EXAMPLE PROGRAM TRACES

EXAMPLE 1

$ ./a.out 5 3
Blocks: 5 Stacks: 3
initial state:
1 | C A B
2 | E
3 | D
goal state:
1 | A B C D E
2 |
3 |
iter=1, queue=1, f=g+h=10, depth=0
iter=2, queue=6, f=g+h=11, depth=1
iter=3, queue=9, f=g+h=11, depth=1
iter=4, queue=10, f=g+h=11, depth=1
iter=5, queue=11, f=g+h=11, depth=2
iter=6, queue=14, f=g+h=11, depth=1
iter=7, queue=17, f=g+h=11, depth=1
iter=8, queue=18, f=g+h=11, depth=2
iter=9, queue=21, f=g+h=11, depth=1
iter=10, queue=22, f=g+h=12, depth=2
iter=11, queue=23, f=g+h=12, depth=2
iter=12, queue=26, f=g+h=12, depth=2
iter=13, queue=27, f=g+h=12, depth=3
iter=14, queue=30, f=g+h=12, depth=2
iter=15, queue=31, f=g+h=12, depth=2
iter=16, queue=32, f=g+h=12, depth=2
iter=17, queue=35, f=g+h=12, depth=2
iter=18, queue=36, f=g+h=12, depth=3
iter=19, queue=37, f=g+h=12, depth=2
iter=20, queue=37, f=g+h=12, depth=3
iter=21, queue=38, f=g+h=12, depth=2
iter=22, queue=41, f=g+h=12, depth=2
iter=23, queue=44, f=g+h=12, depth=2
iter=24, queue=43, f=g+h=12, depth=3
iter=25, queue=46, f=g+h=12, depth=3
iter=26, queue=47, f=g+h=12, depth=4
iter=27, queue=50, f=g+h=12, depth=4
iter=28, queue=52, f=g+h=11, depth=5
iter=29, queue=55, f=g+h=10, depth=6
iter=30, queue=58, f=g+h=9, depth=7

iter=31, queue=59, f=g+h=8, depth=8
success! depth=8, total_goal_tests=31, max_queue_size=59
solution path:
1 | C A B
2 | E
3 | D

