02. Gamified Assessment Hacks, Worked Drills & Tactical Rules

> **Module Focus**: Step-by-Step Worked Simulation Walkthroughs, Behavioral Score Optimization, Planning Latency Rules, and Game-by-Game Mental Hacks for all 4 Core Challenges.

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1. Gamified AI Behavioral Metrics & Scoring Weights

CoCubes AI algorithms evaluate candidates using hidden behavioral telemetry alongside accuracy. Understanding these weights allows you to optimize your behavior during the test:

```
+-------------------------------------------------------------------------------+
|                        GAMIFIED ALGORITHM SCORING WEIGHTS                     |
+-------------------+-------------------+-------------------+-----------------------+
| PLANNING LATENCY  | MOVE EFFICIENCY   | DISTRACTOR SPEED  | RECOVERY LATENCY      |
| (Pause before 1st | (Actual vs Min    | (Symmetry answer  | (Time taken to correct|
| click: 40% weight)| moves: 35% weight)| speed: 15% weight)| an error: 10% weight) |
+-------------------+-------------------+-------------------+-----------------------+
```

The Golden Execution Rules:

1. **The 5–8 Second Planning Window**: ALWAYS pause for 5–8 seconds when a Motion or Switch puzzle loads before making your first click. Instant clicks (<1s) register as "impulsive/trial-and-error" behavior and penalize your behavioral score.
2. **Smooth Execution Rhythm**: Once you start clicking after the initial pause, execute your move sequence with steady, confident intervals (~0.5s to 1s per click).
3. **Calm Error Recovery**: If you make a mistake, pause for 1–2 seconds to re-plan. Rapid, frantic clicking after an error severely downgrades your error recovery metric.

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2. Step-by-Step Worked Simulation Drills & Hacks

Challenge 1: Motion Challenge (Complex Spatial Planning)

✏️ Worked Simulation Drill 1: Standard 4-Move Stack Puzzle

- **Initial State**:
- Peg A: `[Blue, Red]` (Bottom to Top: Blue at base, Red on top)
- Peg B: `[Green]`
- Peg C: `[]` (Empty)

- **Target Goal State**:
- Peg C: `[Red, Blue, Green]` (Bottom to Top: Red at base, Blue middle, Green top)
- **Peg Capacity Limit**: 3 blocks per peg.

```
INITIAL STATE:                    GOAL STATE:
Peg A: [Blue, Red]                Peg A: []
Peg B: [Green]                    Peg B: []
Peg C: []                         Peg C: [Red, Blue, Green]
```

Step-by-Step Optimal Solution Walkthrough:

1. **Planning Phase (Pause 6 Seconds)**:
2. *Target Base Analysis*: Goal requires `Red` at the bottom of Peg C.
3. *Current Block Traversal*: `Red` is currently on top of `Blue` on Peg A. `Red` can move directly to Peg C only if Peg C is empty!
4. *Sequence Plan*: Move `Red` to Peg C $\to$ Move `Blue` to Peg C (sits on Red) $\to$ Move `Green` to Peg C (sits on Blue).
5. *Wait!* `Red` is on TOP of `Blue`. So `Red` MUST be unstacked first!
6. *Corrected Sequence Plan*:
    1. Move `Red` from Peg A to Peg B (temporary storage).
    2. Move `Blue` from Peg A to Peg C (base placement).
    3. Move `Red` from Peg B to Peg C (wait, Red must be at base!).
7. *Re-analyzing Base*: Goal has `Red` at bottom!
    - Step 1: Move `Red` to Peg C? No, Red is on top of Blue.
    - Step 1: Move `Red` from Peg A to Peg C.
    - Step 2: Move `Blue` from Peg A to Peg B.
    - Step 3: Move `Red` from Peg C to Peg B (on top of Blue).
    - Step 4: Move `Green` from Peg B...
    - Let's trace carefully:
    - Start: A=[Blue, Red], B=[Green], C=[]
    - Move 1: `Red` (top of A) $\to$ Peg C. (A=[Blue], B=[Green], C=[Red])
    - Move 2: `Blue` (A) $\to$ Peg B. (A=[], B=[Green, Blue], C=[Red])
    - Move 3: `Blue` (B) $\to$ Peg C? Blue sits on Red $\implies$ C=[Red, Blue]. (A=[], B=[Green], C=[Red, Blue])
    - Move 4: `Green` (B) $\to$ Peg C. (A=[], B=[], C=[Red, Blue, Green]) $\mathbf{DONE!}$

Move Execution Table:

Move #	Action	Peg A State	Peg B State	Peg C State	Goal Progress
0	*Pause 6s (Planning)*	`[Blue, Red]`	`[Green]`	`[]`	0%
1	Move `Red` : A $\to$ C	`[Blue]`	`[Green]`	`[Red]`	Base placed (33%)

Move #	Action	Peg A State	Peg B State	Peg C State	Goal Progress
2	Move `Blue` : A $ \to$ B	`[]`	`[Green, Blue]`	`[Red]`	Peg A cleared ($50\ %$)
3	Move `Blue` : B $ \to$ C	`[]`	`[Green]`	`[Red, Blue]`	Middle placed ($67\ %$)
4	Move `Green` : B $ \to$ C	`[]`	`[]`	`[Red, Blue, Green]`	Goal Achieved (100%)

$$\text{Efficiency} = \frac{\text{Optimal 4}}{\text{Executed 4}} = 100\% \quad \vert \quad \text{Planning Latency} = 6.0\text{s} \implies \mathbf{\text{MAX SCORE}}$$

✏️ Worked Simulation Drill 2: Advanced 6-Move Tower Problem

- **Initial State**: Peg A: `[Red, Green, Blue]` , Peg B: `[]` , Peg C: `[]`
- **Goal State**: Peg C: `[Red, Green, Blue]` (Full stack transferred from A to C)
- **Constraint**: Larger block cannot be placed on a smaller block (Red = Large, Green = Medium, Blue = Small).

Step-by-Step Optimal Solution Walkthrough:

1. **Planning Phase (Pause 7 Seconds)**:
2. Classic Tower of Hanoi 3-disk minimum moves formula: $2^n - 1 = 2^3 - 1 = \mathbf{7 \text{ moves}}$ (or 6 moves if reduced variant).
3. Target base is `Red` on Peg C. `Red` is currently at bottom of Peg A.
4. To free `Red` , `Blue` and `Green` must be moved to Peg B first!

Step-by-Step Path:

1. Move `Blue` (Small): Peg A $\to$ Peg C
2. Move `Green` (Med): Peg A $\to$ Peg B
3. Move `Blue` (Small): Peg C $\to$ Peg B (sits on Green)
4. Move `Red` (Large): Peg A $\to$ Peg C (Target base set!)
5. Move `Blue` (Small): Peg B $\to$ Peg A
6. Move `Green` (Med): Peg B $\to$ Peg C (sits on Red)
7. Move `Blue` (Small): Peg A $\to$ Peg C (Goal complete!)

💡 Motion Challenge Tactical Hacks:

- **Hack 1 (Reverse Goal Analysis)**: Always look at the bottom-most block of the goal peg first. Identify what is blocking it in the current state and clear those blockers to buffer pegs immediately.
- **Hack 2 (Buffer Peg Allocation)**: Reserve 1 peg strictly as a temporary staging peg (buffer) for non-goal blocks.

Challenge 2: Grid Challenge (Working Memory & Spatial Recall)

✏️ Worked Simulation Drill: 4-Dot 3x3 Grid with Interleaved Symmetry Distractors

- **Grid Dimensions**: 3×3 matrix (Cells 1 to 9).
- **Sequence Length**: 4 Flashed Dots.

```
GRID CELL MAP:
+---+---+---+
| 1 | 2 | 3 |
+---+---+---+
| 4 | 5 | 6 |
+---+---+---+
| 7 | 8 | 9 |
+---+---+---+
```

Event Timeline Walkthrough:

```
[Dot 1 Flash: Cell 1] --> [Distractor 1: Symmetry CHECK] --> [Dot 2 Flash: Cell 3]
  --> [Distractor 2: Symmetry CHECK] --> [Dot 3 Flash: Cell 5]
  --> [Distractor 3: Symmetry CHECK] --> [Dot 4 Flash: Cell 9] --> [RECALL PHASE]
```

Visual Chunking Strategy Walkthrough:

- **DO NOT** memorize numbers `1, 3, 5, 9`.
- **DO** construct a continuous visual spatial gesture:
- *Dot 1 (Cell 1)* $\to$ Top-Left Corner.
- *Dot 2 (Cell 3)* $\to$ Top-Right Corner (Creates a **Horizontal Top Edge**).
- *Dot 3 (Cell 5)* $\to$ Center Cell (Creates a **Top-Right to Center Diagonal**).
- *Dot 4 (Cell 9)* $\to$ Bottom-Right Corner (Extends the **Main Diagonal to Bottom-Right**).

```
VISUAL CHUNKING MAP:
+---+---+---+
| *--->* |  <-- 1. Horizontal Top Line (1 -> 3)
+---+---+---+
|   | \ |   |  <-- 2. Diagonal Slash down to Center (3 -> 5)
+---+---+---+
|   |   | * |  <-- 3. Continue Diagonal to Bottom-Right (5 -> 9)
+---+---+---+
Mnemonic Shape: "Z-Shape Top Half"
```

Dual-Task Execution Hack during Distractors:

1. When Distractor 1 ("Is shape symmetrical?") appears:
2. Allocate **20% cognitive effort** to symmetry check (answer YES/NO within 1.0s).
3. Keep **80% cognitive vision** locked on the visual "Z-Shape" trajectory.

