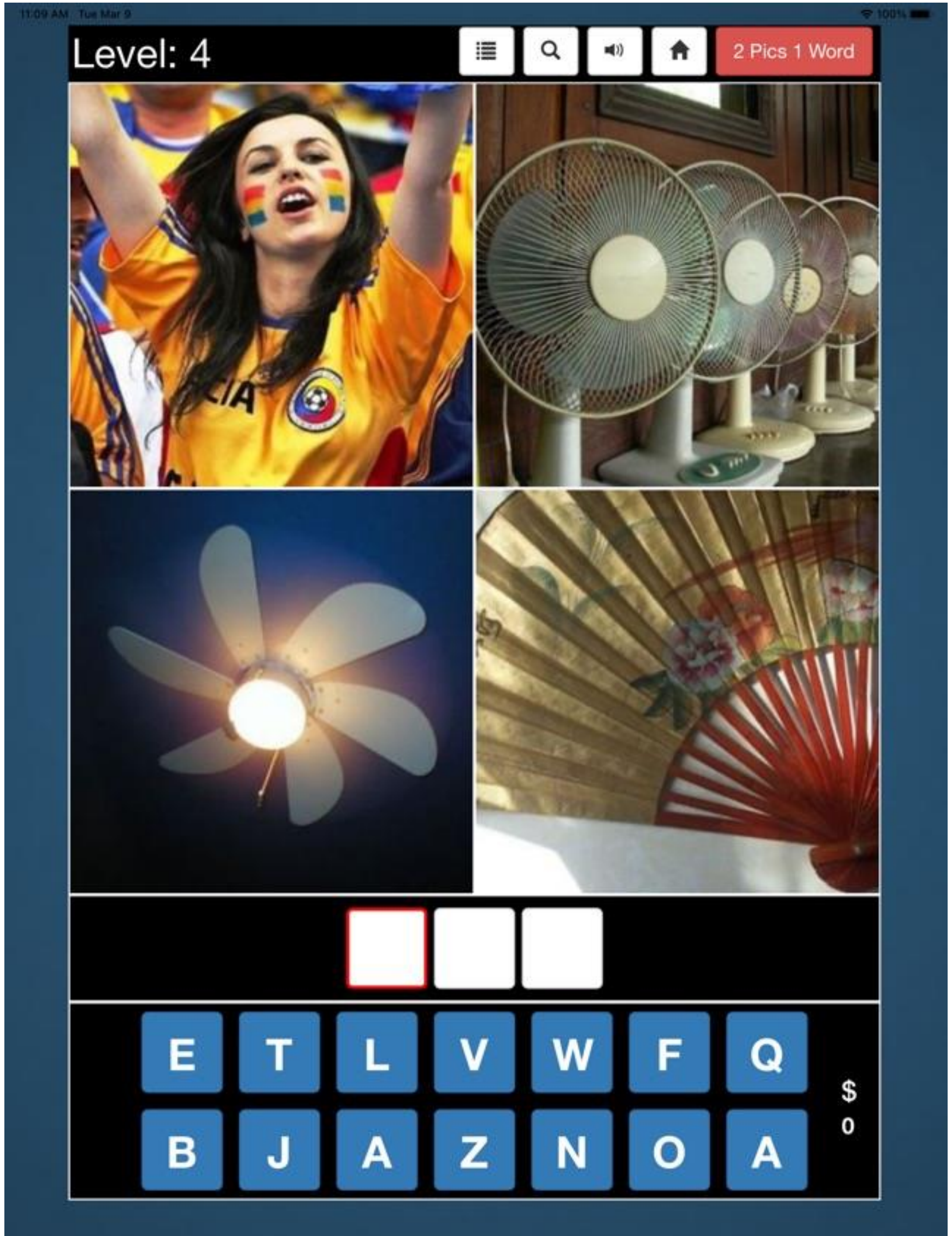
Gr 11 Grid Game + Gr 12 Content

- Grid Game
- Theme
- Instructions + Opening

- Char Functions
- Save / Open from File
- Object
- Stack / Queue
- Search (Dictionary)
- Sorting
- Recursion
- Android
- Neighbours / Swap

