depth=	4
Iter=	104	Queue=	124	Depth=	4
Iter=	105	Queue=	123	Depth=	4
Iter=	106	Queue=	124	Depth=	4
Iter=	107	Queue=	125	Depth=	4
Iter=	108	Queue=	125	Depth=	4
Iter=	109	Queue=	124	Depth=	4
Iter=	110	Queue=	127	Depth=	4
Iter=	111	Queue=	130	Depth=	4
Iter=	112	Queue=	133	Depth=	4
Iter=	113	Queue=	134	Depth=	4
Iter=	114	Queue=	135	Depth=	4
Iter=	115	Queue=	138	Depth=	4
Iter=	116	Queue=	141	Depth=	4
Iter=	117	Queue=	144	Depth=	4
Iter=	118	Queue=	145	Depth=	4
Iter=	119	Queue=	146	Depth=	4
Iter=	120	Queue=	148	Depth=	4
Iter=	121	Queue=	150	Depth=	4
Iter=	122	Queue=	152	Depth=	4
Iter=	123	Queue=	154	Depth=	4
Iter=	124	Queue=	155	Depth=	4
Iter=	125	Queue=	156	Depth=	4
Iter=	126	Queue=	157	Depth=	4
Iter=	127	Queue=	158	Depth=	4
Iter=	128	Queue=	160	Depth=	4
Iter=	129	Queue=	162	Depth=	4
Iter=	130	Queue=	163	Depth=	4
Iter=	131	Queue=	164	Depth=	4
Iter=	132	Queue=	165	Depth=	4
Iter=	133	Queue=	166	Depth=	4
Iter=	134	Queue=	167	Depth=	4
Iter=	135	Queue=	166	Depth=	4
Iter=	136	Queue=	165	Depth=	4
Iter=	137	Queue=	166	Depth=	4
Iter=	138	Queue=	165	Depth=	4
Iter=	139	Queue=	165	Depth=	4
Iter=	140	Queue=	166	Depth=	4
Iter=	141	Queue=	165	Depth=	4
Iter=	142	Queue=	165	Depth=	4
Iter=	143	Queue=	165	Depth=	4
Iter=	144	Queue=	165	Depth=	4

Iter=	145	Queue=	164	Depth=	4
Iter=	146	Queue=	163	Depth=	4
Iter=	147	Queue=	164	Depth=	4
Iter=	148	Queue=	165	Depth=	4
Iter=	149	Queue=	166	Depth=	4
Iter=	150	Queue=	167	Depth=	4
Iter=	151	Queue=	168	Depth=	4
Iter=	152	Queue=	170	Depth=	4
Iter=	153	Queue=	171	Depth=	4
Iter=	154	Queue=	170	Depth=	4
Iter=	155	Queue=	169	Depth=	4
Iter=	156	Queue=	169	Depth=	4
Iter=	157	Queue=	170	Depth=	4
Iter=	158	Queue=	173	Depth=	4
Iter=	159	Queue=	172	Depth=	4
Iter=	160	Queue=	173	Depth=	4
Iter=	161	Queue=	172	Depth=	4
Iter=	162	Queue=	171	Depth=	4
Iter=	163	Queue=	172	Depth=	4
Iter=	164	Queue=	173	Depth=	4
Iter=	165	Queue=	172	Depth=	4
Iter=	166	Queue=	172	Depth=	4
Iter=	167	Queue=	171	Depth=	4
Iter=	168	Queue=	170	Depth=	4
Iter=	169	Queue=	171	Depth=	4
Iter=	170	Queue=	170	Depth=	4
Iter=	171	Queue=	171	Depth=	4
Iter=	172	Queue=	172	Depth=	4
Iter=	173	Queue=	175	Depth=	5
Iter=	174	Queue=	176	Depth=	5
Iter=	175	Queue=	177	Depth=	5
Iter=	176	Queue=	179	Depth=	5
Iter=	177	Queue=	180	Depth=	5
Iter=	178	Queue=	179	Depth=	5
Iter=	179	Queue=	178	Depth=	5
Iter=	180	Queue=	181	Depth=	5
Iter=	181	Queue=	184	Depth=	5
Iter=	182	Queue=	185	Depth=	5
Iter=	183	Queue=	186	Depth=	6
Iter=	184	Queue=	187	Depth=	6
Iter=	185	Queue=	188	Depth=	5
Iter=	186	Queue=	191	Depth=	5
Iter=	187	Queue=	194	Depth=	5
Iter=	188	Queue=	193	Depth=	5
Iter=	189	Queue=	194	Depth=	5
Iter=	190	Queue=	194	Depth=	5
Iter=	191	Queue=	193	Depth=	5
Iter=	192	Queue=	194	Depth=	6
Iter=	193	Queue=	195	Depth=	5
Iter=	194	Queue=	196	Depth=	5
Iter=	195	Queue=	195	Depth=	5
Iter=	196	Queue=	195	Depth=	5
Iter=	197	Queue=	196	Depth=	5

