

PUZZLE BOOK

SPACECHEM



PRINTED IN CHINA

© 2013 ZACHTRONICS

WHAT IS SPACECHEM?

SpaceChem: Paper Edition is a paper adaptation of the puzzle game *SpaceChem*, by Zachtronics.

In this puzzle book you will “program” chemical reactors by drawing lines to combine letters like “C” and “H” (atoms) into specific sequences like “HCCH” (molecules). It would be wise to use a pencil, as you’re likely to make mistakes!

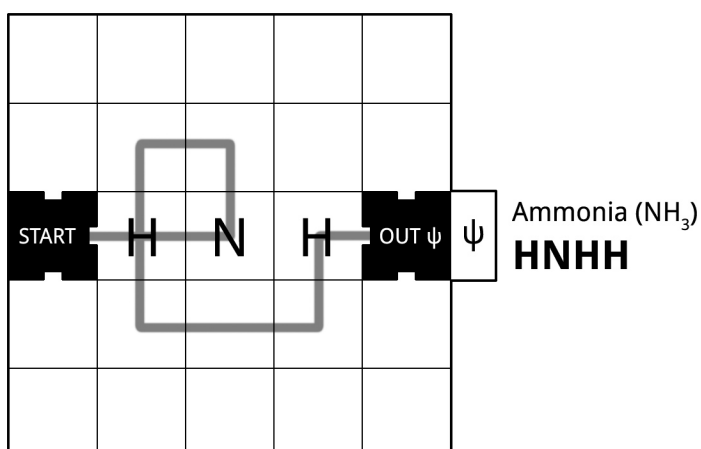
YOUR OBJECTIVE

Draw a line from each **START** square to an **OUT** square so the line runs through letters “spelling out” the **sequence** of the molecule next to the OUT square.

Each START and OUT square may connect to only one line. Since the number of START squares is always equal to the number of OUT squares, you may only draw as many lines as there are START squares in the puzzle.

AN EXAMPLE

In the example below, the sequence “HNHH” must be spelled out. Because the line passes through the letters “H”, “N”, “H”, and “H”, while connecting a START to the OUT, this is a valid solution.



VALID LINES

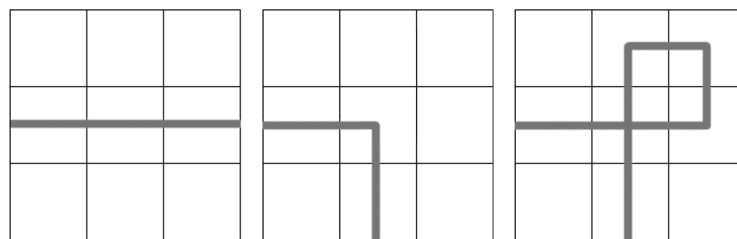
A valid line must start in a START square and end in an OUT square. It must be the only line leaving that START square and the only line entering that OUT square.

Generally speaking, a square may only be crossed once, by any line. The exception to this is the “double-cross”, where a square is crossed straight through in each direction.

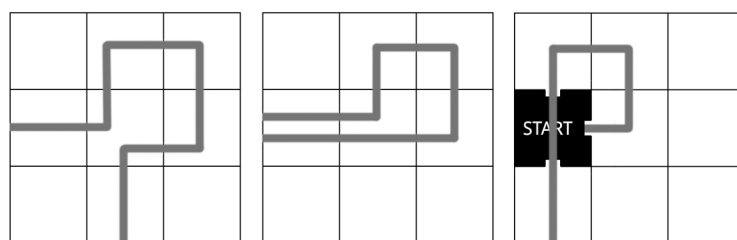
A line may “turn” and change direction in a square, but doing so prevents that square from being crossed again in the future.

START and END squares may not be crossed. Lines may only leave START squares and enter END squares.

The following lines are valid:

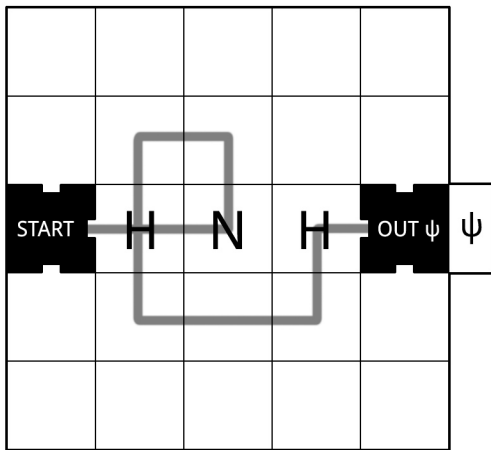


The following lines are invalid:

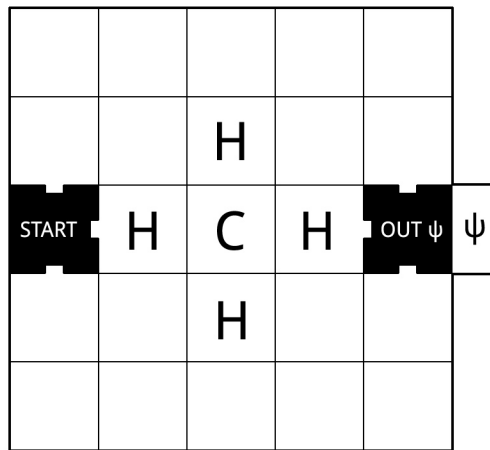


LOOKING FOR MORE?

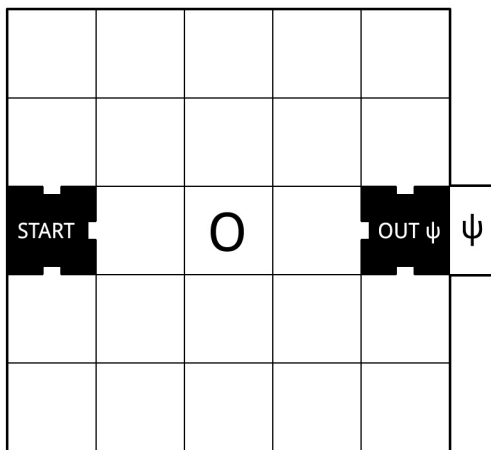
If you enjoy solving the puzzles in *SpaceChem: Paper Edition*, you’ll love the PC (or iPad, or Android) version as well. Visit spacechemthegame.com to find out more!