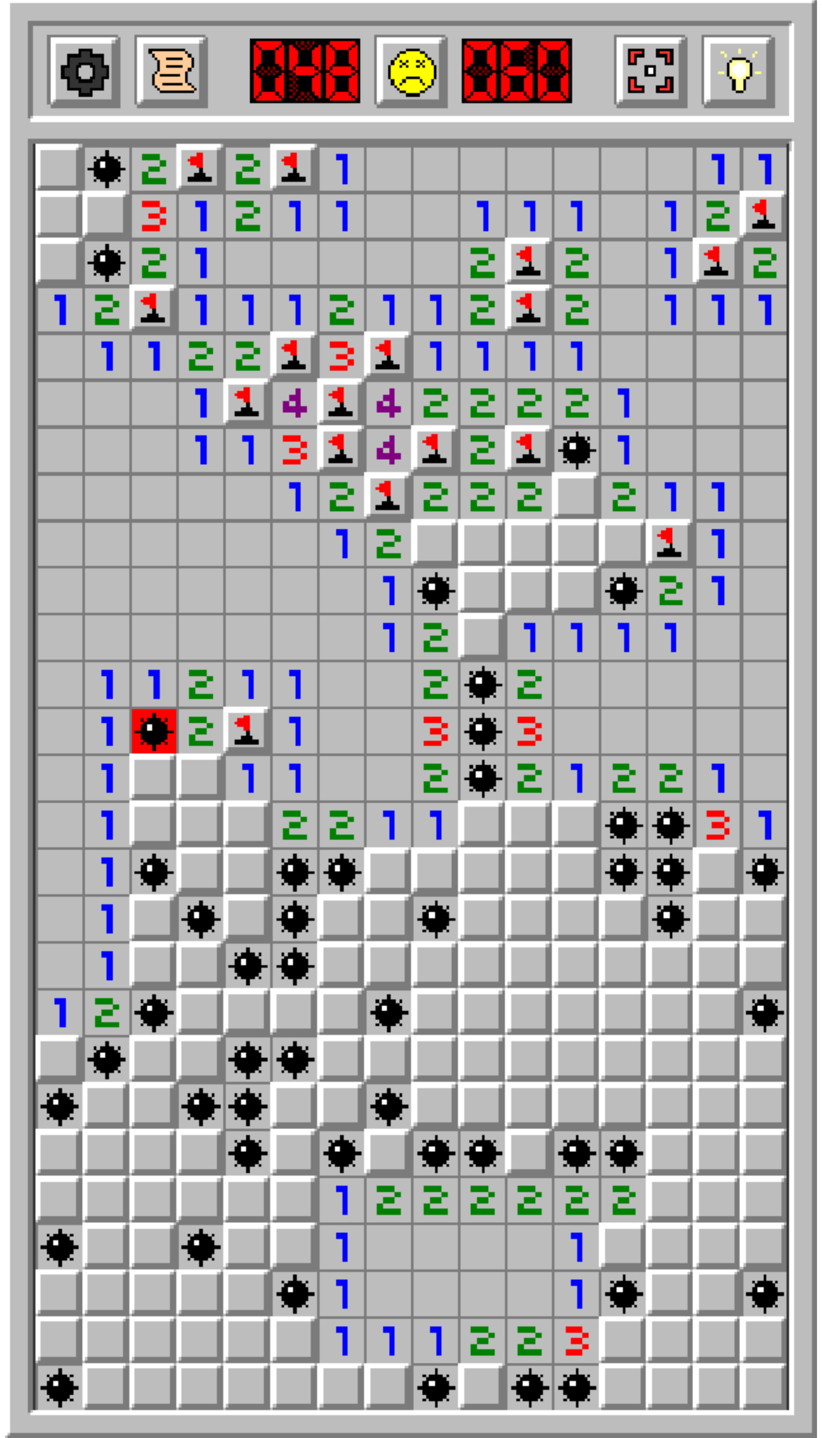


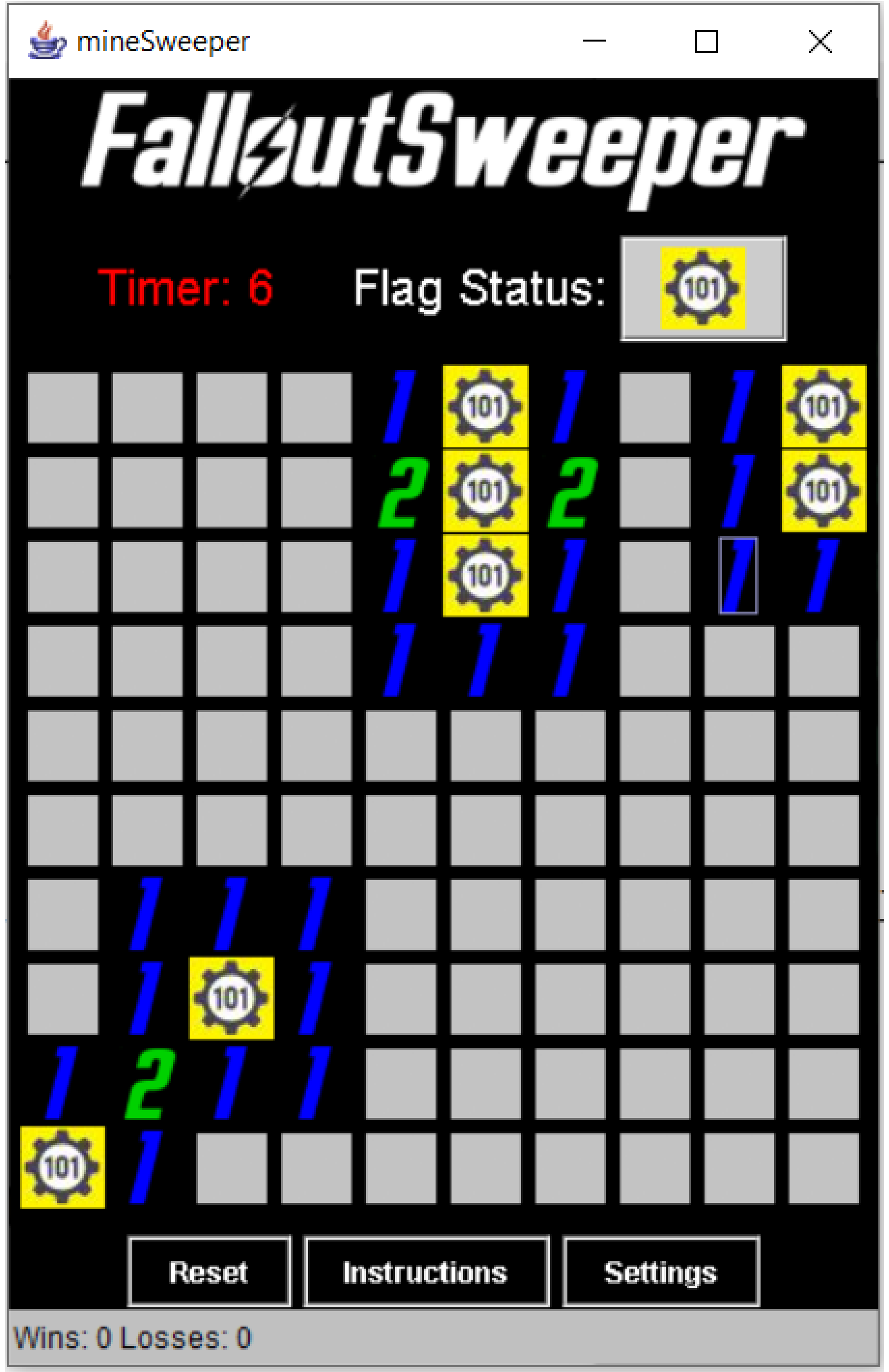
Guide on Website

4 Pics 1 Word

- Grid of letters
- Char functions
- Possible object = picture

