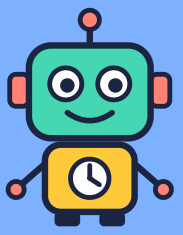
PRINT-AND-PLAY CODING GAME

Tock's Battery Run

Write a program with cards. No computer needed. For 2 to 4 players, about 15 minutes.



You need

- The mission board and the Tock token
- The 36 cards (print one set for each group)
- Scissors to cut everything out

Set up

1. Put Tock on START.
2. Lay the arrow cards and Repeat cards face up in piles.
3. Put the Bug cards to one side for later.

How to play: program and run

1. One player is the **robot driver**. The others are the **programmers**.
2. The programmers plan a route from START to the battery that never touches a crate.
3. They lay arrow cards in a row, from left to right. That row is the **program**.
4. The robot driver moves Tock one square for each card, exactly as the cards say. No helping, and no guessing what was meant!
5. Bonked a crate or left the grid? Stop. Find the card that went wrong, fix it, and run the program again from START.
6. Reach the battery to win the mission. Then swap jobs.

Repeat cards

Put a Repeat card in front of an arrow card. Tock does that arrow 2 or 3 times. Three ups in a row? Use "Repeat × 3" and one Up card instead.

More ways to play

- **Fewest cards.** Every team writes a program for the same mission. The program that works with the fewest cards wins.
- **Bug hunt.** Build a program that works. While your partner looks away, swap one card for a Bug card and hide the real one. They run the program, spot where it goes wrong, and say which card is missing.
- **Mission maker.** Use the blank board and the crate tokens to build a mission for another team. Check that it can be solved first.

The thinking behind it

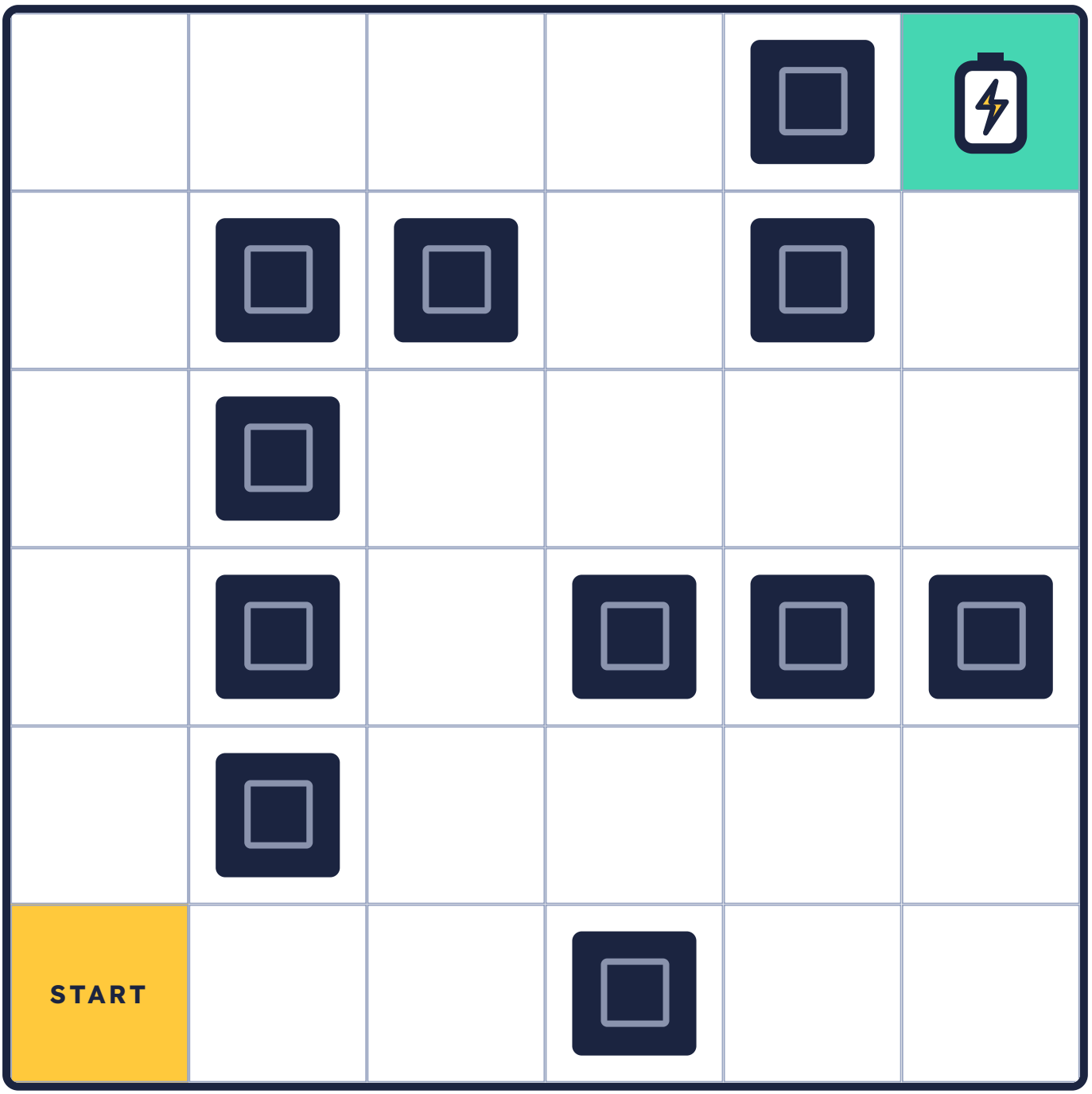
The row of cards is an **algorithm**. Repeat cards are **loops**. Finding the wrong card is **debugging**. Using fewer cards is being **efficient**.