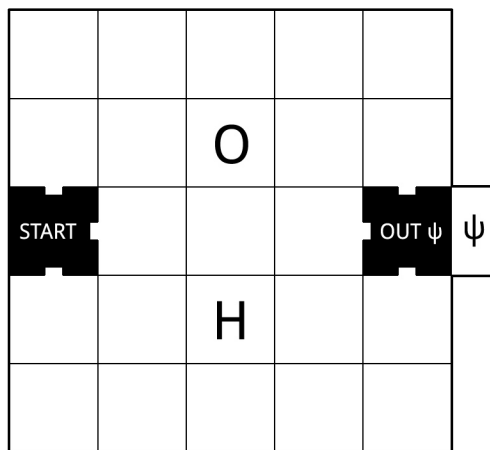
Ammonia (NH_3)
HNHH



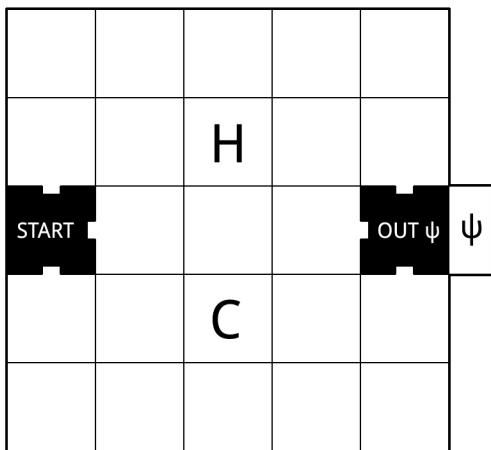
Methane (CH_4)
HHCHH



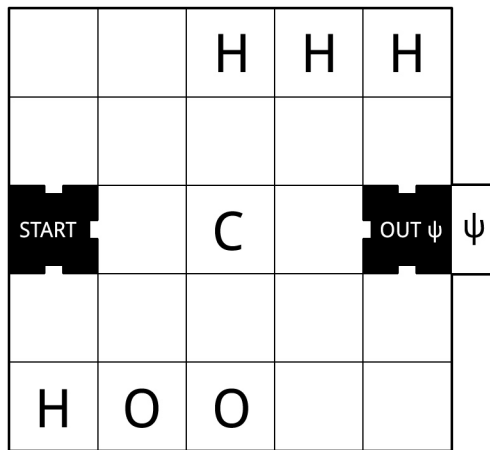
Oxygen (O_2)
OO



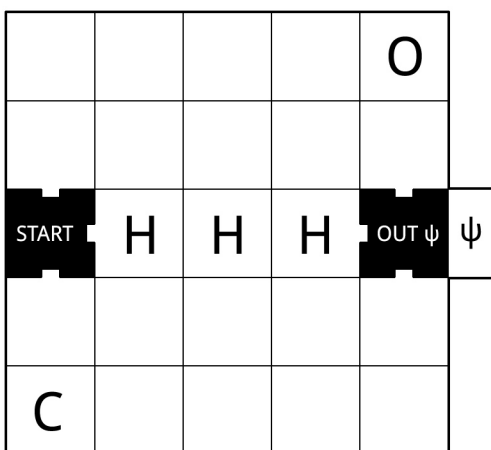
Water (H_2O)
HOH



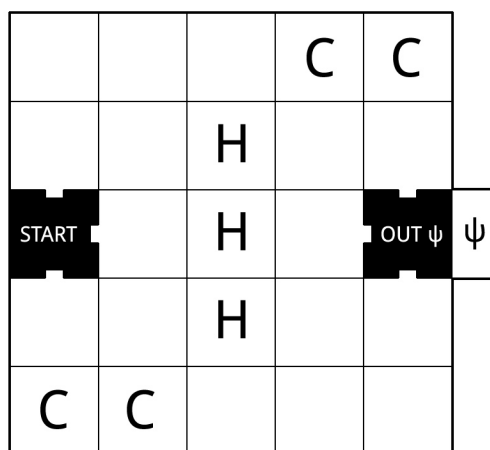
Acetylene (C_2H_2)
HCCH



Acetic Acid (CH_3COOH)
CHHHCOOH



Methanol (CH_3OH)
CHHHOH

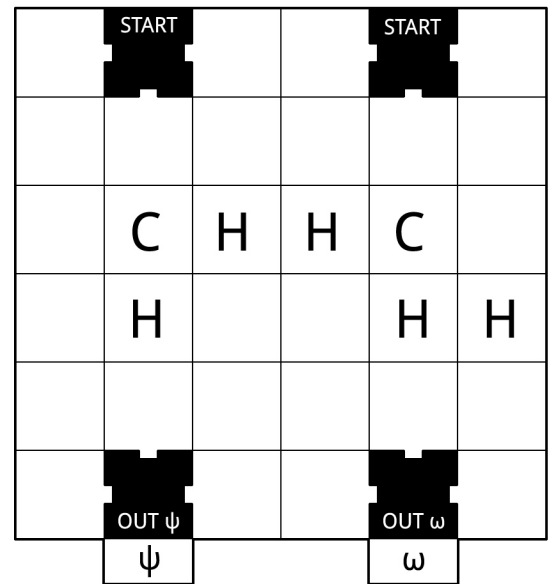