Iter= 198	Queue= 199	Depth= 5
Iter= 199	Queue= 202	Depth= 5
Iter= 200	Queue= 203	Depth= 5
Iter= 201	Queue= 204	Depth= 5
Iter= 202	Queue= 207	Depth= 6
Iter= 203	Queue= 208	Depth= 5
Iter= 204	Queue= 209	Depth= 5
Iter= 205	Queue= 210	Depth= 5
Iter= 206	Queue= 213	Depth= 5
Iter= 207	Queue= 214	Depth= 5
Iter= 208	Queue= 215	Depth= 5
Iter= 209	Queue= 214	Depth= 5
Iter= 210	Queue= 215	Depth= 5
Iter= 211	Queue= 216	Depth= 5
Iter= 212	Queue= 215	Depth= 5
Iter= 213	Queue= 214	Depth= 5
Iter= 214	Queue= 215	Depth= 5
Iter= 215	Queue= 218	Depth= 5
Iter= 216	Queue= 218	Depth= 5
Iter= 217	Queue= 217	Depth= 5
Iter= 218	Queue= 218	Depth= 5
Iter= 219	Queue= 218	Depth= 5
Iter= 220	Queue= 221	Depth= 5
Iter= 221	Queue= 222	Depth= 5
Iter= 222	Queue= 224	Depth= 5
Iter= 223	Queue= 225	Depth= 5
Iter= 224	Queue= 226	Depth= 5
Iter= 225	Queue= 227	Depth= 5
Iter= 226	Queue= 228	Depth= 5
Iter= 227	Queue= 229	Depth= 5
Iter= 228	Queue= 228	Depth= 5
Iter= 229	Queue= 229	Depth= 5
Iter= 230	Queue= 230	Depth= 5
Iter= 231	Queue= 230	Depth= 5
Iter= 232	Queue= 230	Depth= 5
Iter= 233	Queue= 230	Depth= 5
Iter= 234	Queue= 230	Depth= 5
Iter= 235	Queue= 229	Depth= 5
Iter= 236	Queue= 228	Depth= 5
Iter= 237	Queue= 229	Depth= 5
Iter= 238	Queue= 228	Depth= 5
Iter= 239	Queue= 227	Depth= 5
Iter= 240	Queue= 227	Depth= 5
Iter= 241	Queue= 226	Depth= 5
Iter= 242	Queue= 225	Depth= 5
Iter= 243	Queue= 226	Depth= 5
Iter= 244	Queue= 227	Depth= 5
Iter= 245	Queue= 228	Depth= 5
Iter= 246	Queue= 229	Depth= 5
Iter= 247	Queue= 230	Depth= 5
Iter= 248	Queue= 231	Depth= 5
Iter= 249	Queue= 231	Depth= 5
Iter= 250	Queue= 231	Depth= 5

Iter=	251	Queue=	232	Depth=	5
Iter=	252	Queue=	233	Depth=	5
Iter=	253	Queue=	234	Depth=	5
Iter=	254	Queue=	234	Depth=	5
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Iter=	256	Queue=	236	Depth=	5
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Iter=	273	Queue=	245	Depth=	5
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Iter=	296	Queue=	269	Depth=	5
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Iter=	299	Queue=	273	Depth=	5
Iter=	300	Queue=	272	Depth=	5
Iter=	301	Queue=	273	Depth=	5
Iter=	302	Queue=	274	Depth=	5
Iter=	303	Queue=	273	Depth=	5