https://4pics1word.ws/6-letter-words/





Guide on Website

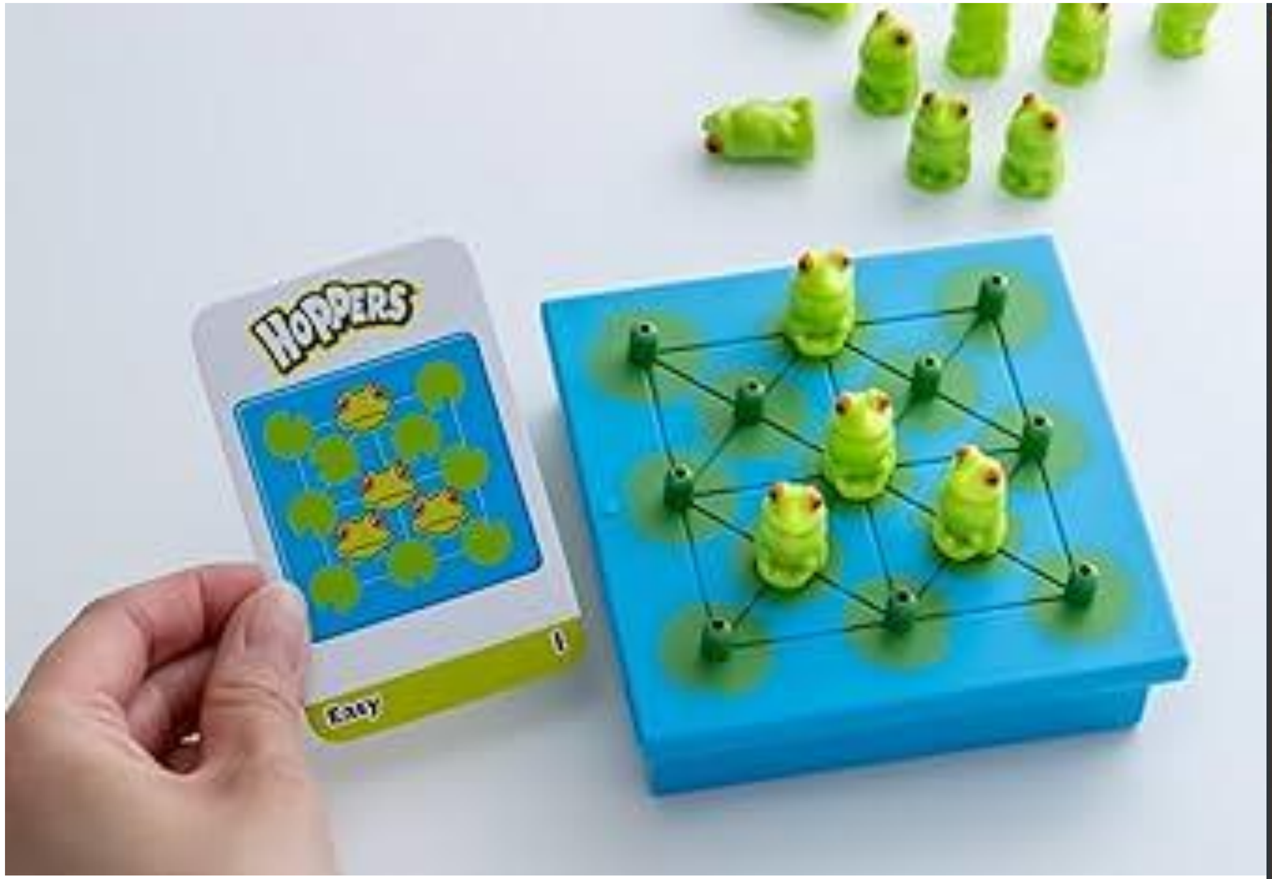
Minesweeper

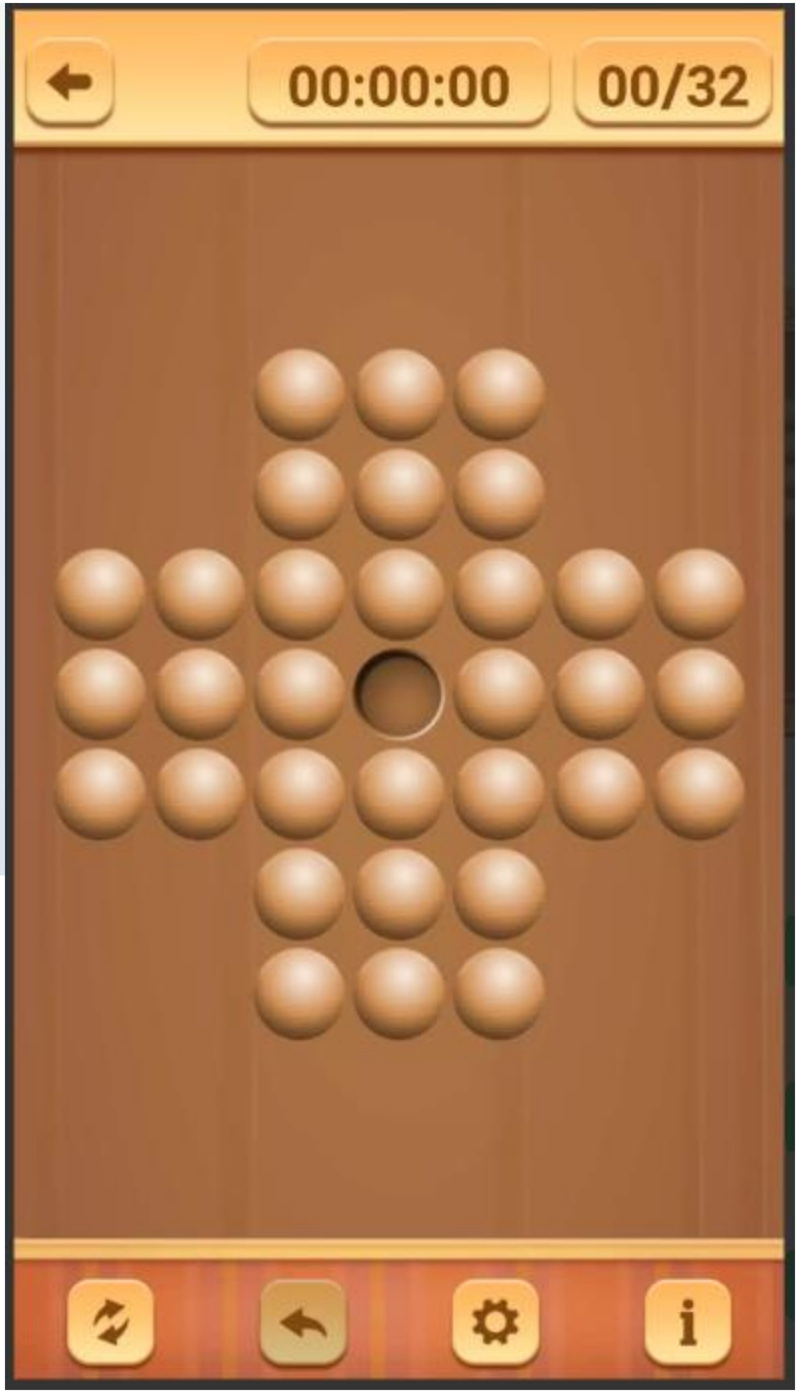
- Grid mines
- Recursion to pop open
- Possible object = square