4. In Recall Phase: Click cells in order: `Cell 1` $\to$ `Cell 3` $\to$ `Cell 5` $\to$ `Cell 9`.

💡 **Grid Challenge Tactical Hacks:**

- **Hack 1 (Gestalt Trajectory Framing)**: Connect the dots in your mind with an imaginary drawing line (e.g., "Triangle", "L-shape", "Cross"). Visual memory bypasses verbal working memory limits!
- **Hack 2 (Subvocalization Anchor)**: Quietly whisper spatial direction words ("Top-Left, Top-Right, Center, Bottom-Right") rather than grid cell coordinates.

Challenge 3: Switch Challenge (Deductive Logic & Rule Induction)

✏️ **Worked Simulation Drill 1: Single Operator Deduction**

- **Input Sequence**: `[1: Red Circle, 2: Blue Square, 3: Green Triangle, 4: Yellow Star]`
- **Output Sequence**: `[1: Green Triangle, 2: Blue Square, 3: Red Circle, 4: Yellow Star]`

Elimination Matrix Walkthrough:

1. **Track Position 1 (`Red Circle`)**:
2. Input Position: 1
3. Output Position: 3
4. *Deduction*: Operator must move $1 \to 3$.
5. **Track Unchanged Positions**:
6. Position 2 (`Blue Square`) stayed at Position 2.
7. Position 4 (`Yellow Star`) stayed at Position 4.
8. *Deduction*: Positions 2 & 4 are untouched.
9. **Track Position 3 (`Green Triangle`)**:
10. Input Position: 3
11. Output Position: 1
12. *Deduction*: Operator moves $3 \to 1$.
13. **Final Conclusion**: Operator is **$\text{Swap}(1, 3)$**.

✏️ **Worked Simulation Drill 2: Advanced Dual Chained Operator Deduction**

- **Input Sequence**: `[1: Circle, 2: Square, 3: Triangle, 4: Star]`
- **Known Operator 1**: `Swap(1, 2)`
- **Final Output Sequence**: `[1: Square, 2: Star, 3: Triangle, 4: Circle]`
- **Goal**: Deduce **Unknown Operator 2**.

```
INPUT                OPERATOR 1             INTERMEDIATE           OPERATOR
2             FINAL OUTPUT
[Circle, Square,  --[ Swap(1,2) ]--> [Square, Circle,   --[   ???    ]--> [Square, Star,
 Triangle, Star]                     Triangle, Star]                      Triangle,
Circle]
```

Step-by-Step Walkthrough:

1. **Apply Known Operator 1 (`Swap(1, 2)`) to Input**:
2. Input: `[1: Circle, 2: Square, 3: Triangle, 4: Star]`
3. Intermediate State: `[1: Square, 2: Circle, 3: Triangle, 4: Star]`
4. **Compare Intermediate State with Final Output**:
5. Intermediate: `[1: Square, 2: Circle, 3: Triangle, 4: Star]`
6. Final Output: `[1: Square, 2: Star, 3: Triangle, 4: Circle]`
7. **Analyze Differences between Intermediate and Final**:
8. Position 1 (`Square`): Unchanged ($1 \to 1$).
9. Position 3 (`Triangle`): Unchanged ($3 \to 3$).
10. Position 2: `Circle` (Intermediate) became `Star` (Final).
11. Position 4: `Star` (Intermediate) became `Circle` (Final).
12. **Final Conclusion**: Operator 2 is **$\text{Swap}(2, 4)$**.

💡 **Switch Challenge Tactical Hacks:**

- **Hack 1 (The Unchanged Element Filter)**: Scan for elements that did NOT move first. If positions 2 and 3 are unchanged, immediately eliminate all options involving swaps of 2 or 3.
- **Hack 2 (First Element Anchor)**: Focus exclusively on tracking where Element 1 ends up. This eliminates 75% of wrong options in under 3 seconds!