Iter=	304	Queue=	274	Depth=	5
Iter=	305	Queue=	275	Depth=	5
Iter=	306	Queue=	274	Depth=	5
Iter=	307	Queue=	275	Depth=	5
Iter=	308	Queue=	276	Depth=	5
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Iter=	310	Queue=	278	Depth=	5
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Iter=	333	Queue=	289	Depth=	5
Iter=	334	Queue=	288	Depth=	5
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Iter=	346	Queue=	297	Depth=	5
Iter=	347	Queue=	298	Depth=	5
Iter=	348	Queue=	297	Depth=	5
Iter=	349	Queue=	298	Depth=	5
Iter=	350	Queue=	298	Depth=	5
Iter=	351	Queue=	299	Depth=	5
Iter=	352	Queue=	300	Depth=	5
Iter=	353	Queue=	301	Depth=	6
Iter=	354	Queue=	302	Depth=	6
Iter=	355	Queue=	305	Depth=	6
Iter=	356	Queue=	308	Depth=	6

```
Iter= 357 Queue= 311 Depth= 6
Iter= 358 Queue= 314 Depth= 6
Iter= 359 Queue= 317 Depth= 6
Iter= 360 Queue= 318 Depth= 6
Iter= 361 Queue= 321 Depth= 6
Iter= 362 Queue= 324 Depth= 6
Iter= 363 Queue= 327 Depth= 6
Iter= 364 Queue= 328 Depth= 6
Iter= 365 Queue= 329 Depth= 6
Iter= 366 Queue= 328 Depth= 6
Iter= 367 Queue= 328 Depth= 6
Iter= 368 Queue= 327 Depth= 6
Iter= 369 Queue= 326 Depth= 7
Iter= 370 Queue= 327 Depth= 7
Iter= 371 Queue= 329 Depth= 6
Iter= 372 Queue= 329 Depth= 6
Iter= 373 Queue= 331 Depth= 7
Iter= 374 Queue= 332 Depth= 8
Iter= 375 Queue= 335 Depth= 7
Iter= 376 Queue= 336 Depth= 9
Iter= 377 Queue= 337 Depth= 8
Iter= 378 Queue= 337 Depth= 10
```

GOAL REACHED, SUCCESS!

Number of iterations are :378

Frontier size is :337

Run time (in seconds) :9.59800004959

Depth of goal state is 10

Initial State:

1 | ['C', 'D']

2 | ['B', 'E']

3 | ['A']

Solution path is:

Next move:

1 | ['C', 'D']

2 | ['B', 'E', 'A']

3 | []

Next move:

1 | ['C']

2 | ['B', 'E', 'A']

3 | ['D']

Next move:

1 | []

2 | ['B', 'E', 'A']

3 | ['D', 'C']

Next move:

1 | ['A']

```
2 | ['B', 'E']
3 | ['D', 'C']
```

Next move:

```
1 | ['A']
2 | ['B']
3 | ['D', 'C', 'E']
```

Next move:

```
1 | ['A', 'B']
2 | []
3 | ['D', 'C', 'E']
```

Next move:

```
1 | ['A', 'B']
2 | ['E']
3 | ['D', 'C']
```

Next move:

```
1 | ['A', 'B', 'C']
2 | ['E']
3 | ['D']
```

Next move:

```
1 | ['A', 'B', 'C', 'D']
2 | ['E']
3 | []
```

Next move:

```
1 | ['A', 'B', 'C', 'D', 'E']
2 | []
3 | []
```

```
e:\Users\Dell\Desktop>python blocksworld.py 6 4
```

Initial State:

```
1 | ['F', 'E']
2 | ['C', 'D']
3 | ['A']
4 | ['B']
```

```
Iter= 1 Queue= 0 Depth= 0
Iter= 2 Queue= 11 Depth= 1
Iter= 3 Queue= 19 Depth= 1
Iter= 4 Queue= 27 Depth= 1
Iter= 5 Queue= 35 Depth= 1
Iter= 6 Queue= 43 Depth= 1
Iter= 7 Queue= 50 Depth= 1
Iter= 8 Queue= 57 Depth= 1
Iter= 9 Queue= 61 Depth= 1
Iter= 10 Queue= 65 Depth= 1
Iter= 11 Queue= 68 Depth= 1
Iter= 12 Queue= 71 Depth= 1
```