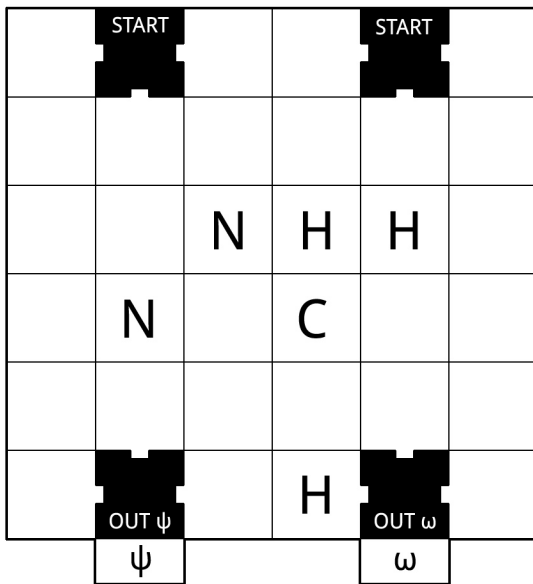
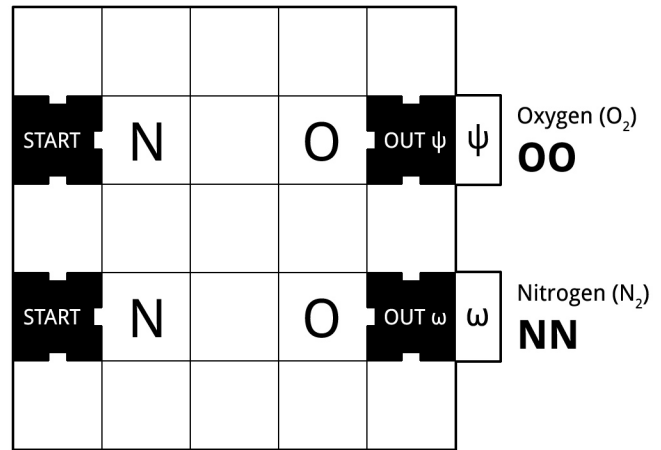
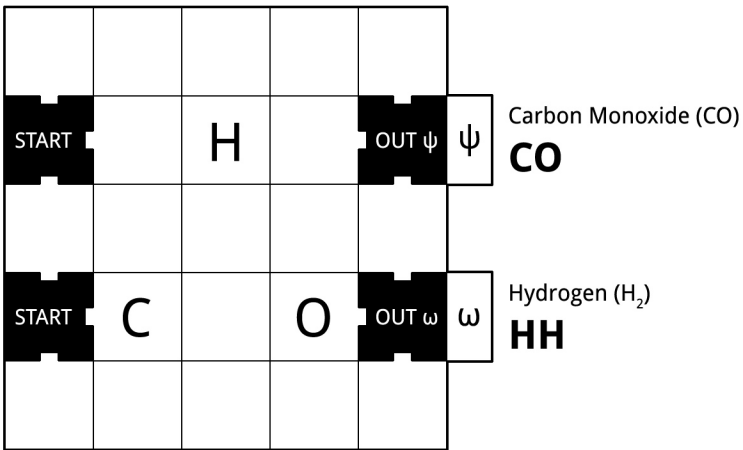
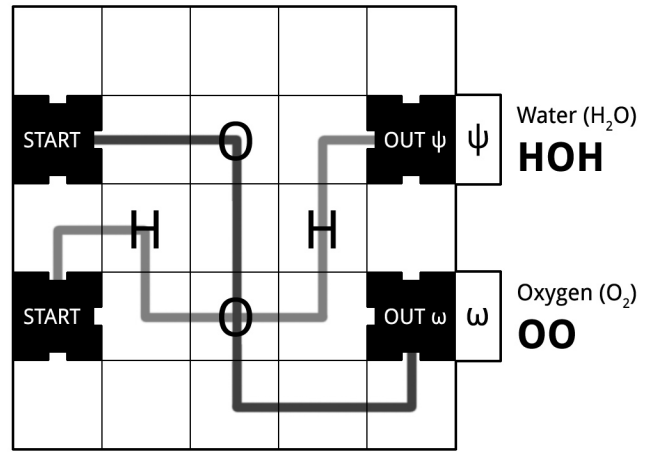


Ethane (C_2H_6)
HHHCCHHH

DUAL LINES

When a puzzle includes two START squares and two OUT squares, you must draw two lines instead of one.

A line may only cross another line in the same way that it may cross itself: by "double-crossing" perpendicularly.

