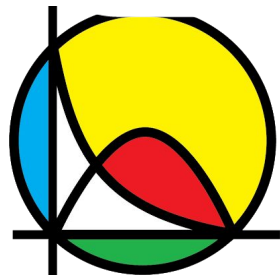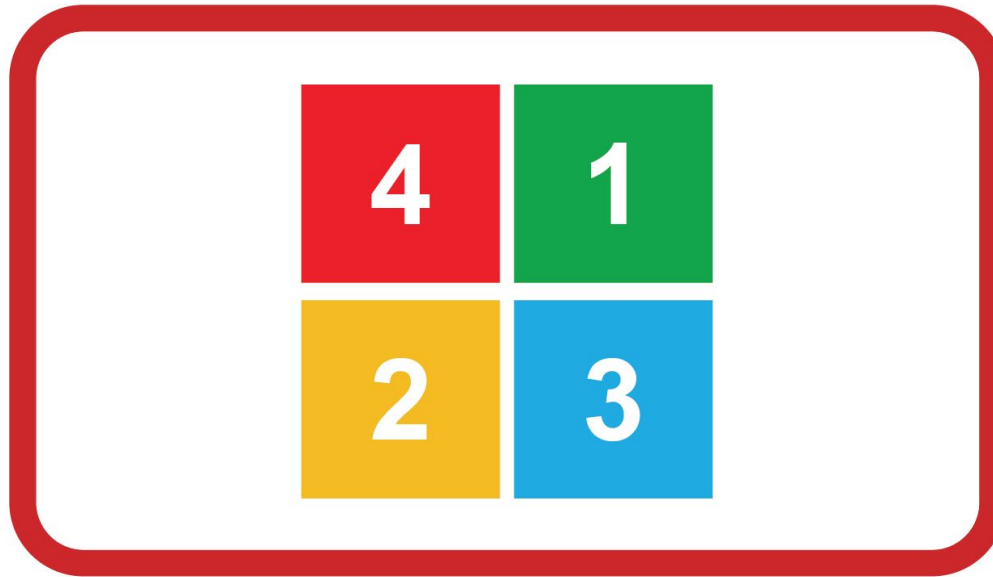# Jumping Julia

Julia Robinson
Mathematics Festival ®

App   jrmf.org   Español

Jumping Julia Instructions

Goal:

Reach the bottom-right square labeled "Goal."

Rules

- Start on the top-left square labeled "Start."

- The number on the square you are standing on tells you how far you must jump to the next square. (For example, if you are standing on a square with a 2 on it, you must jump to a square that is 2 spaces away.)

- You can jump horizontally or vertically but not diagonally.

In each of the above scenarios, the squares outlined in red are precisely those that can be jumped to from square outlined in blue.

2

4x4 Puzzles

1. Can you find a solution to the puzzle below? How many jumps did it take?
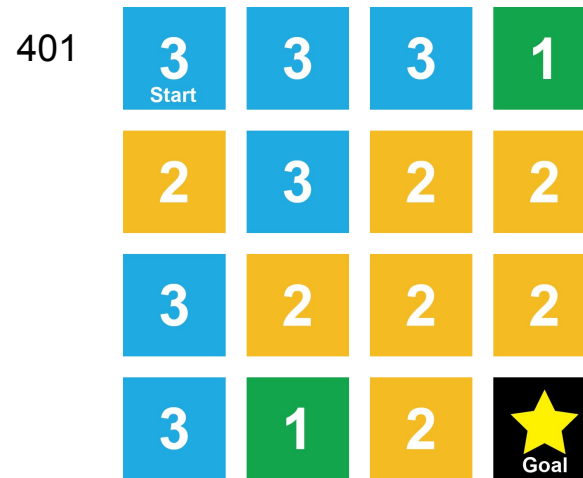
2. Find a second solution.   Did it take more jumps? Fewer? The same?

3. What's the fewest number of jumps needed to solve this puzzle? How do you know it can't be solved with fewer jumps?

4. Can you find a solution that visits every square? If not, what's the largest number of distinct squares you can visit in a solution? (It's ok to revisit squares along the way if that helps!)

4x4 Puzzles (Cont.)

Try to solve the following puzzles. (As a challenge, see if you can find a shortest and longest solution to each!)