15 Puzzle

- Grid pieces
- Save/Open
- Neighbours, swapping

Guide on Website





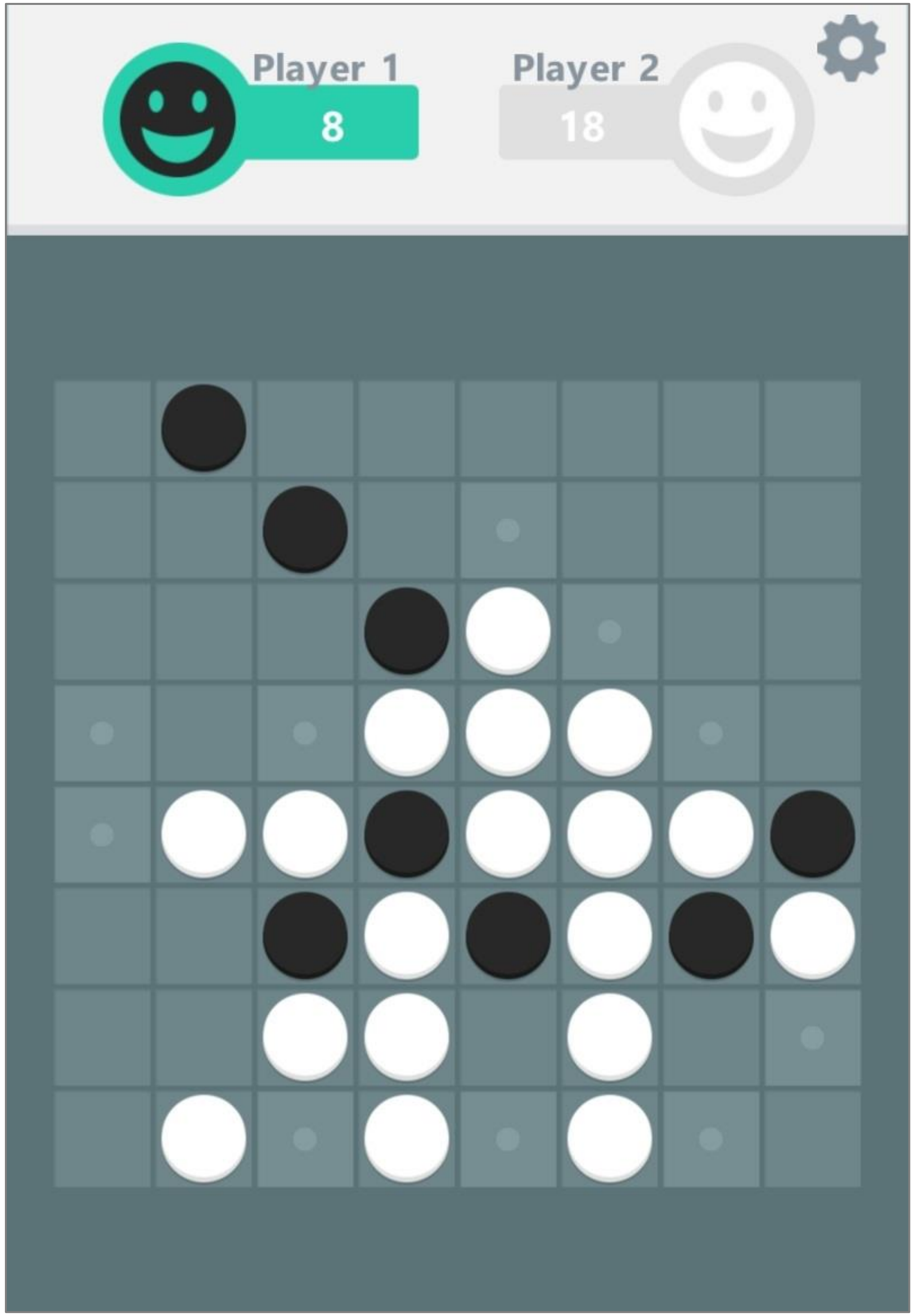
Guide on Website

Peg Solitaire

- Grid
- Save/Open
- Neighbours, Swapping

Boggle

- Object – Dice
- Grid of Dice
- Dictionary/Search
- Neighbours

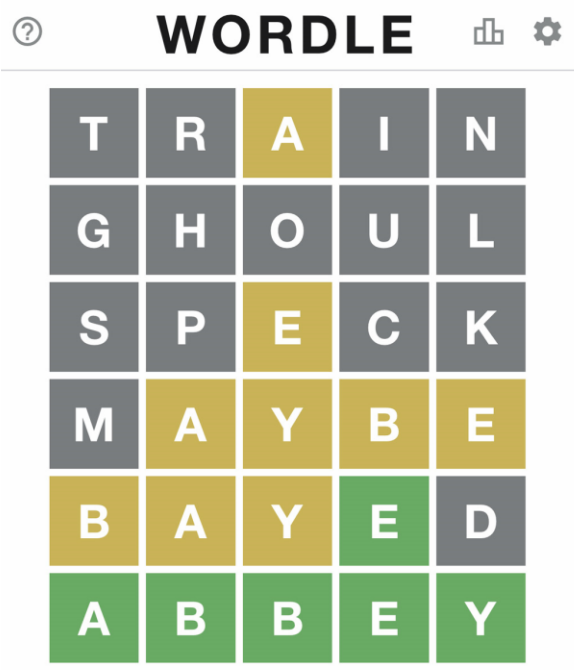


Othello

- Grid
- Save/Open
- Neighbours, Swapping

Wordle

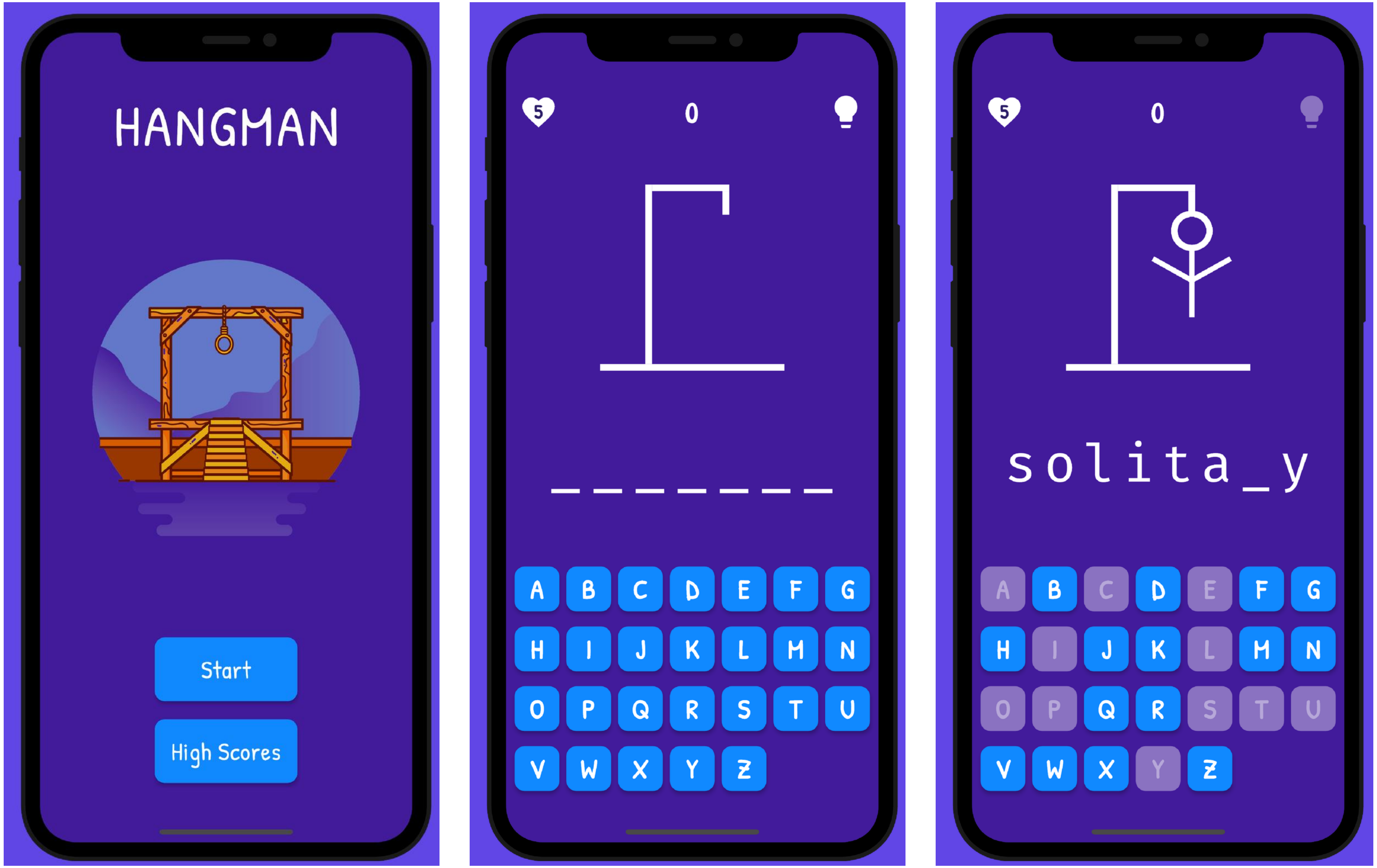
- Dictionary
- Grid of Letters
- Char functions



Hnefatafl (Viking Chess)

- Grid of pieces
- Neighbours / Swap
- Save / Open

Guide on Website



Hangman

- Grid of letters
- Grid of answer letters
- Char functions

*This is quite difficult to code, students underestimate hangman.

Where would you like to go next?

Right | Up | Left

Down

Your Backpack:

0 1 0 1 2 0

Your Charmander meets a Wild Squirtle.

Your HP: 100 Wild Squirtle HP: 67

Which attack do you choose?

Scratch

Smokescreen

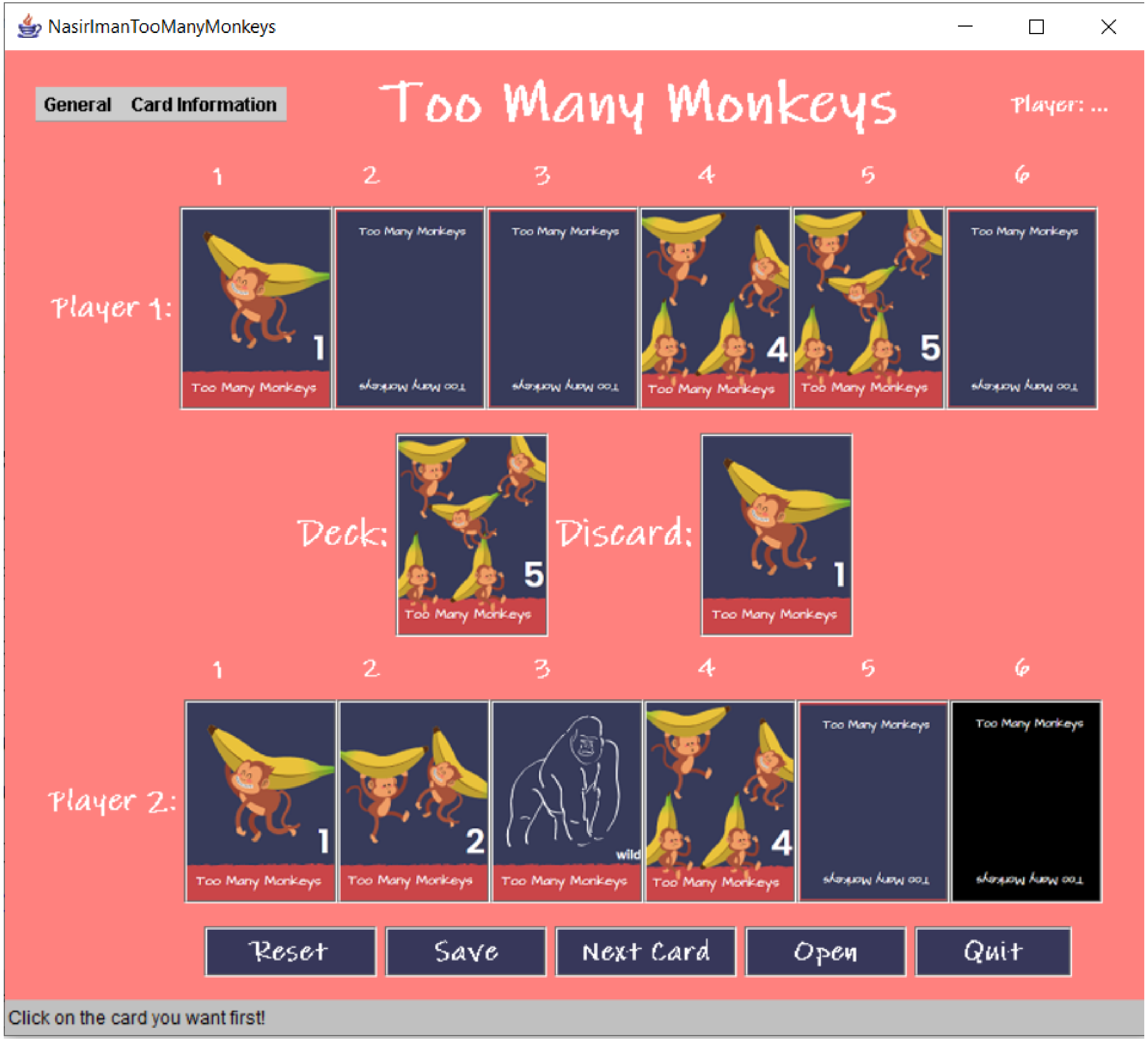
Dragon Breath

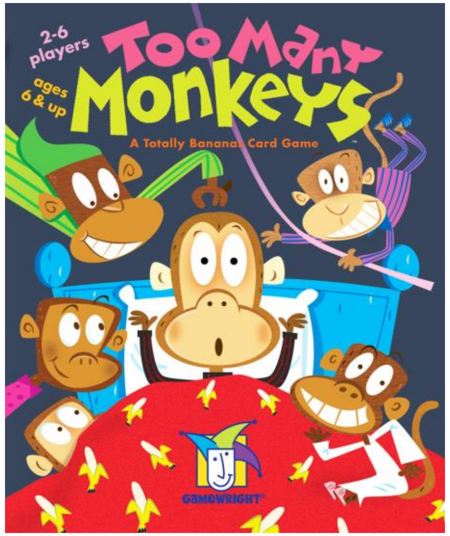
Your Backpack:

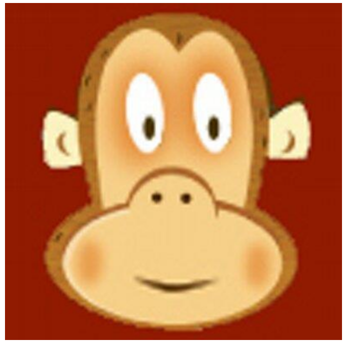
0 1 0 1 2 0

Pokemon

- Grid = Map
- Grid = Backpack
- Objects = Pokemon







Card games are possible. They need a fixed number of cards in a hand.