Print on A4 at 100% and cut along the dashed lines.

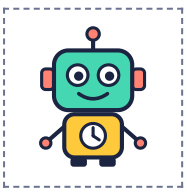
MISSION BOARD

Mission 1: Battery Run

Get Tock from START to the battery. Don't bonk a crate!



The shortest route takes 10 steps. Can Repeat cards make your program even shorter?



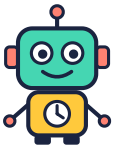
Cut out the Tock token and place it on START.

MISSION MAKER

Build your own mission

Place the battery and the crates on the grid, then swap boards with another team.

START



Cut along the dashed lines

ARROW CARD



Up

ARROW CARD



Up

ARROW CARD



Up

ARROW CARD



Up

ARROW CARD



Up

ARROW CARD



Up

REPEAT CARD



Repeat

× 2

Put me in front of an arrow card.

REPEAT CARD



Repeat

× 2

Put me in front of an arrow card.

REPEAT CARD



Repeat

× 2

Put me in front of an arrow card.

Cut along the dashed lines

ARROW CARD



Down

ARROW CARD



Down

ARROW CARD



Down

ARROW CARD



Down

ARROW CARD



Down

ARROW CARD



Down

REPEAT CARD



Repeat

× 2

Put me in front of an arrow card.

REPEAT CARD



Repeat

× 3

Put me in front of an arrow card.

REPEAT CARD



Repeat

× 3

Put me in front of an arrow card.

Cut along the dashed lines

ARROW CARD



Left

ARROW CARD



Left

ARROW CARD



Left

ARROW CARD



Left

ARROW CARD



Left

ARROW CARD



Left

REPEAT CARD



Repeat

× 3

Put me in front of an arrow card.

REPEAT CARD



Repeat

× 3

Put me in front of an arrow card.

BUG CARD



Bug!

Swap me for one card in a program. Can they find where I am?

Cut along the dashed lines

ARROW CARD



Right

ARROW CARD



Right

ARROW CARD



Right

ARROW CARD



Right

ARROW CARD



Right

ARROW CARD



Right

BUG CARD



Bug!

Swap me for one card in a program. Can they find where I am?

BUG CARD



Bug!

Swap me for one card in a program. Can they find where I am?

BUG CARD



Bug!

Swap me for one card in a program. Can they find where I am?

HOW TO USE

Thinking prompts

Keep these cards on your desk. Stuck on a problem? Pick a card and ask yourself its question.

CLEVER THINKING · DECOMPOSITION

1

Break it down

ASK YOURSELF

What smaller jobs is this made of?

CLEVER THINKING · PATTERN RECOGNITION

2

Spot the pattern

ASK YOURSELF

What repeats? What is the rule?

CLEVER THINKING · ABSTRACTION

3

Keep what matters

ASK YOURSELF

Which details do I really need?

CLEVER THINKING · ALGORITHM

4

Make a plan

ASK YOURSELF

What are the steps, in order?

CLEVER THINKING · LOOP

5

Do it again

ASK YOURSELF

Which steps can I repeat?

CLEVER THINKING · CONDITIONAL

6

If this, then that

ASK YOURSELF

What yes-or-no question decides?

CLEVER THINKING · DEBUGGING

7

Bug hunt

ASK YOURSELF

Where does it first go wrong?

CLEVER THINKING · EFFICIENT

8

Find it faster

ASK YOURSELF

Is there a way with fewer steps?