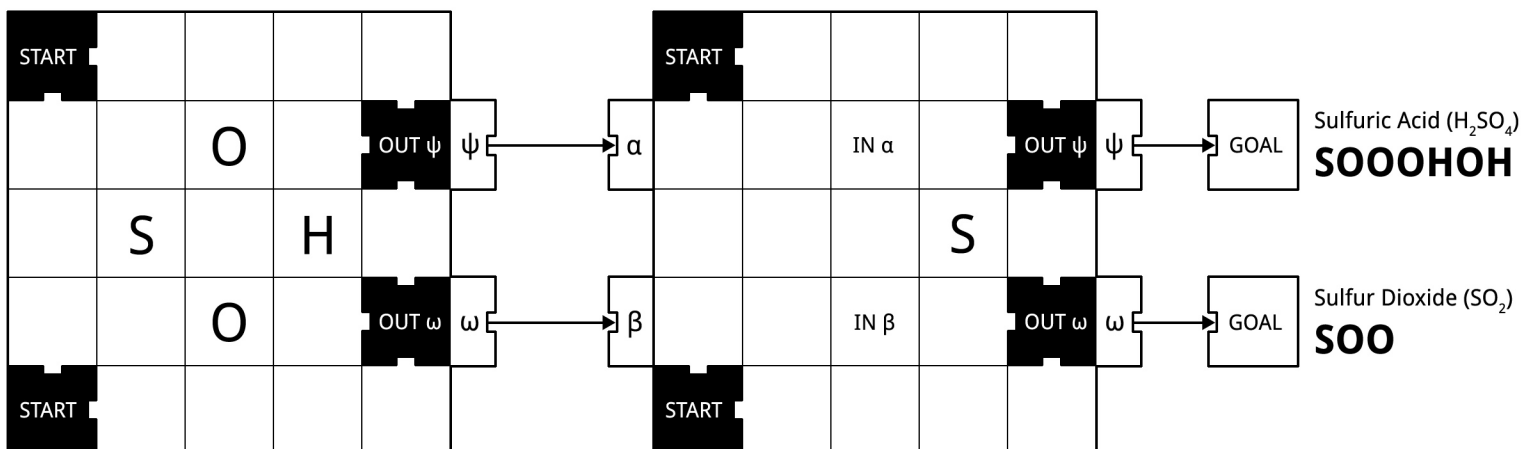
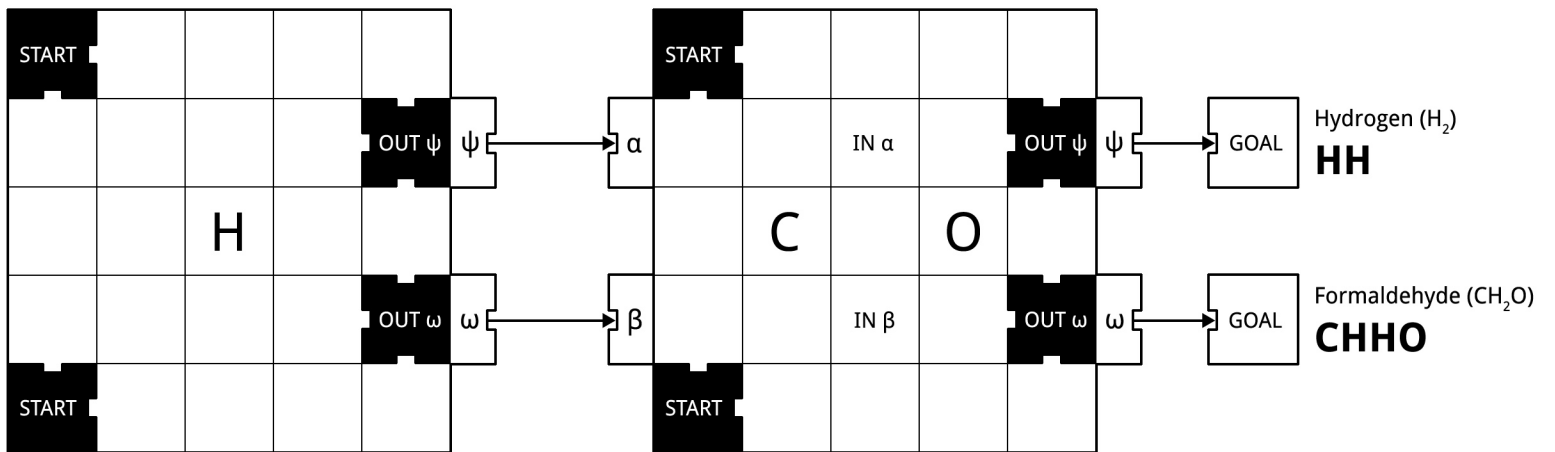
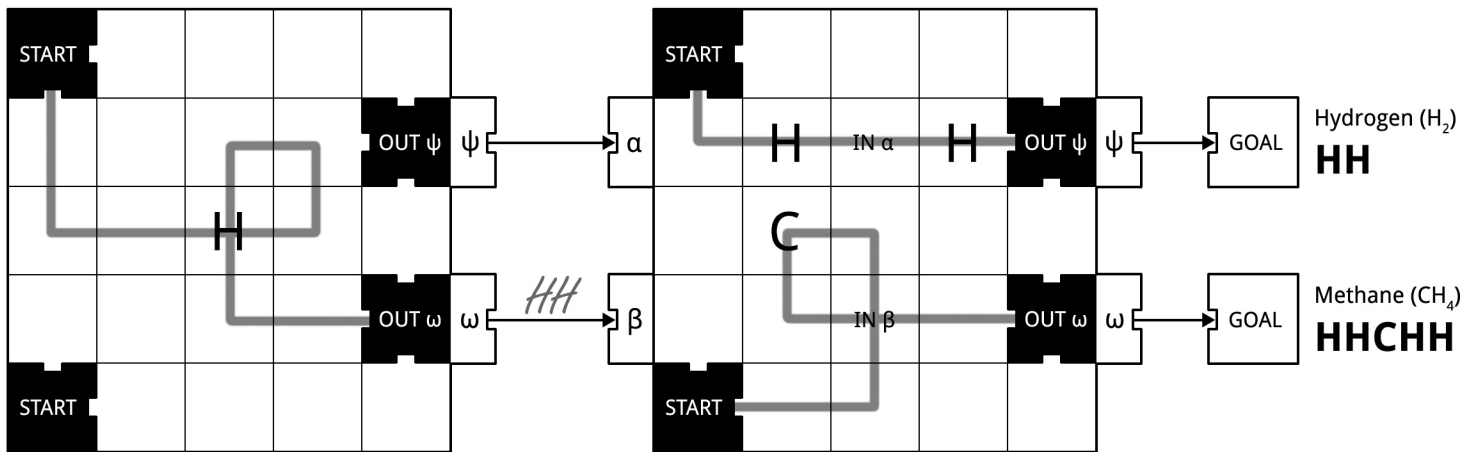