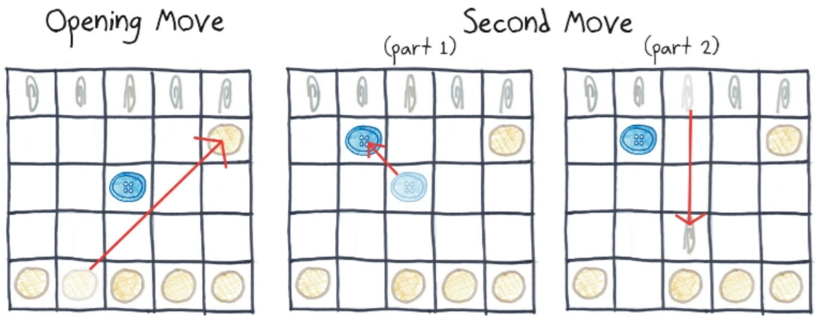
NEUTRON

A GAME OF BACK AND FORTH

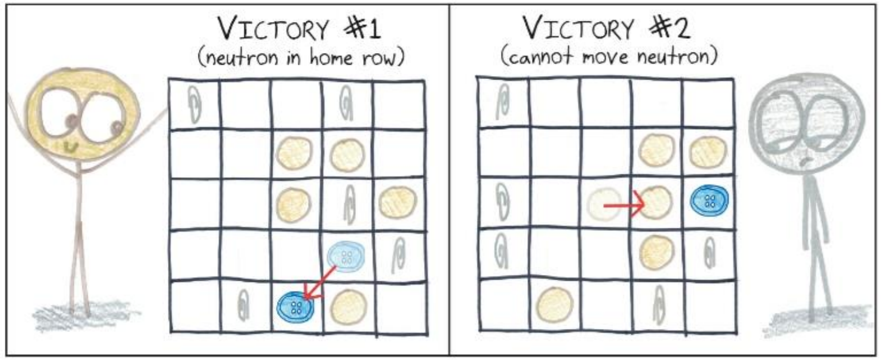
The titular "neutron" is a neutral particle, shunted back and forth between opposing teams, a kind of abstract hockey puck. But in this game, no skater knows how to stop, and the goal you want to score on is your own.[20]

You'll need a **5-by-5 grid** and **11 game pieces**: five of one kind, five of another, and one special marker (the neutron itself). The goal: **Get the neutron into your home row.**

On each turn, you first **move the neutron one step in any direction** (like a chess king),[21] and then move one of your pieces **as far as possible in any direction** (like a chess queen whose brakes have been cut and won't stop until it encounters an obstacle). The exception is the game's opening move: The first player doesn't move the neutron, just one of their own pieces.



You can win in one of two ways: (1) if the neutron reaches your home row, or (2) if you trap the neutron so that your opponent cannot move it on their turn.



You reach the game's depths sooner than you expect, as if wading into the water to find a plunging seafloor. I find it gratifying when I can force my opponent to move the neutron in my direction (or better yet, force them to push the neutron into my home row, thereby winning the game on their move). Meanwhile, it's hard to trap the neutron unless you've got the upper hand already; when on defense, you have fewer safe choices, so it's harder to spring a trap.

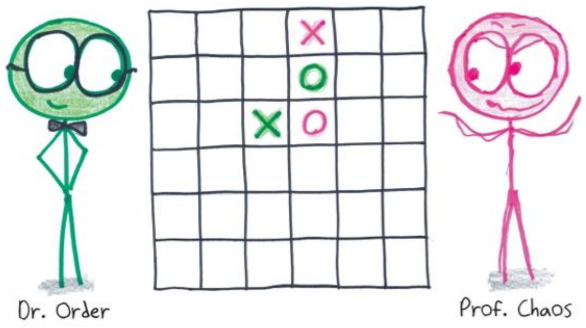
ORDER AND CHAOS

A GAME OF ELEMENTAL STRUGGLE

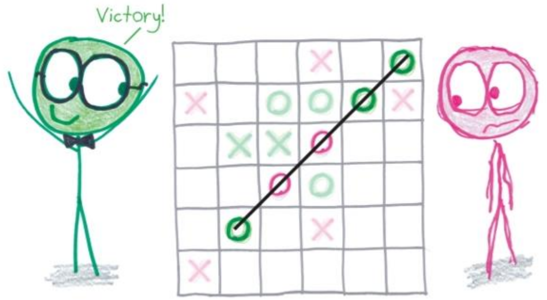
Published by Stephen Sniderman in a 1981 issue of *Games* magazine, this two-player game embodies an ancient conflict. It is the struggle of makers vs. breakers, structure vs. destruction, parents vs. children, Bert vs. Ernie.

It is the battle of Order and Chaos.

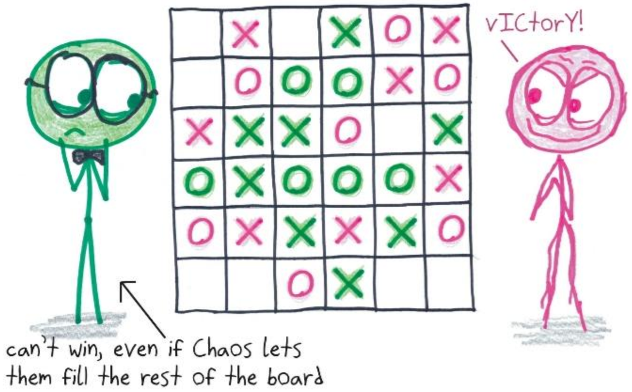
Play on a **6-by-6 grid**. One player (order) aims to create a five-in-a-row; the other (chaos) aims to prevent any such five-in-a-row. Players take turns marking squares, and **each is free to use either symbol (X or O) as they please**.



Order wins by achieving a five-in-a-row. The five can be horizontal, vertical, or diagonal, and made either of all X's or all O's.



Chaos wins if the board fills up with no five-in-a-row created.



Deliciously, each player's symbols can be used against them. Order's old moves may block new progress, and chaos's may form part of an eventual five-in-a-row. The game is also nicely balanced: Beginners often feel that chaos has the advantage, while experts tend to consider order the stronger side.

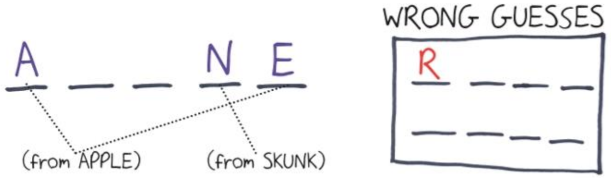
I suggest playing several rounds, switching sides each time, and keeping score as you play. If you win as order, score 5 points, plus 1 point per blank square remaining. If you win as chaos, score 5 points, plus 1 point per blank square remaining *at the moment when the board becomes so clogged that order cannot possibly win.*[22]

QUANTUM HANGMAN

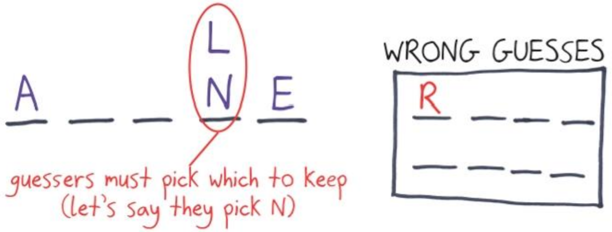
A GAME OF SIMULTANEOUS WORDS

In classic hangman, players guess one letter at a time, aiming to figure out a secret word before committing eight wrong guesses. In this sneaky variant, suggested by Aviv Newman, you pick two words of the same length (like "skunk" and "apple"). Other players then guess letters, with the following outcomes:

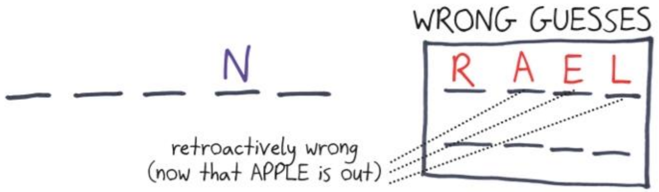
1. **If the letter is in neither word, then the guess counts as wrong.**[21] If the letter is in either or both words, then **all corresponding blanks are filled.**



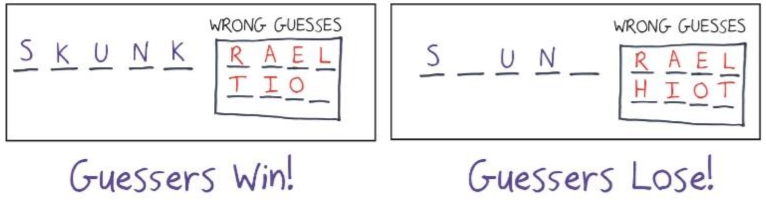
2. At some point, **two conflicting letters will occupy the same blank**. When this occurs, the guessers must "collapse the waveform" by **choosing which letter to keep**.