1 | C A
2 | E
3 | D B

1 | C
2 | E
3 | D B A

1 |
2 | E C
3 | D B A

1 | A
2 | E C
3 | D B

1 | A B
2 | E C
3 | D

1 | A B C
2 | E
3 | D

1 | A B C D
2 | E
3 |

1 | A B C D E
2 |
3 |

EXAMPLE 2

```
$ ./a.out 10 5
Blocks: 10 Stacks: 5
initial state:
1 | D
2 | E J I G H
3 | C F
4 | A
5 | B
goal state:
1 | A B C D E F G H I J
2 |
3 |
4 |
5 |
iter=1, queue=1, f=g+h=19, depth=0
iter=2, queue=20, f=g+h=20, depth=1
iter=3, queue=31, f=g+h=20, depth=1
iter=4, queue=46, f=g+h=20, depth=1
iter=5, queue=60, f=g+h=20, depth=2
iter=6, queue=71, f=g+h=19, depth=3
iter=7, queue=78, f=g+h=19, depth=4
iter=8, queue=85, f=g+h=20, depth=1
iter=9, queue=96, f=g+h=20, depth=1
iter=10, queue=104, f=g+h=20, depth=5
iter=11, queue=115, f=g+h=20, depth=5
iter=12, queue=126, f=g+h=20, depth=2
iter=13, queue=133, f=g+h=19, depth=3
iter=14, queue=136, f=g+h=19, depth=4
iter=15, queue=143, f=g+h=20, depth=5
iter=16, queue=152, f=g+h=20, depth=5
iter=17, queue=159, f=g+h=20, depth=4
iter=18, queue=165, f=g+h=19, depth=5
iter=19, queue=168, f=g+h=20, depth=4
iter=20, queue=178, f=g+h=19, depth=5
iter=21, queue=181, f=g+h=18, depth=6
iter=22, queue=188, f=g+h=18, depth=7
iter=23, queue=191, f=g+h=19, depth=7
iter=24, queue=198, f=g+h=19, depth=7
iter=25, queue=208, f=g+h=19, depth=8
iter=26, queue=210, f=g+h=19, depth=7
iter=27, queue=220, f=g+h=19, depth=7
iter=28, queue=227, f=g+h=19, depth=7
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iter=29, queue=231, f=g+h=19, depth=8
iter=30, queue=234, f=g+h=19, depth=8
iter=31, queue=237, f=g+h=19, depth=8
iter=32, queue=242, f=g+h=19, depth=7
iter=33, queue=245, f=g+h=19, depth=7
iter=34, queue=249, f=g+h=20, depth=8
iter=35, queue=258, f=g+h=20, depth=8
iter=36, queue=263, f=g+h=20, depth=9
iter=37, queue=273, f=g+h=20, depth=9
iter=38, queue=283, f=g+h=20, depth=8
iter=39, queue=290, f=g+h=20, depth=8
iter=40, queue=297, f=g+h=20, depth=9
iter=41, queue=303, f=g+h=20, depth=8
iter=42, queue=310, f=g+h=20, depth=9
iter=43, queue=316, f=g+h=20, depth=9
iter=44, queue=322, f=g+h=20, depth=9
iter=45, queue=332, f=g+h=20, depth=9
iter=46, queue=338, f=g+h=20, depth=9
iter=47, queue=345, f=g+h=20, depth=9
iter=48, queue=351, f=g+h=20, depth=8
iter=49, queue=360, f=g+h=20, depth=8
iter=50, queue=367, f=g+h=20, depth=8
iter=51, queue=374, f=g+h=20, depth=8
iter=52, queue=381, f=g+h=20, depth=8
iter=53, queue=388, f=g+h=20, depth=8
iter=54, queue=395, f=g+h=20, depth=8
iter=55, queue=405, f=g+h=20, depth=8
iter=56, queue=412, f=g+h=20, depth=8
iter=57, queue=421, f=g+h=20, depth=8
iter=58, queue=424, f=g+h=20, depth=8
iter=59, queue=430, f=g+h=20, depth=8
iter=60, queue=435, f=g+h=20, depth=8
iter=61, queue=444, f=g+h=20, depth=8
iter=62, queue=447, f=g+h=20, depth=8
iter=63, queue=453, f=g+h=20, depth=8
iter=64, queue=463, f=g+h=20, depth=8
iter=65, queue=466, f=g+h=20, depth=8
iter=66, queue=471, f=g+h=20, depth=8
iter=67, queue=478, f=g+h=20, depth=8
iter=68, queue=487, f=g+h=20, depth=8
iter=69, queue=488, f=g+h=20, depth=8
iter=70, queue=490, f=g+h=20, depth=8
iter=71, queue=492, f=g+h=20, depth=8
iter=72, queue=497, f=g+h=20, depth=8