Iter= 13	Queue= 74	Depth= 1
Iter= 14	Queue= 77	Depth= 2
Iter= 15	Queue= 82	Depth= 2
Iter= 16	Queue= 86	Depth= 2
Iter= 17	Queue= 90	Depth= 2
Iter= 18	Queue= 94	Depth= 2
Iter= 19	Queue= 98	Depth= 2
Iter= 20	Queue= 99	Depth= 2
Iter= 21	Queue= 102	Depth= 2
Iter= 22	Queue= 105	Depth= 2
Iter= 23	Queue= 106	Depth= 2
Iter= 24	Queue= 110	Depth= 2
Iter= 25	Queue= 115	Depth= 2
Iter= 26	Queue= 117	Depth= 2
Iter= 27	Queue= 124	Depth= 2
Iter= 28	Queue= 131	Depth= 2
Iter= 29	Queue= 135	Depth= 2
Iter= 30	Queue= 136	Depth= 2
Iter= 31	Queue= 137	Depth= 2
Iter= 32	Queue= 140	Depth= 2
Iter= 33	Queue= 142	Depth= 2
Iter= 34	Queue= 144	Depth= 2
Iter= 35	Queue= 149	Depth= 2
Iter= 36	Queue= 154	Depth= 2
Iter= 37	Queue= 158	Depth= 2
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Iter= 50	Queue= 199	Depth= 2
Iter= 51	Queue= 205	Depth= 2
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Iter= 53	Queue= 217	Depth= 2
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Iter= 55	Queue= 222	Depth= 2
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Iter= 57	Queue= 224	Depth= 2
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Iter= 60	Queue= 240	Depth= 2
Iter= 61	Queue= 242	Depth= 2
Iter= 62	Queue= 243	Depth= 2
Iter= 63	Queue= 247	Depth= 2
Iter= 64	Queue= 248	Depth= 2
Iter= 65	Queue= 249	Depth= 2

Iter=	66	Queue=	252	Depth=	2
Iter=	67	Queue=	257	Depth=	2
Iter=	68	Queue=	263	Depth=	2
Iter=	69	Queue=	264	Depth=	2
Iter=	70	Queue=	263	Depth=	2
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Iter=	82	Queue=	307	Depth=	2
Iter=	83	Queue=	308	Depth=	2
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Iter=	89	Queue=	328	Depth=	2
Iter=	90	Queue=	333	Depth=	2
Iter=	91	Queue=	337	Depth=	2
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Iter=	93	Queue=	345	Depth=	3
Iter=	94	Queue=	347	Depth=	3
Iter=	95	Queue=	351	Depth=	3
Iter=	96	Queue=	353	Depth=	4
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Iter=	104	Queue=	367	Depth=	3
Iter=	105	Queue=	372	Depth=	3
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Iter=	109	Queue=	378	Depth=	3
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Iter=	271	Queue=	754	Depth=	3
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Iter=	287	Queue=	795	Depth=	3
Iter=	288	Queue=	796	Depth=	3
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Iter=	291	Queue=	799	Depth=	4
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Iter=	315	Queue=	849	Depth=	3
Iter=	316	Queue=	851	Depth=	3
Iter=	317	Queue=	854	Depth=	3
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Iter=	319	Queue=	863	Depth=	3
Iter=	320	Queue=	868	Depth=	3
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Iter=	322	Queue=	870	Depth=	3
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Iter=	326	Queue=	874	Depth=	3
Iter=	327	Queue=	873	Depth=	3
Iter=	328	Queue=	874	Depth=	3
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Iter=	330	Queue=	883	Depth=	3

Iter=	331	Queue=	887	Depth=	3
Iter=	332	Queue=	886	Depth=	3
Iter=	333	Queue=	887	Depth=	3
Iter=	334	Queue=	886	Depth=	3
Iter=	335	Queue=	889	Depth=	3
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Iter=	381	Queue=	979	Depth=	3
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Iter=	4515	Queue=	6305	Depth=	7
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Iter=	4517	Queue=	6310	Depth=	7