3. One of the two words is thus eliminated, and all of its letters are stricken from the board. This may result in **some letters becoming wrong guesses retroactively**.



4. From there, **play proceeds as in normal hangman**. If the guessers reach eight wrong guesses, they lose; if they guess the word before that, they win.

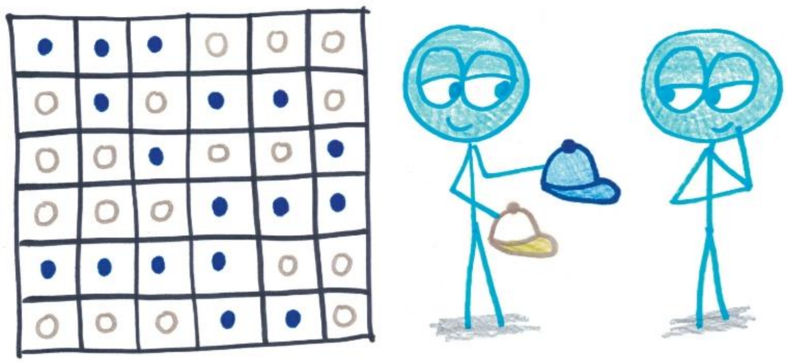


For a next-level game, try playing with *three* simultaneous words. When the first conflict occurs, the player chooses a word to eliminate. Later, another conflict will occur, at which point the final word will be determined.

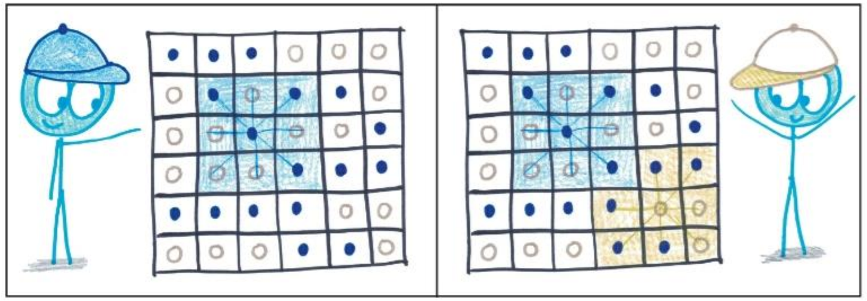
SPLATTER

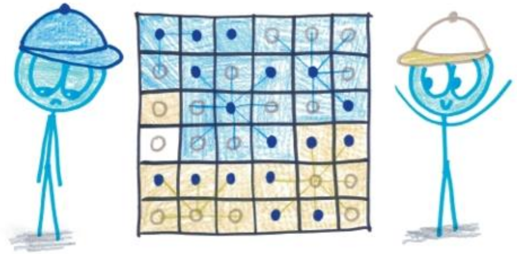
A GAME OF EXPLOSIVE PAINT

For this two-player game, you'll need a **rectangular grid of any size, filled with two kinds of paint blobs in equal numbers**. For a speedy setup, let one player fill the grid as they please; the other then gets to pick a color and go second (or defer the choice of color and go first). For a slower alternative, assign colors beforehand, and take turns placing blobs on an empty grid.



Now, on each turn, **splatter one of your paint blobs**. A blob can splatter in two ways: **alone**, or **taking all of its neighbors with it**. Either way, shade in the affected squares; they are eliminated from the game. Take turns splattering, never skipping a turn. **The last color with an unsplattered blob remaining is the winner.**





The game unfolds at its own peculiar tempo. Sometimes you want to accelerate the pace, splattering as many squares as possible. Later, you may want to apply the brakes, splattering lone squares in an effort to eke out extra turns.

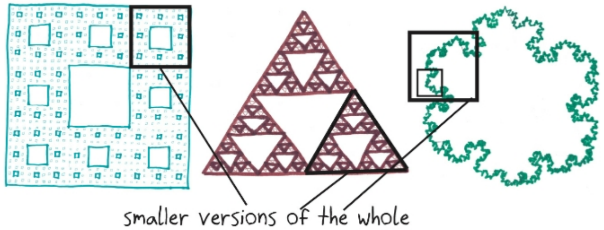
For a more complex variant, allow two other splatter patterns: **diagonal** (splattering to the northwest, northeast, southwest, and southeast) or **orthogonal** (splattering to the north, south, east, and west). Each of these options will splatter four neighbors while leaving the other four untouched.

ULTIMATE TIC-TAC-TOE

A GAME OF FRACTAL STRUCTURE

In 2013, after coming across this game at a math department picnic, I wrote a quick blog post about it. That post launched a brief internet phenomenon, reaching the top of Hacker News,[9] hitting the front page of Reddit,[10] and spawning a mini-industry of phone apps.[11] Since I owe my career in no small part to this game, I've thought a lot about what makes it special. Is it the elegance of the rules? The ease of developing strategic ideas? The subconscious association with Ultimate Frisbee?

Over the years, I've come to credit something else, something I should have suspected all along: fractals.



From clouds to coastlines to tree branches, we live surrounded by fractals. Perhaps that's why Ultimate Tic-Tac-Toe feels so natural. It's the game tic-tac-toe has always aspired to be.

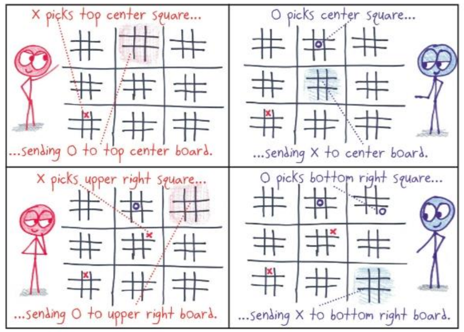
THE RULES

What do you need? Two players, pen, and paper. Draw a large tic-tac-toe board, and then fill each of the nine squares with a smaller tic-tac-toe board.

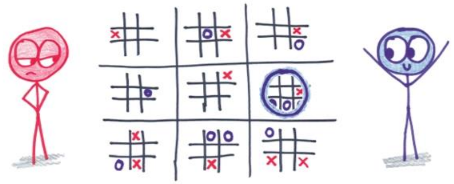
What's the goal? Win three boards in a row.

How do you play?

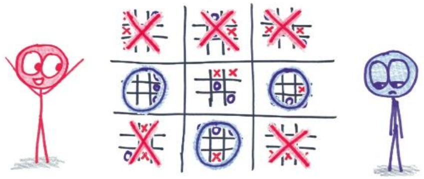
1. Take turns marking individual squares. The first move of the game can occur anywhere; after that, you must play on the mini-board dictated by your opponent's previous move. How so? **Whichever square they picked, you must play on the corresponding mini-board.**



2. If you place **three in a row on a mini-board,** then you win that mini-board. The board is now closed; any player sent there may move anywhere they like, on any other board.



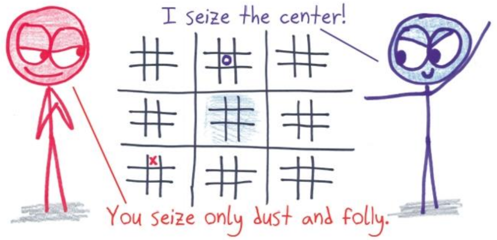
3. **Three mini-boards in a row wins the game.**



For other possible win conditions, see Ultimate Tic-Tac-Toe's Variations and Related Games.

TASTING NOTES

One day in May 2018, I visited the political news site *FiveThirtyEight* to find a surprising headline. "Trump Isn't Playing 3D Chess," declared the lead story, written by Ollie Roeder. "He's Playing Ultimate Tic-Tac-Toe."