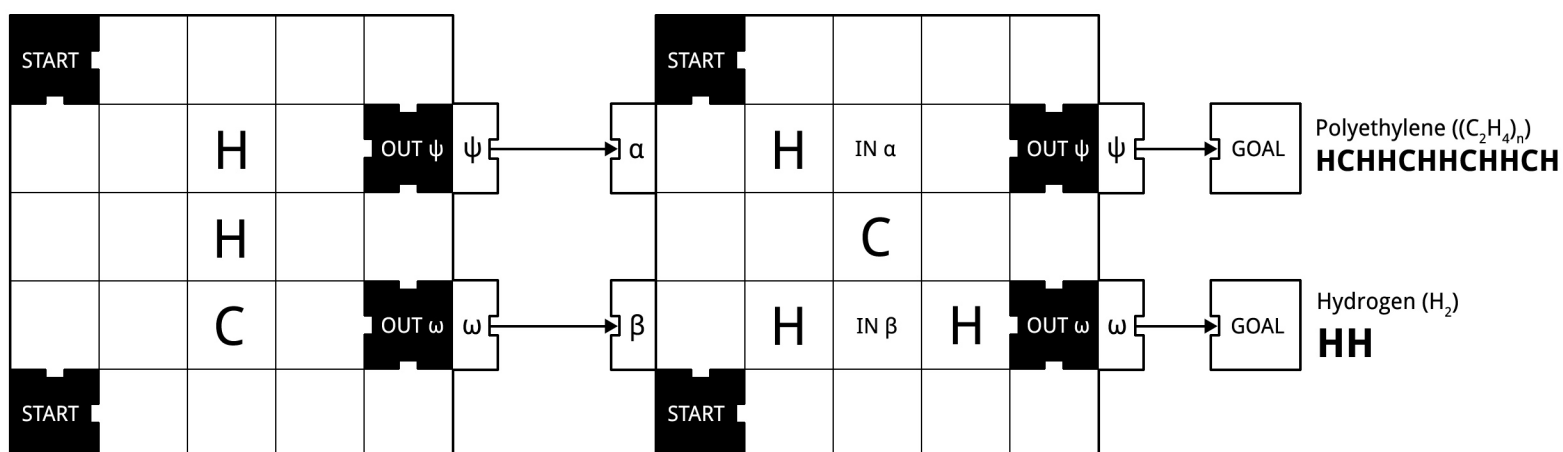
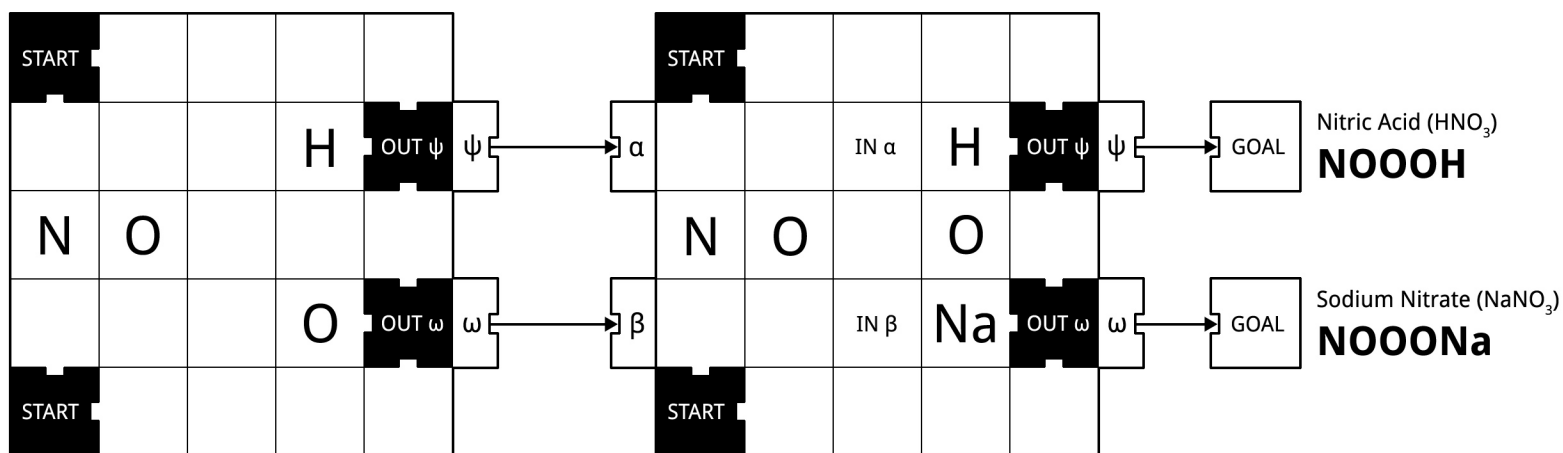
PIPELINE PUZZLES

Multiple puzzle grids can be connected together to create a **pipeline**. When a **connection** is drawn between an **output** on one grid and an **input** on another, the sequence sent to the corresponding OUT square can be “imported” by drawing a line over the corresponding IN square.

In the example below, the first grid outputs “HH” at the ω output. The “HH” sequence then enters the second grid at the β input. When a line is drawn over the “IN β ” square in the second grid, it is equivalent to drawing a line over two “H” squares at once. Thus, the sequence “IN β ”, “C”, “IN β ” becomes “HHCHH”.

Connections are fixed in the next few puzzles, but you will draw your own later on!