402

1 Start	2	3	3
2	1	2	3
3	2	1	2
3	3	2	★ Goal

403

1 Start	2	1	3
3	2	2	2
3	2	3	3
1	1	2	★ Goal

404

2 Start	3	2	3
2	3	2	3
3	2	3	2
3	2	3	★ Goal

405

1 Start	3	2	3
3	3	1	1
2	1	2	3
2	1	3	★ Goal

406

3 Start	2	2	1
3	2	1	3
1	1	1	1
1	3	1	★ Goal

407

2 Start	1	2	3
1	2	3	2
2	3	1	2
2	3	2	★ Goal

408

3 Start	2	2	1
2	1	1	3
3	2	2	1
2	1	2	★ Goal

409

2 Start	3	2	2
2	3	2	2
3	2	1	3
3	2	3	★ Goal

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410

1 Start	2	2	1
3	1	3	1
1	2	2	2
3	1	3	★ Goal

411

2 Start	1	2	2
3	1	2	2
3	3	3	2
3	3	2	★ Goal

412

2 Start	3	2	2
3	1	1	2
3	3	3	2
2	1	2	★ Goal

413

3 Start	3	3	1
3	3	2	1
2	2	1	3
2	2	2	★ Goal

414

2 Start	1	3	3
2	1	3	1
2	2	2	2
1	3	2	★ Goal

415

1 Start	3	2	1
2	1	3	2
1	2	2	2
2	3	3	★ Goal

5

5x5 Puzzles

As you practice solving harder puzzles, here are some questions to consider:

1. Is it ever necessary to visit the same square twice?

2. Are there any squares that *must* be visited in any solution? What about squares that *can't* be visited in a solution?

3. While each puzzle is presented as a grid, are there other ways to think about it geometrically?

501

2 Start	4	2	2	4
2	4	2	4	4
1	3	3	1	3
3	3	4	1	2
3	4	4	2	★ Goal

502

1 Start	4	2	3	2
1	3	4	3	3
4	2	4	1	1
2	4	3	4	3
1	1	1	3	★ Goal

503

2 Start	4	2	3	1
2	2	4	2	2
1	1	3	3	1
2	3	1	4	2
1	1	2	2	★ Goal

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504

1 (Start)	2	3	2	3
1	2	1	2	2
3	3	2	1	3
3	1	1	2	3
2	2	2	1	★ Goal

505

2 (Start)	3	4	3	1
3	1	4	2	4
3	1	2	1	3
3	1	3	2	3
4	2	1	2	★ Goal

506

3 (Start)	2	4	3	2
4	1	2	3	2
3	1	2	1	2
3	2	3	2	3
2	1	1	3	★ Goal

507

3 (Start)	1	1	4	3
2	3	2	2	1
2	1	4	4	3
1	1	1	3	1
2	2	1	4	★ Goal

508

4 (Start)	3	1	4	1
1	4	2	1	4
2	3	3	3	2
2	3	3	2	1
2	4	3	3	★ Goal

509

3 (Start)	2	4	1	2
2	1	3	4	1
4	2	4	1	1
2	2	3	3	3
4	3	4	2	★ Goal

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510

3 (Start)	3	1	3	1
1	2	3	2	2
4	2	4	2	1
3	3	1	2	3
1	4	1	1	★ Goal

511

1 (Start)	1	4	1	4
4	3	2	2	4
3	4	3	2	1
1	1	1	4	1
1	1	3	4	★ Goal

512

3 (Start)	1	2	3	3
4	3	1	4	4
1	4	2	3	2
2	1	4	2	1
2	2	3	3	★ Goal

513

3 (Start)	2	1	4	2
1	2	4	1	2
2	2	3	4	4
1	2	4	3	3
3	3	2	4	★ Goal

514

3 (Start)	1	2	3	3
4	1	2	1	4
2	3	3	3	1
4	1	3	3	2
4	3	3	4	★ Goal

515

1 (Start)	3	1	1	3
1	4	2	4	1
3	1	2	3	3
1	4	2	4	4
3	1	2	4	★ Goal

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We've tried to order the mazes roughly in order of increasing difficulty. What makes one maze harder or easier than another?

1. Are there any mazes where you have a lot of choices at each step? What about few choices? How does this impact difficulty?

2. Looking at a square, how many squares could have been jumped from to that square? Is it many or few? How does this impact difficulty of the maze if that square must appear in a solution?