Back then, we all spent a lot of time analyzing the behavior of President Donald Trump. He'd leap from one political battle to the next, changing the subject at a whim. Was he carrying out a master plan? Or just obeying wild impulses? "He's not playing three-dimensional chess," critics would often quip.

Ollie Roeder agreed. In his view, Trump was playing another game entirely.

Whereas chess has just one battlefield, Ultimate Tic-Tac-Toe has many. "Those battlefields interact with each other in weird and complicated ways," Ollie wrote. "Even good ultimate tic-tac-toe play looks haphazard, facile, and even plain stupid at first glance." It's a game of "fluid, shifting goals," lending itself to "the strategy of distraction, delay, misdirection, procrastination, and improvisation." In other words: a Trumpian media strategy.

Good politics? Maybe not. Good game? Absolutely. More than that, it's a nifty conception of space: a fractal vision, where choices resonate between large and small levels.

That creates an inherent tension. What seems like a good move on the little board (such as taking the central square) may turn out to be a mistake in the grand scheme (by sending your opponent to the center board). To win, you've got to balance the two levels, doing what political activists strive to do: "Think globally, act locally."

WHERE IT COMES FROM

The earliest version I can find is a 1977 board game called Tic Tac Toe Times 10. A later version titled Tic Tac Ku won a 2009 Mensa Select award, with rules that differ slightly (you win not with three boards in a row, but by claiming five of the nine boards overall).[12] An electronic version titled Tic Tac Ten surfaced a few years later, with a rule change that speeds things up: If you win a single mini-board, you win the game.

Still, for whatever reason, my 2013 blog post marked the game's entry into the popular lexicon.

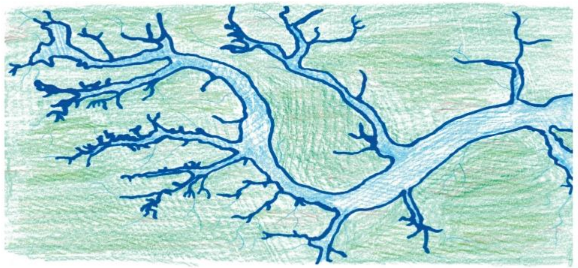
The game goes by many names. Wikipedia mentions "super tic-tac-toe," "strategic tic-tac-toe," "meta tic-tac-toe," "tic-tac-tic-tac-toe-toe," and "(tic-tac-toe)^2," omitting two others that I've heard: my favorite, "fractal tic-tac-toe," and my least favorite, "tic-tac-toe-ception."[13] In any case, the name "Ultimate" seems to have stuck. That's a point of immense pride for me, since it was coined by my students at Oakland Charter High School. Go Matadors!

WHY IT MATTERS

Because we live in a fractal world.

A fractal is something that looks the same on different scales. It is indifferent to zooming in, impervious to zooming out. See how tree branches split into smaller branches, each a miniature version of the whole? Or how coastlines trace jagged curves, appearing the same at all different scales? Even the fluffy architecture of clouds has a fractal quality.

It's no accident that we find these things beautiful. A simple design principle, repeated across scales, creates an enchanting complexity. It's what James Gleick, author of *Chaos*, calls "a wavering, lurching, animating harmony."



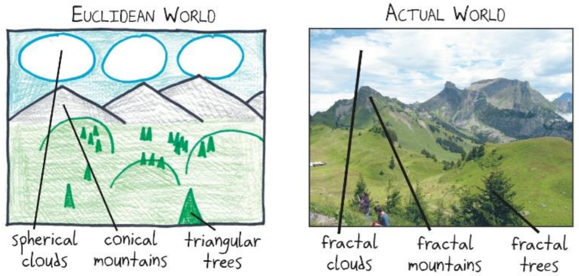
"A river is, in its essence, a thing that branches… its structure echoing itself on all scales, from river to stream to brook to creek to rivulet, branches too small to name and too many to count."

—James Gleick

Fractals arrived at the mathematical party in the 19th century, uninvited and somewhat unwelcome. These new shapes were jagged, fractured, and hard to visualize. Mathematicians called them "pathological," because they broke every rule of polite geometry.

For decades, though, no one grouped them together. They were just a scattered population of misfit toys. Then, in the 20th century, the mathematician Benoit Mandelbrot united them under the name "fractal" and began treating them not as the disease, but the cure. The cure to what? Well, to the crazy old idea that triangles, squares, and pyramids have something to do with physical reality. The real pathology, according to Benoit, was the geometry we're taught in schools. "Clouds are not spheres," he wrote, "mountains are not cones, coastlines are not circles, and bark is not smooth, nor does lightning travel in a straight line."

Nature is not Euclidean. It's fractal.



Plato would have hated it. The ancient philosopher believed so firmly in pure Euclidean geometry that one of his dialogues posits the whole universe is made of triangles—specifically, the two "special right triangles" that fill the nightmares of trigonometry students.

Well, okay, Plato. Go flip through your favorite nature account on Instagram. How many 30°-60°-90° triangles do you see?

Now look for fractals. A little more common, aren't they?

Nature is a garden of fractals. Mountains are jagged piles of rock, topped with smaller piles of rock, topped with even smaller piles of rock. Your lungs, beginning with the trachea, split and split and split again, an average of 23 times, before terminating in tiny balloon-like alveoli that feed oxygen into the blood. In short: You breathe fractally. Decades before fractal geometry was born, geologists realized that tiny streambeds and enormous canyons look indistinguishable in photographs, and so they always made sure to stick a lens cap or hammer in the frame for scale.

LAP

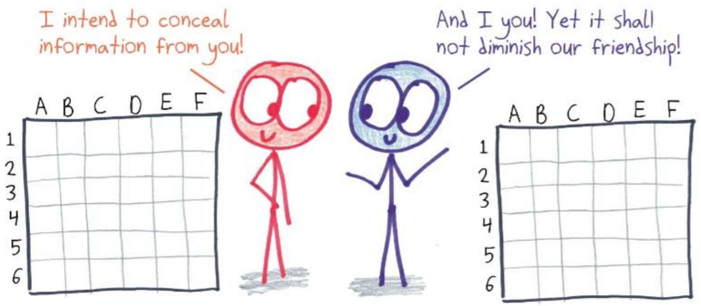
A GAME OF LABYRINTHINE AREA PUZZLES

Hey, you know Battleship? Well, forget it. Wipe it from your memory. Delete the file.

Hey, you know Battleship? No? Good, the memory wipe worked. Now you're ready to meet a better game, a harder game, the game that Battleship aspires to be: LAP. Its name comes from the initials of its creator, Lech A. Pijanowski, but it could just as easily stand for "Let's All Play," "Labyrinthine Area Puzzles," or "Like a Pro." As in Battleship,[11] players probe a hidden grid. Yet LAP is deeper, subtler, and ultimately more rewarding. So, let's all play labyrinthine area puzzles like a pro.

HOW TO PLAY

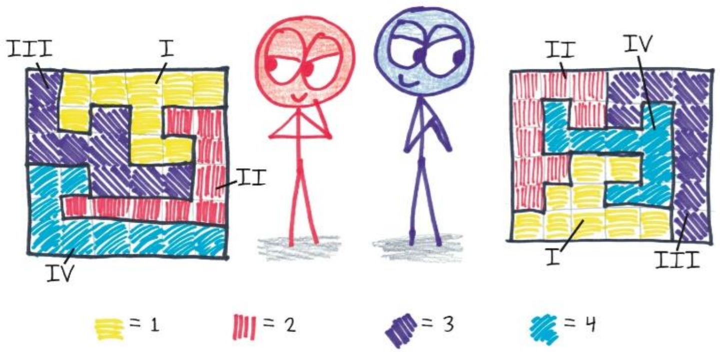
What do you need? Two players, each with a **6-by-6 grid**, **plus extra grids** on which to track information gained from your opponent.



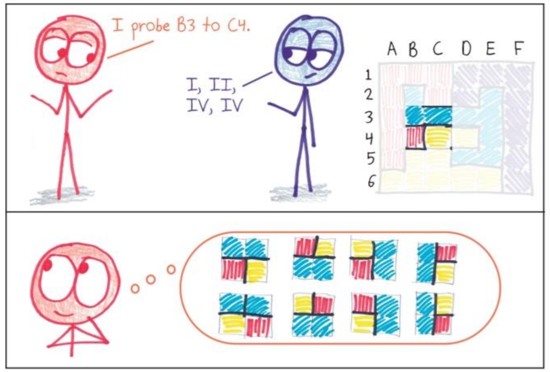
What's the goal? Fully map your opponent's regions before they can map yours.