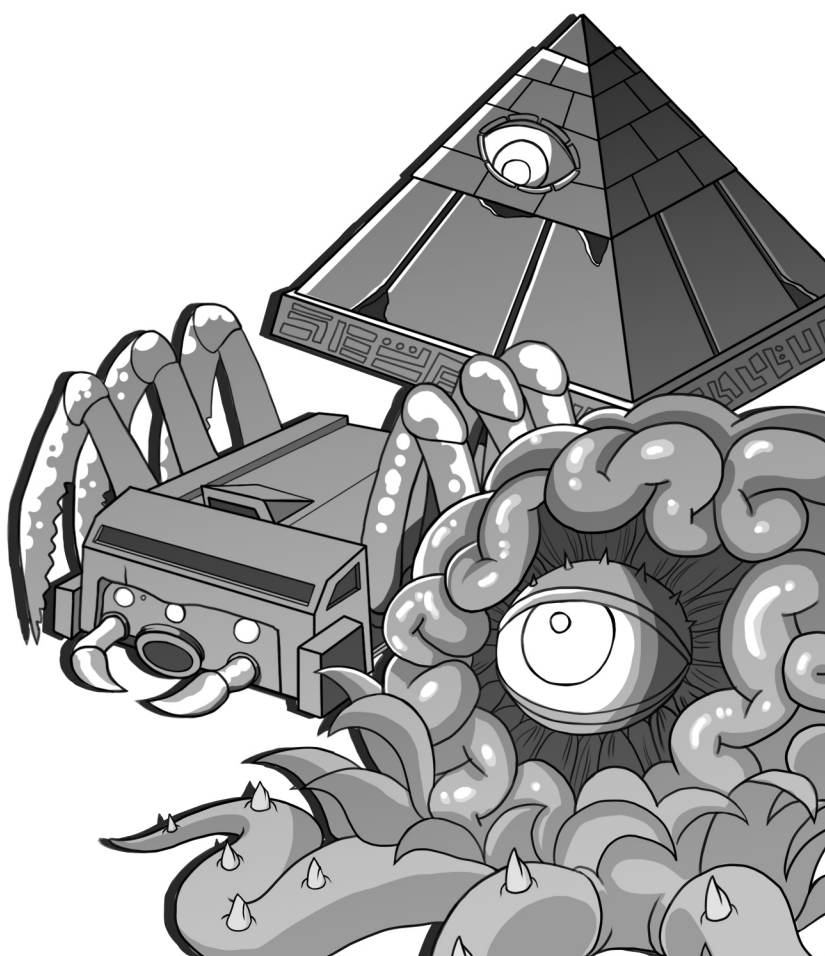


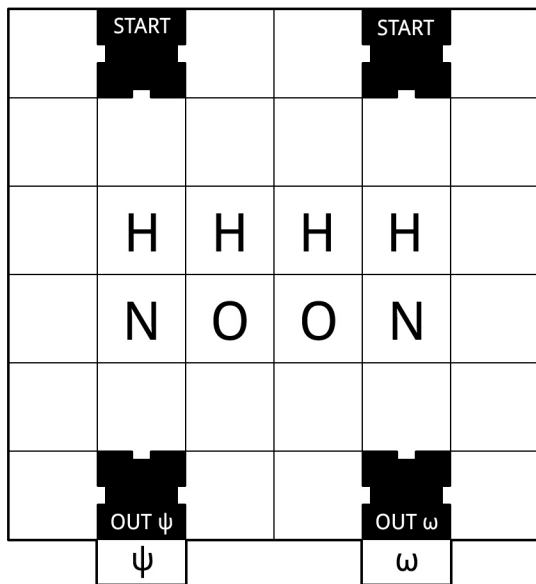
IF YOU'RE ENJOYING THESE PUZZLES,
YOU'RE GOING TO LOVE

SPACECHEM

THE VIDEO GAME!

- SpaceChem features over 50 mind-bending puzzles, an original soundtrack, and ResearchNET, which allows you to design and play custom puzzles!
- SpaceChem is available for Windows, Mac, and Linux on **Steam**.
- SpaceChem Mobile is available for iOS on the **App Store** and Android on **Google Play**.



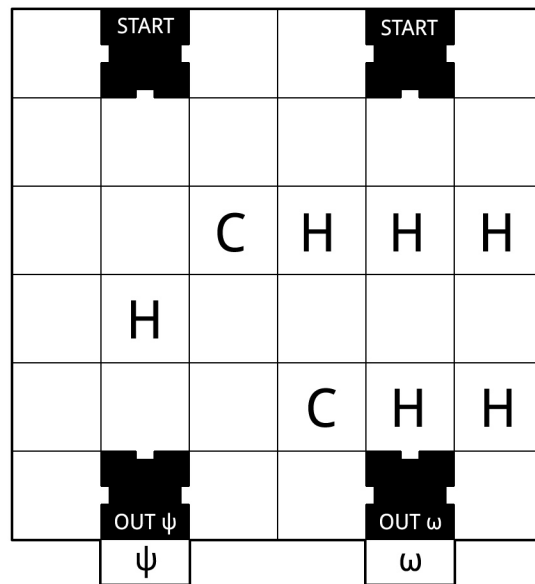


Ammonia (NH_3)

NHHH

Nitric Acid (HNO_3)

HONOO

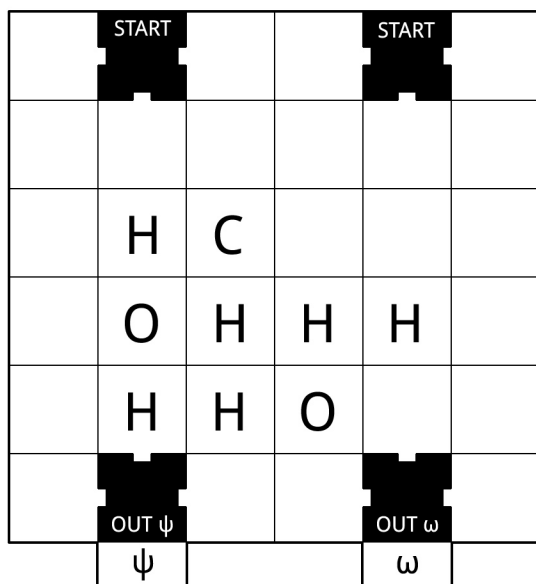


Acetylene (C_2H_2)

HCCH

Ethane (C_2H_6)

HHHCCHHH

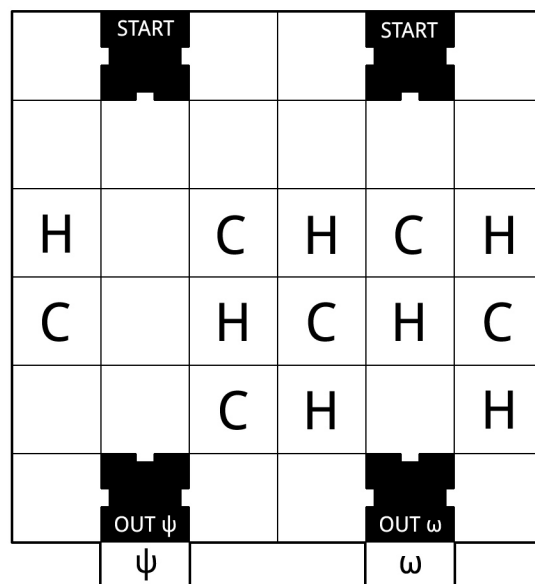


Water (H_2O)