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iter=73, queue=500, f=g+h=20, depth=5
iter=74, queue=507, f=g+h=20, depth=6
iter=75, queue=510, f=g+h=20, depth=6
iter=76, queue=516, f=g+h=20, depth=6
iter=77, queue=526, f=g+h=20, depth=6
iter=78, queue=534, f=g+h=20, depth=6
iter=79, queue=540, f=g+h=20, depth=6
iter=80, queue=539, f=g+h=20, depth=6
iter=81, queue=543, f=g+h=20, depth=4
iter=82, queue=552, f=g+h=19, depth=5
iter=83, queue=555, f=g+h=18, depth=6
iter=84, queue=558, f=g+h=19, depth=7
iter=85, queue=561, f=g+h=19, depth=7
iter=86, queue=568, f=g+h=19, depth=7
iter=87, queue=575, f=g+h=19, depth=7
iter=88, queue=584, f=g+h=20, depth=4
iter=89, queue=592, f=g+h=20, depth=4
iter=90, queue=601, f=g+h=20, depth=8
iter=91, queue=606, f=g+h=20, depth=8
iter=92, queue=614, f=g+h=20, depth=8
iter=93, queue=626, f=g+h=20, depth=8
iter=94, queue=633, f=g+h=20, depth=8
iter=95, queue=638, f=g+h=20, depth=8
iter=96, queue=647, f=g+h=20, depth=8
iter=97, queue=650, f=g+h=20, depth=8
iter=98, queue=657, f=g+h=20, depth=8
iter=99, queue=666, f=g+h=20, depth=8
iter=100, queue=669, f=g+h=20, depth=8
iter=101, queue=676, f=g+h=20, depth=8
iter=102, queue=683, f=g+h=20, depth=8
iter=103, queue=690, f=g+h=20, depth=8
iter=104, queue=693, f=g+h=20, depth=8
iter=105, queue=700, f=g+h=20, depth=8
iter=106, queue=707, f=g+h=20, depth=4
iter=107, queue=712, f=g+h=20, depth=5
iter=108, queue=718, f=g+h=20, depth=1
iter=109, queue=732, f=g+h=20, depth=8
iter=110, queue=735, f=g+h=20, depth=8
iter=111, queue=738, f=g+h=20, depth=1
iter=112, queue=748, f=g+h=20, depth=6
iter=113, queue=756, f=g+h=20, depth=5
iter=114, queue=767, f=g+h=20, depth=2
iter=115, queue=774, f=g+h=20, depth=5
iter=116, queue=785, f=g+h=20, depth=6
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iter=117, queue=791, f=g+h=20, depth=6
iter=118, queue=798, f=g+h=20, depth=4
iter=119, queue=807, f=g+h=20, depth=5
iter=120, queue=813, f=g+h=20, depth=5
iter=121, queue=824, f=g+h=20, depth=4
iter=122, queue=823, f=g+h=20, depth=1
iter=123, queue=836, f=g+h=20, depth=4
iter=124, queue=842, f=g+h=20, depth=4
iter=125, queue=850, f=g+h=20, depth=5
iter=126, queue=853, f=g+h=20, depth=5
iter=127, queue=860, f=g+h=21, depth=9
iter=128, queue=859, f=g+h=21, depth=10
iter=129, queue=864, f=g+h=21, depth=9
iter=130, queue=872, f=g+h=21, depth=7
iter=131, queue=875, f=g+h=21, depth=5
iter=132, queue=885, f=g+h=21, depth=7
iter=133, queue=888, f=g+h=21, depth=7
iter=134, queue=891, f=g+h=21, depth=3
iter=135, queue=901, f=g+h=21, depth=9
iter=136, queue=913, f=g+h=21, depth=7
iter=137, queue=916, f=g+h=21, depth=6
iter=138, queue=926, f=g+h=21, depth=9
iter=139, queue=934, f=g+h=21, depth=6
iter=140, queue=941, f=g+h=21, depth=6
iter=141, queue=951, f=g+h=21, depth=3
iter=142, queue=964, f=g+h=21, depth=9
iter=143, queue=972, f=g+h=21, depth=9
iter=144, queue=979, f=g+h=21, depth=2
iter=145, queue=986, f=g+h=21, depth=9
iter=146, queue=992, f=g+h=21, depth=9
iter=147, queue=995, f=g+h=21, depth=9
iter=148, queue=998, f=g+h=21, depth=6
iter=149, queue=1007, f=g+h=21, depth=9
iter=150, queue=1010, f=g+h=21, depth=9
iter=151, queue=1013, f=g+h=21, depth=3