What are the rules?

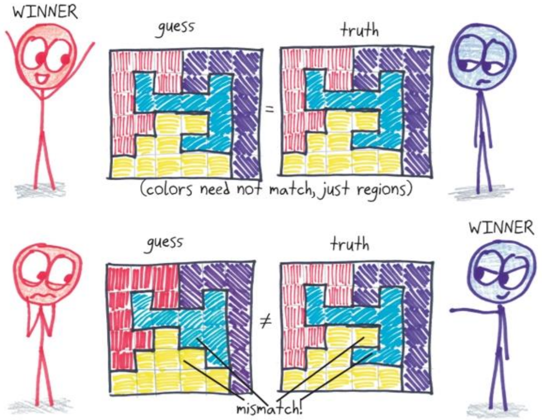
1. To begin, **secretly divide your grid into four equal-sized regions:** I, II, III, and IV. A region consists of precisely nine connected squares. Diagonal connections don't count. I suggest distinguishing them three ways: numbers, shading patterns, and pencil color (though in theory, just numbers would suffice).



2. Take turns **asking your opponent about a rectangle of squares** (e.g., B3 to C4). The rectangle must be at least 2 by 2, but it may be larger. Your opponent will tell you **which regions those squares belong to** (e.g., I, II, IV, IV), **but not their formation** (e.g., you don't learn *which* square belongs to region I).



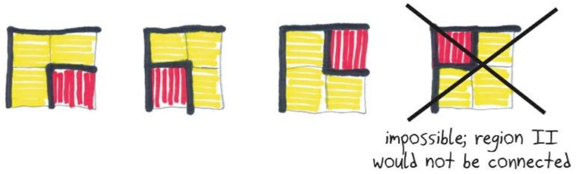
3. When you have solved your opponent's board, **announce that you are making a guess**. Then, hold your guess and your opponent's board side by side. If they are identical, you win. If not, you lose.



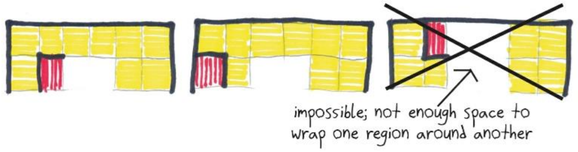
TASTING NOTES

The name of the game is extracting information. Well, not actually; the name of the game is Little Affable Probes. Still, extracting information is the challenge and thrill of the game, if not its title.

I like to begin by probing the corners. For example, if I'm told the upper left corner is three Is and one II, then I know it must be one of three formations:



Next, I might learn that the upper-right corner is all Is. I can then deduce that the Is hug the top wall. If they didn't, then connecting the Is would require them to wrap around region II, which is impossible. Try it: Either region II would have to be smaller than nine squares, or region I would have to be larger.



LAP offers a classic trade-off. Do I seek the *most* information or the *easiest-to-interpret* information? Myself, I pick the corners first, because the logical deductions are clear. But expert player Bart Wright (who plays on an 8-by-8 board) prefers to begin with the center, knowing that from this information, he can usually deduce the values along the edges. Thus, I play for easy-to-interpret information, while Bart plays for maximal information.

There are also strategic considerations in designing your board. Regions with big solid chunks are easier to figure out, and certain board designs are especially devious:

In Lech's original rules to LAP, which only allowed 2-by-2 probes, the four boards above would be indistinguishable. That's why I've tweaked the rules to allow larger rectangular probes; they let you resolve this ambiguity.

WHERE IT COMES FROM

The game was first published in a Polish newspaper column written by the game's creator, Lech Pijanowski. He later took the leap of sharing it with celebrated game designer Sid Sackson. "It could be a shock, really," Lech wrote to Sid, "getting a letter like this one, from a faraway country and an unknown person." Lech needn't have worried. Sid was so impressed, he translated the game from Polish ("with considerable difficulty") and featured it in his hit 1969 book, *A Gamut of Games*. LAP does the things that Sid said a good game should: "be easy to learn yet have infinite strategic possibilities, give you a chance to make choices, create interaction among players[12] and take a maximum of one and a half hours to play."

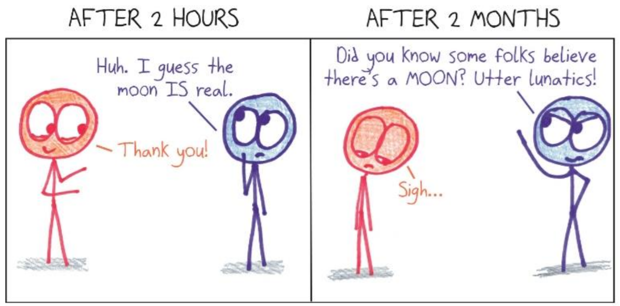
It's clear that Sid was fond not only of the game but also its creator. "In another twenty years," he wrote, "we might begin to exhaust the information we have to impart to each other." Alas, Lech died just a few years later. Sid outlived him by 28 years.

WHY IT MATTERS

Because no information exists in isolation.

Tell me if you've had this experience. A person says something false, like "The moon is a hoax." "You mean the moon landing?" you ask. "No," they insist, "the moon itself." Spurred to act, you give a heroic succession of patient arguments until, finally, you persuade them of the truth. Then, months later, you run into the person again…

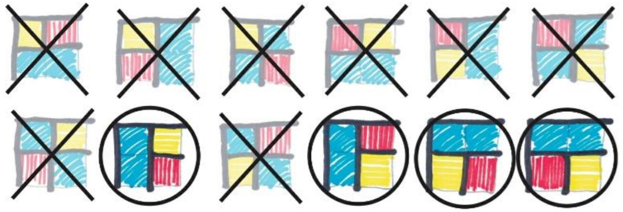
And they're back to spouting the same old nonsense.



What went wrong? Have you time-traveled into the past, so that your decisive argument has yet to take place? Did all that hard-won insight just vanish?

According to psychologist Jean Piaget, we respond to novel information via two basic processes. The smoother one is *assimilation*: adjusting new facts to fit your existing worldview. The rougher one is *accommodation*: adjusting your worldview to make room for challenging new facts.

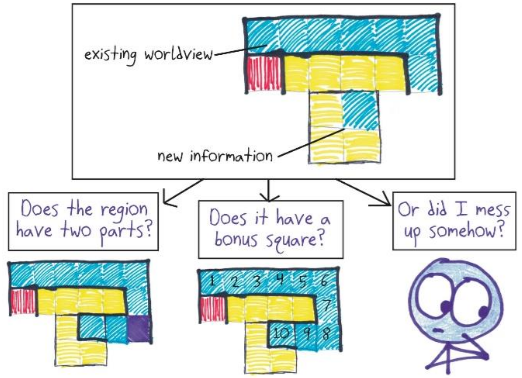
LAP is a toy model of this process. For example, say I'm told that the upper-left corner contains one I, one II, and two IIIs. Based on that fact alone, 12 formations are possible. However, while my gameboard might be a blank slate, my mind isn't. I have a preexisting worldview; in particular, I know each region must be connected. That rules out any formation with an isolated square in the corner.



In absorbing the new information, I modify and reinterpret it, winnowing 12 possibilities down to four. That's how assimilation works. Filling a mind with facts is not like filling a vessel with water. For anyone with a worldview—that is, anyone with a pulse—assimilation is an active process.

As for accommodation, it occurs when new information forces me to confront a mistake. Say I've deduced—or believe that I've deduced—the top two rows of the board. Then I probe C3 to D4, and learn that it contains three Is and a III.

This is, according to my worldview, impossible. One of my beliefs must give way.



In life, as in LAP, knowledge is not just a pile of logical propositions. It's a network of them, held together by beliefs, experiences, and values. Often, when we fail to learn something, it's because we struggle to reconcile the new information with the old. Assimilation fails, accommodation is scary, and so the incoming data, no matter how factual, is rejected like a foreign pathogen.

Want to persuade your fellow human beings of the truth? It's hard. You've got to speak to their worldview. You've got to help them see how they can revise particular beliefs while keeping intact their values, identity, and sense of self. No easy feat. And to build that trust, it can't hurt to start with a friendly game of LAP.

VARIATIONS AND RELATED GAMES

Beginners' LAP: Divide your 6-by-6 grid into just two regions.

Experts' LAP: Play on an 8-by-8 grid, divided into four regions.