Iter=	4518	Queue=	6312	Depth=	7
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Iter=	4567	Queue=	6368	Depth=	6
Iter=	4568	Queue=	6367	Depth=	6
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Iter=	4573	Queue=	6373	Depth=	7
Iter=	4574	Queue=	6376	Depth=	7
Iter=	4575	Queue=	6378	Depth=	7
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Iter=	4620	Queue=	6465	Depth=	6
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Iter=	4626	Queue=	6476	Depth=	6
Iter=	4627	Queue=	6480	Depth=	6
Iter=	4628	Queue=	6482	Depth=	7
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Iter=	4677	Queue=	6512	Depth=	6
Iter=	4678	Queue=	6514	Depth=	6
Iter=	4679	Queue=	6516	Depth=	6
Iter=	4680	Queue=	6515	Depth=	6
Iter=	4681	Queue=	6517	Depth=	6
Iter=	4682	Queue=	6519	Depth=	6
Iter=	4683	Queue=	6521	Depth=	6
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Iter=	4685	Queue=	6522	Depth=	7
Iter=	4686	Queue=	6524	Depth=	6
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Iter=	4698	Queue=	6531	Depth=	6
Iter=	4699	Queue=	6530	Depth=	6
Iter=	4700	Queue=	6533	Depth=	6
Iter=	4701	Queue=	6534	Depth=	6
Iter=	4702	Queue=	6533	Depth=	6
Iter=	4703	Queue=	6537	Depth=	6
Iter=	4704	Queue=	6536	Depth=	6
Iter=	4705	Queue=	6535	Depth=	7
Iter=	4706	Queue=	6537	Depth=	8
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Iter=	4708	Queue=	6535	Depth=	6
Iter=	4709	Queue=	6534	Depth=	6
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Iter=	4712	Queue=	6539	Depth=	6
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Iter=	4726	Queue=	6561	Depth=	6
Iter=	4727	Queue=	6563	Depth=	6
Iter=	4728	Queue=	6565	Depth=	6
Iter=	4729	Queue=	6566	Depth=	6

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Iter= 4730 Queue= 6568 Depth= 6
Iter= 4731 Queue= 6569 Depth= 6
Iter= 4732 Queue= 6571 Depth= 6
Iter= 4733 Queue= 6573 Depth= 7
Iter= 4734 Queue= 6575 Depth= 8
Iter= 4735 Queue= 6575 Depth= 8
Iter= 4736 Queue= 6577 Depth= 8
Iter= 4737 Queue= 6578 Depth= 8
Iter= 4738 Queue= 6577 Depth= 8
Iter= 4739 Queue= 6579 Depth= 8
Iter= 4740 Queue= 6579 Depth= 8
Iter= 4741 Queue= 6578 Depth= 7
Iter= 4742 Queue= 6577 Depth= 8
Iter= 4743 Queue= 6576 Depth= 10
Iter= 4744 Queue= 6575 Depth= 10
Iter= 4745 Queue= 6574 Depth= 11
```

GOAL REACHED, SUCCESS!

Number of iterations are :4745

Frontier size is :6574

Run time (in seconds) :130.924000025

Depth of goal state is 11

Initial State:

1 | ['F', 'E']

2 | ['C', 'D']

3 | ['A']

4 | ['B']

Solution path is:

Next move:

1 | ['F', 'E']

2 | ['C', 'D', 'B']

3 | ['A']

4 | []

Next move:

1 | ['F']

2 | ['C', 'D', 'B']

3 | ['A']

4 | ['E']

Next move:

1 | []

2 | ['C', 'D', 'B']

3 | ['A']

4 | ['E', 'F']

Next move:

1 | ['A']

2 | ['C', 'D', 'B']

3 | []

4 | ['E', 'F']

Next move:

1 | ['A', 'B']

2 | ['C', 'D']

3 | []

4 | ['E', 'F']

Next move:

1 | ['A', 'B']

2 | ['C']

3 | ['D']

4 | ['E', 'F']

Next move:

1 | ['A', 'B', 'C']

2 | []

3 | ['D']

4 | ['E', 'F']

Next move:

1 | ['A', 'B', 'C', 'D']

2 | []

3 | []

4 | ['E', 'F']

Next move:

1 | ['A', 'B', 'C', 'D']

2 | []

3 | ['F']

4 | ['E']

Next move:

1 | ['A', 'B', 'C', 'D', 'E']

2 | []

3 | ['F']

4 | []

Next move:

1 | ['A', 'B', 'C', 'D', 'E', 'F']

2 | []

3 | []

4 | []