iter=152, queue=1012, f=g+h=21, depth=6
iter=153, queue=1021, f=g+h=21, depth=9
iter=154, queue=1026, f=g+h=21, depth=9
iter=155, queue=1032, f=g+h=21, depth=9
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iter=165, queue=1056, f=g+h=21, depth=2
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iter=171, queue=1095, f=g+h=21, depth=2
iter=172, queue=1100, f=g+h=21, depth=3
iter=173, queue=1111, f=g+h=21, depth=9
iter=174, queue=1120, f=g+h=21, depth=9
iter=175, queue=1128, f=g+h=21, depth=6
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iter=181, queue=1171, f=g+h=21, depth=9
iter=182, queue=1180, f=g+h=21, depth=9
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iter=187, queue=1208, f=g+h=21, depth=10
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iter=189, queue=1220, f=g+h=21, depth=9
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iter=196, queue=1263, f=g+h=21, depth=9
iter=197, queue=1268, f=g+h=21, depth=9
iter=198, queue=1277, f=g+h=21, depth=9
iter=199, queue=1287, f=g+h=21, depth=9
iter=200, queue=1298, f=g+h=21, depth=1
iter=201, queue=1306, f=g+h=21, depth=6
iter=202, queue=1313, f=g+h=21, depth=9
iter=203, queue=1314, f=g+h=21, depth=2
iter=204, queue=1324, f=g+h=21, depth=2

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iter=205, queue=1335, f=g+h=21, depth=9
iter=206, queue=1339, f=g+h=21, depth=9
iter=207, queue=1345, f=g+h=21, depth=9
iter=208, queue=1350, f=g+h=21, depth=9
iter=209, queue=1359, f=g+h=21, depth=9
iter=210, queue=1360, f=g+h=21, depth=3
iter=211, queue=1369, f=g+h=21, depth=9
iter=212, queue=1368, f=g+h=21, depth=9
iter=213, queue=1373, f=g+h=21, depth=9
iter=214, queue=1376, f=g+h=21, depth=9
iter=215, queue=1384, f=g+h=21, depth=9
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iter=224, queue=1450, f=g+h=21, depth=2
iter=225, queue=1461, f=g+h=21, depth=9
iter=226, queue=1471, f=g+h=21, depth=6
iter=227, queue=1478, f=g+h=21, depth=9
iter=228, queue=1481, f=g+h=21, depth=9
iter=229, queue=1487, f=g+h=21, depth=9
iter=230, queue=1490, f=g+h=21, depth=3
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iter=234, queue=1506, f=g+h=21, depth=9
iter=235, queue=1517, f=g+h=21, depth=9
iter=236, queue=1523, f=g+h=21, depth=9
iter=237, queue=1530, f=g+h=21, depth=6
iter=238, queue=1544, f=g+h=21, depth=5
iter=239, queue=1554, f=g+h=21, depth=6
iter=240, queue=1564, f=g+h=21, depth=6
iter=241, queue=1573, f=g+h=21, depth=6
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iter=243, queue=1590, f=g+h=21, depth=5
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iter=245, queue=1607, f=g+h=21, depth=6
iter=246, queue=1614, f=g+h=21, depth=9
iter=247, queue=1613, f=g+h=21, depth=2
iter=248, queue=1618, f=g+h=21, depth=9
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iter=249, queue=1617, f=g+h=21, depth=5
iter=250, queue=1624, f=g+h=21, depth=5
iter=251, queue=1634, f=g+h=21, depth=9
iter=252, queue=1637, f=g+h=21, depth=5
iter=253, queue=1644, f=g+h=21, depth=5
iter=254, queue=1650, f=g+h=21, depth=5
iter=255, queue=1656, f=g+h=21, depth=2
iter=256, queue=1657, f=g+h=21, depth=2