601

5 Start	1	3	3	2	3
4	1	1	3	3	3
2	3	3	5	3	2
2	2	2	5	3	5
2	1	4	5	3	4
1	1	3	3	5	Goal ★

602

1 Start	4	2	4	2	2
5	1	2	1	2	5
3	4	4	2	3	2
4	5	4	2	3	1
1	2	2	2	4	1
3	1	3	1	5	Goal ★

603

1 Start	2	4	1	1	4
2	2	1	1	2	4
1	2	1	1	2	2
4	4	2	1	4	2
4	2	2	1	4	2
2	1	1	4	4	Goal ★

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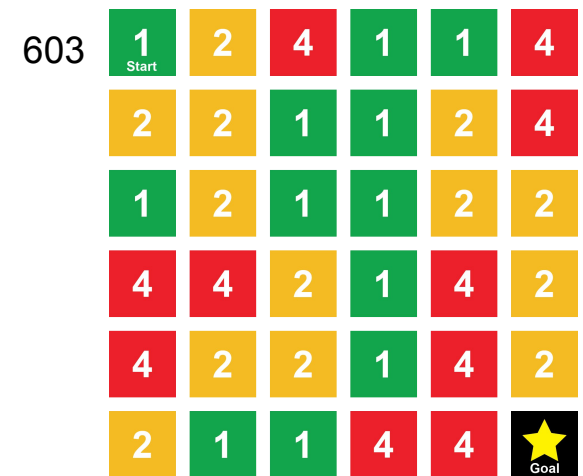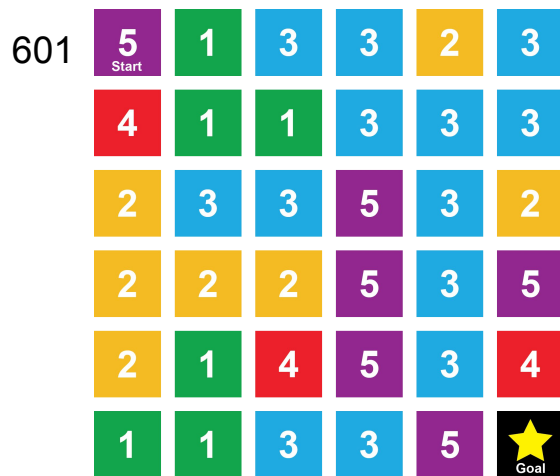
604

3 Start	1	4	4	4	1
4	3	3	4	1	4
1	4	3	1	3	4
3	4	1	4	3	1
3	1	4	3	4	3
4	4	4	1	3	Goal

605

5 Start	5	5	1	2	2
5	1	2	1	2	2
1	1	2	5	1	5
5	2	5	2	5	1
1	1	5	2	2	2
2	1	5	2	2	Goal

606

4 Start	1	1	1	3	5
4	2	1	4	2	3
2	2	2	4	1	2
4	5	2	4	4	4
3	1	1	4	3	1
3	1	5	3	3	Goal

607

3 Start	4	2	4	2	5
2	2	1	5	3	5
1	2	2	4	4	5
4	3	2	4	4	5
3	3	3	3	2	4
1	1	5	3	1	Goal

608

4 Start	5	2	2	2	2
5	1	4	2	3	5
2	5	3	2	2	1
3	3	5	2	1	3
4	3	1	4	5	1
5	1	4	1	2	Goal

609

4 Start	3	5	1	5	5
5	1	3	4	2	5
4	2	5	3	3	3
3	2	5	1	4	2
4	1	5	1	4	2
4	1	3	5	4	Goal

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610

2 (Start)	2	2	3	2	3
3	3	2	2	3	3
2	3	2	3	2	3
3	3	3	3	3	2
2	3	3	3	2	3
2	2	2	2	2	Goal

611

4 (Start)	3	4	2	3	3
3	4	1	3	3	4
4	2	4	2	5	2
1	4	1	4	3	1
4	5	1	4	4	2
1	3	4	4	5	Goal

612

2 (Start)	5	4	1	1	4
2	4	5	4	3	4
2	2	5	2	1	5
5	1	3	3	5	5
5	1	5	2	3	4
4	1	4	4	2	Goal

613

2 (Start)	5	4	4	3	3
4	1	3	4	1	3
5	2	1	5	1	4
3	4	2	1	1	4
4	5	5	1	2	1
2	2	2	5	4	Goal

614

3 (Start)	3	5	2	2	2
2	3	2	2	4	4
1	4	3	4	5	5
4	5	1	3	4	4
2	4	3	3	1	2
1	2	5	1	4	Goal

615

2 (Start)	3	4	2	4	2
4	1	3	3	3	4
4	3	4	4	3	2
1	4	3	2	5	4
5	4	5	3	1	4
1	1	1	3	3	Goal

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Design You Own Maze

Try designing your own maze! You might start by plunking down some random numbers and then trying to solve it. Here are some questions to consider while designing:

1. Can you design a maze that is impossible to solve? If you accidentally design one, what can you change to make it solvable?

2. If your maze is too easy, what can you do to make it harder? (Or if it's too hard, how can it be made easier?)

3. Can you design a maze where there is only one way to solve it? Would this necessarily make it easier or harder to solve?

4. Can you design a maze where every square is visited in a solution? Where every square *must* be visited? If not, how close can you get to this goal?

5. Can you design a maze that requires a specific number of jumps to solve? Are there any jump counts that will never show up in a solution?

6. What is the largest number of jumps a shortest solution can require?

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