HOH

Ethanol ($\text{C}_2\text{H}_5\text{OH}$)

CHHHCHHOH



Acetylene (C_2H_2)

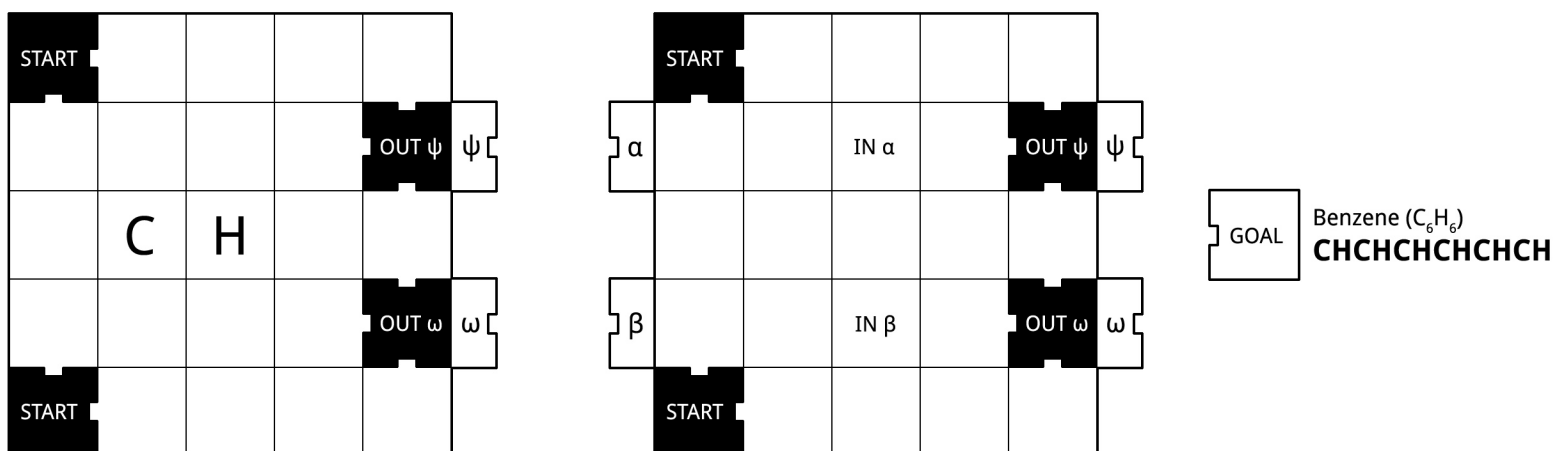
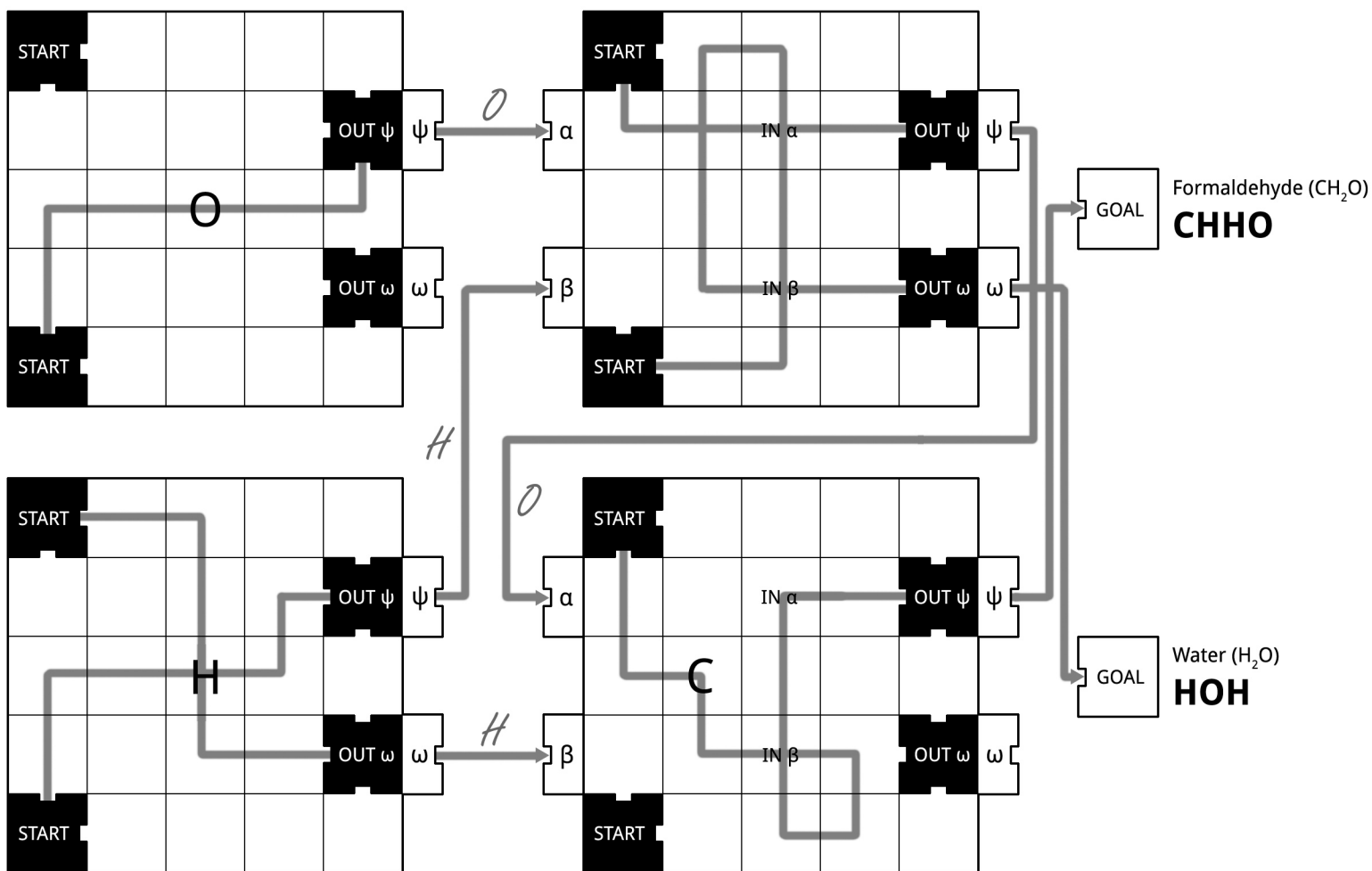
HCCH