iter=257, queue=1672, f=g+h=21, depth=9
iter=258, queue=1671, f=g+h=21, depth=9
iter=259, queue=1678, f=g+h=21, depth=9
iter=260, queue=1685, f=g+h=21, depth=9
iter=261, queue=1688, f=g+h=21, depth=9
iter=262, queue=1695, f=g+h=21, depth=9
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iter=267, queue=1721, f=g+h=21, depth=2
iter=268, queue=1732, f=g+h=21, depth=2
iter=269, queue=1742, f=g+h=21, depth=2
iter=270, queue=1753, f=g+h=21, depth=6
iter=271, queue=1762, f=g+h=21, depth=9
iter=272, queue=1761, f=g+h=21, depth=3
iter=273, queue=1769, f=g+h=20, depth=4
iter=274, queue=1770, f=g+h=21, depth=9
iter=275, queue=1771, f=g+h=21, depth=6
iter=276, queue=1775, f=g+h=21, depth=2
iter=277, queue=1785, f=g+h=21, depth=5
iter=278, queue=1791, f=g+h=21, depth=5
iter=279, queue=1797, f=g+h=20, depth=6
iter=280, queue=1796, f=g+h=21, depth=6
iter=281, queue=1799, f=g+h=21, depth=3
iter=282, queue=1806, f=g+h=20, depth=4
iter=283, queue=1809, f=g+h=19, depth=5
iter=284, queue=1812, f=g+h=18, depth=6
iter=285, queue=1811, f=g+h=20, depth=6
iter=286, queue=1814, f=g+h=20, depth=6
iter=287, queue=1816, f=g+h=20, depth=6
iter=288, queue=1818, f=g+h=21, depth=9
iter=289, queue=1823, f=g+h=21, depth=6
iter=290, queue=1829, f=g+h=21, depth=4
iter=291, queue=1836, f=g+h=21, depth=5
iter=292, queue=1838, f=g+h=21, depth=5
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iter=293, queue=1843, f=g+h=21, depth=5
iter=294, queue=1849, f=g+h=21, depth=9
iter=295, queue=1850, f=g+h=21, depth=6
iter=296, queue=1861, f=g+h=21, depth=2
iter=297, queue=1865, f=g+h=21, depth=2
iter=298, queue=1880, f=g+h=21, depth=9
iter=299, queue=1883, f=g+h=21, depth=6
iter=300, queue=1890, f=g+h=21, depth=6
iter=301, queue=1901, f=g+h=21, depth=6
iter=302, queue=1910, f=g+h=21, depth=6
iter=303, queue=1919, f=g+h=21, depth=9
iter=304, queue=1926, f=g+h=21, depth=6
iter=305, queue=1932, f=g+h=21, depth=6
iter=306, queue=1939, f=g+h=21, depth=2
iter=307, queue=1944, f=g+h=21, depth=9
iter=308, queue=1951, f=g+h=21, depth=9
iter=309, queue=1954, f=g+h=21, depth=5
iter=310, queue=1961, f=g+h=21, depth=5
iter=311, queue=1970, f=g+h=21, depth=5
iter=312, queue=1980, f=g+h=21, depth=2
iter=313, queue=1995, f=g+h=21, depth=6
iter=314, queue=2004, f=g+h=21, depth=6
iter=315, queue=2011, f=g+h=21, depth=9
iter=316, queue=2020, f=g+h=21, depth=5
iter=317, queue=2027, f=g+h=21, depth=9
iter=318, queue=2036, f=g+h=21, depth=9
iter=319, queue=2041, f=g+h=21, depth=6
iter=320, queue=2044, f=g+h=21, depth=9
iter=321, queue=2043, f=g+h=21, depth=7
iter=322, queue=2051, f=g+h=21, depth=7
iter=323, queue=2060, f=g+h=21, depth=7
iter=324, queue=2070, f=g+h=21, depth=7
iter=325, queue=2077, f=g+h=21, depth=9
iter=326, queue=2084, f=g+h=21, depth=9
iter=327, queue=2091, f=g+h=21, depth=7
iter=328, queue=2098, f=g+h=21, depth=7
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iter=700, queue=4151, f=g+h=22, depth=3
iter=701, queue=4166, f=g+h=22, depth=2
iter=702, queue=4175, f=g+h=22, depth=3
iter=703, queue=4181, f=g+h=22, depth=4
iter=704, queue=4191, f=g+h=22, depth=10
iter=705, queue=4196, f=g+h=22, depth=10
iter=706, queue=4202, f=g+h=22, depth=8
