

Diagram illustrating a sequence of 15 moves in a 3D puzzle, starting from a root state and branching into four main paths. The moves are labeled with numbers 1-6 and their corresponding face orientations (e.g., 2-3, 5-4).

Root State: ROOT -3 -4 2 -6 -1 5

Move 1: 2-3 (Left branch)

Move 2: 2-1 (Middle branch)

Move 3: 5-4 (Right branch)

Move 4: 5-6 (Far right branch)

Intermediate States:

- Left branch: -3 -2 4 -6 -1 5
- Middle branch: -3 -4 6 -2 -1 5
- Right branch: -3 1 6 -2 4 5
- Far right branch: -3 -4 2 -6 -5 1

Subsequent Moves and States:

- Left branch (Move 5): 4-3 (Left), 5-6 (Right) → State: 2 3 4 -6 -1 5
- Middle branch (Move 5): 5-4 (Left) → State: -3 -2 4 -6 -5 1
- Right branch (Move 5): 1-2 (Left), 4-3 (Right) → State: -3 1 2 -6 4 5
- Far right branch (Move 5): 2-3 (Left) → State: 2 5 DUP -3 1 2 -6 4 5

Final Moves and States:

- Left branch (Move 6): 2-1 (Left), 5-6 (Right) → State: 2 3 4 -6 -1 5
- Middle branch (Move 6): 4-3 (Left), 4-5 (Right) → State: -3 -2 4 -6 -5 1
- Right branch (Move 6): 2-3 (Left), 4-3 (Right), 5-6 (Far right) → State: 2 5 DUP -3 1 2 -6 4 5
- Far right branch (Move 6): 2-1 (Left), 5-6 (Right) → State: 2 -6 -1 3 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 3 -2 4 5 6 1
- Right branch: 3 -2 -1 5 6 -4
- Far right branch: 3 -2 -1 -6 4 5

Final Moves and States:

- Left branch (Move 7): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 7): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 7): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 7): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 8): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 8): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 8): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 8): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 9): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 9): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 9): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 9): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 10): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 10): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 10): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 10): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 11): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 11): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 11): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 11): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 12): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 12): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 12): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 12): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 13): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 13): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 13): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 13): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 14): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 14): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 14): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 14): 4-3 (Left), 5-6 (Right) → State: 3 -2 -1 -6 4 5

Final States:

- Left branch: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch: 6 -2 -1 3 4 5 -3 1 2 -6 -5 -4
- Right branch: 2 6 DUP -3 -2 -1 -6 4 5 2 DUP -3 -2 3 1 2 5 -3 1 2 -6 4 5
- Far right branch: 2 -6 -1 3 4 5 -4 4 DUP 2 3 4 -6 -5 1 4 2 DUP -3 -2 4 5 6 1 5 DUP -3 -2 -1 5 6 -4

Final Moves and States:

- Left branch (Move 15): 5-4 (Left), 4-5 (Right) → State: 6 -4 -3 -2 -1 5 2 3 4 -6 -5 1
- Middle branch (Move 15): 4-3 (Left), 1-2 (Right) → State: 3 -2 4 5 6 1
- Right branch (Move 15): 3-2 (Left), 2-3 (Right) → State: 3 -2 -1 5 6 -4
- Far right branch (Move 15): 4-3 (Left), 5-6 (