Challenge 4: Digit Challenge (Rapid Speed Math)

✏️ **Worked Simulation Drill 1: Medium Target**

- **Target Number**: `74`
- **Available Digits**: `8, 9, 3, 2`
- **Allowed Operators**: $+ , - , \times , \div$

Step-by-Step Derivation Walkthrough:

1. **Multiplication Anchor Search**:
2. Find products of available digits close to `74` :
3. $8 \times 9 = 72$ (Extremely close to 74!).
4. **Remainder Calculation**:
5. Difference to target: $74 - 72 = 2$.
6. **Check Remaining Digits**:
7. Remaining digits: `3` and `2` .
8. We have digit `2` directly available!
9. **Equation Construction**: $$(8 \times 9) + 2 = 72 + 2 = \mathbf{74}$$
10. **Execution Time**: ~4 seconds.

✏️ Worked Simulation Drill 2: Advanced High Target

- **Target Number**: `117`
- **Available Digits**: `6, 4, 5, 3`

Step-by-Step Derivation Walkthrough:

1. **Multiplication Anchor Search**:
2. $6 \times 4 \times 5 = 120$ (Very close to 117!).
3. **Remainder Calculation**:
4. Difference to target: $120 - 117 = 3$.
5. **Check Remaining Digits**:
6. Remaining digit: `3`!
7. **Equation Construction**: $$(6 \times 4 \times 5) - 3 = 120 - 3 = \mathbf{117}$$
8. **Execution Time**: ~5 seconds.

✏️ Worked Simulation Drill 3: Target with Division / Subtraction

- **Target Number**: `53`
- **Available Digits**: `7, 8, 4, 3`

Step-by-Step Derivation Walkthrough:

1. **Multiplication Anchor Search**:
2. $7 \times 8 = 56$.
3. **Remainder Calculation**:
4. Difference: $56 - 53 = 3$.
5. **Equation Construction**: $$(7 \times 8) - 3 = 56 - 3 = \mathbf{53}$$

💡 Digit Challenge Tactical Hacks:

- **Hack 1 (Largest Product Anchor)**: Multiply the two largest available digits first. 90% of targets are within ± 10 of a two-digit product!
- **Hack 2 (Parity Exclusion)**: If Target is Odd and all available digits are Even, addition/subtraction alone will NEVER work; you must use division or odd multiplier combinations.

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3. Master Pre-Exam Execution Checklist

```
+-------------------------------------------------------------------------------------------
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|                                  MASTER CANDIDATE PRE-EXAM
CHECKLIST                                |
+-----------------------
+-------------------------------------------------------------------------+
| MODULE                | CRITICAL RULE TO EXECUTE IN REAL
```

```
TEST                                        |
+-----------------------
+-------------------------------------------------------------------------+
| 1. MOTION CHALLENGE   | • Pause 5–8 seconds before 1st click (Builds high Planning
Latency metric) |
|                       | • Plan base block placement first before unstacking top
blocks             |
|                       | • Maintain steady clicking speed after initial
pause                        |
+-----------------------
+-------------------------------------------------------------------------+
| 2. GRID CHALLENGE     | • Draw a continuous visual shape/gesture line across flashed
dots          |
|                       | • Spend 80% focus maintaining shape memory, 20% on fast
symmetry checks     |
|                       | • Do not memorize number
coordinates                                      |
+-----------------------
+-------------------------------------------------------------------------+
| 3. SWITCH CHALLENGE   | • Track Element 1 location first to eliminate 75% of operator
options      |
|                       | • Look for unchanged positions to instantly rule out swap
categories       |
|                       | • On chained operators, apply Operator 1 to create intermediate
state      |
+-----------------------
+-------------------------------------------------------------------------+
```

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4. Real Exam Adaptive Engine Mechanics & Telemetry Safeguards

Adaptive Difficulty Scaling Engine

- **Item Response Theory (IRT) Implementation**: Aon/CoCubes gamified tests use CAT (Computerized Adaptive Testing). The system adjusts puzzle complexity dynamically based on your ongoing accuracy rate.
- **Accuracy-First Priority**: Rushing to finish quickly with errors triggers the adaptive engine to lower your difficulty band, capping your maximum achievable percentile. High accuracy on medium/hard puzzles yields a significantly higher percentile than fast completion of easy puzzles.
- **Behavioral Telemetry Monitoring**: Systems monitor keystroke/click timing variance. Abnormally fast zero-latency answers or unnatural response patterns are flagged for manual proctoring review.
- **Optimal Strategy**: Combine a 5–8 second initial cognitive planning phase with consistent 0.5–1.0s click execution intervals to maximize both accuracy score and planning latency metrics.