iter=707, queue=4214, f=g+h=22, depth=8
iter=708, queue=4225, f=g+h=22, depth=8
iter=709, queue=4229, f=g+h=22, depth=10
iter=710, queue=4237, f=g+h=22, depth=8
iter=711, queue=4244, f=g+h=22, depth=8
iter=712, queue=4253, f=g+h=22, depth=8
iter=713, queue=4266, f=g+h=22, depth=4
iter=714, queue=4269, f=g+h=22, depth=8
iter=715, queue=4276, f=g+h=22, depth=8
iter=716, queue=4283, f=g+h=22, depth=8
iter=717, queue=4292, f=g+h=22, depth=8
iter=718, queue=4298, f=g+h=22, depth=10
iter=719, queue=4304, f=g+h=22, depth=7
iter=720, queue=4314, f=g+h=22, depth=10
iter=721, queue=4322, f=g+h=22, depth=10
iter=722, queue=4330, f=g+h=22, depth=5
iter=723, queue=4333, f=g+h=22, depth=10
iter=724, queue=4338, f=g+h=22, depth=5
iter=725, queue=4338, f=g+h=22, depth=10
iter=726, queue=4345, f=g+h=22, depth=10
iter=727, queue=4356, f=g+h=22, depth=10
iter=728, queue=4364, f=g+h=22, depth=10
iter=729, queue=4372, f=g+h=22, depth=10
iter=730, queue=4381, f=g+h=22, depth=10
iter=731, queue=4384, f=g+h=22, depth=4
iter=732, queue=4389, f=g+h=22, depth=8
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iter=733, queue=4394, f=g+h=22, depth=10
iter=734, queue=4397, f=g+h=22, depth=10
iter=735, queue=4400, f=g+h=22, depth=4
iter=736, queue=4402, f=g+h=22, depth=4
iter=737, queue=4409, f=g+h=22, depth=7
iter=738, queue=4422, f=g+h=22, depth=4
iter=739, queue=4427, f=g+h=22, depth=10
iter=740, queue=4434, f=g+h=21, depth=11
iter=741, queue=4441, f=g+h=22, depth=10
iter=742, queue=4451, f=g+h=21, depth=11
iter=743, queue=4454, f=g+h=20, depth=12
iter=744, queue=4457, f=g+h=21, depth=13
iter=745, queue=4460, f=g+h=21, depth=13
iter=746, queue=4466, f=g+h=21, depth=13
iter=747, queue=4472, f=g+h=21, depth=13
iter=748, queue=4479, f=g+h=22, depth=10
iter=749, queue=4487, f=g+h=22, depth=6
iter=750, queue=4496, f=g+h=22, depth=6
iter=751, queue=4508, f=g+h=22, depth=6
iter=752, queue=4518, f=g+h=22, depth=6
iter=753, queue=4527, f=g+h=22, depth=6
iter=754, queue=4536, f=g+h=22, depth=12
iter=755, queue=4535, f=g+h=22, depth=12
iter=756, queue=4537, f=g+h=22, depth=14
iter=757, queue=4546, f=g+h=21, depth=15
iter=758, queue=4557, f=g+h=20, depth=16
iter=759, queue=4564, f=g+h=19, depth=17
iter=760, queue=4567, f=g+h=18, depth=18
success! depth=18, total_goal_tests=760, max_queue_size=4567
solution path:
1 | D
2 | E J I G H
3 | C F
4 | A
5 | B

1 |
2 | E J I G H D
3 | C F
4 | A
5 | B

1 | A
2 | E J I G H D

```
3 | C F
4 |
5 | B

1 | A B
2 | E J I G H D
3 | C F
4 |
5 |

1 | A B
2 | E J I G H D
3 | C
4 |
5 | F

1 | A B C
2 | E J I G H D
3 |
4 |
5 | F

1 | A B C D
2 | E J I G H
3 |
4 |
5 | F

1 | A B C D
2 | E J I G
3 |
4 | H
5 | F

1 | A B C D
2 | E J I
3 |
4 | H G
5 | F

1 | A B C D
2 | E J
3 |
4 | H G I
```

5 | F

1 | A B C D
2 | E
3 |
4 | H G I J
5 | F

1 | A B C D E
2 |
3 |
4 | H G I J
5 | F

1 | A B C D E F
2 |
3 |
4 | H G I J
5 |

1 | A B C D E F
2 |
3 | J
4 | H G I
5 |

1 | A B C D E F
2 |
3 | J
4 | H G
5 | I

1 | A B C D E F G
2 |
3 | J
4 | H
5 | I

1 | A B C D E F G H
2 |
3 | J
4 |
5 | I

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

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