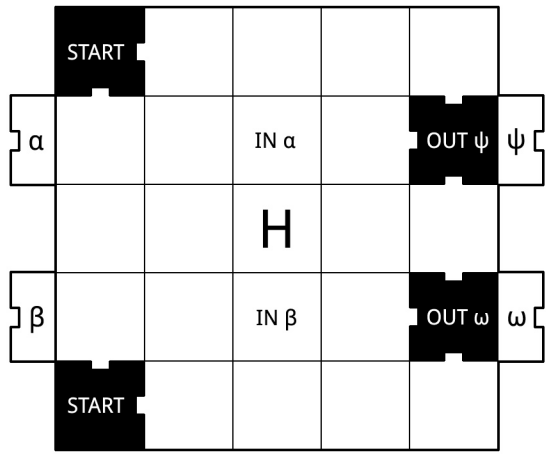
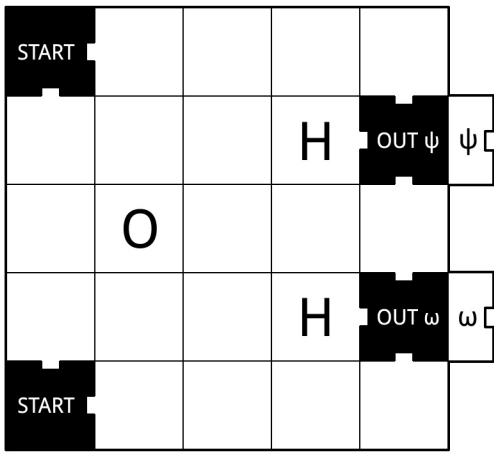
Benzene (C_6H_6)

CHCHCHCHCHCH

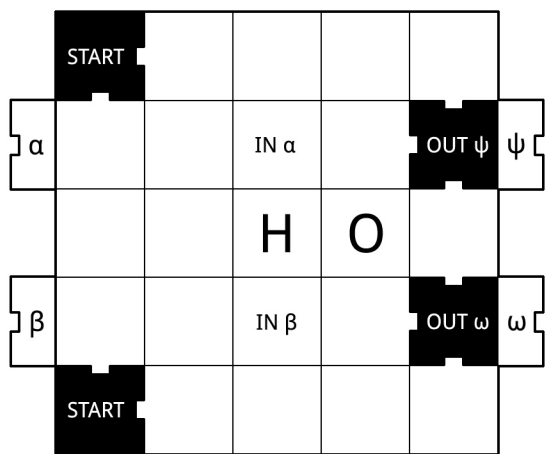
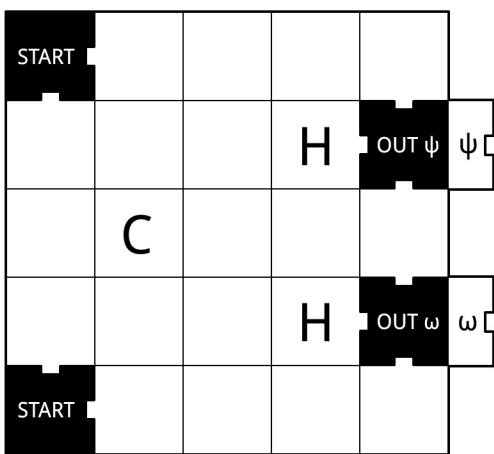
CUSTOM CONNECTIONS

In the following pipeline puzzles, you must draw in your own connections. In addition to connecting one puzzle grid to another, this allows you to connect a puzzle grid's output to an input on the very same puzzle grid!

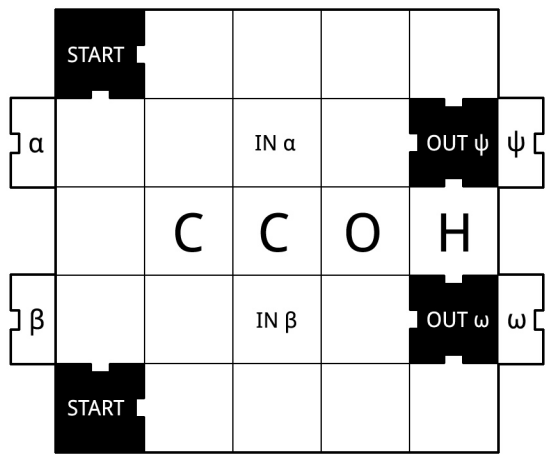
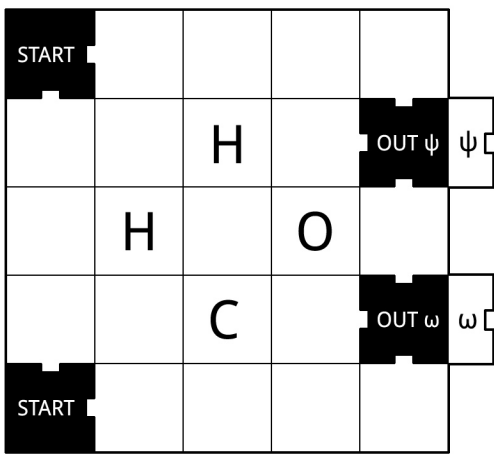




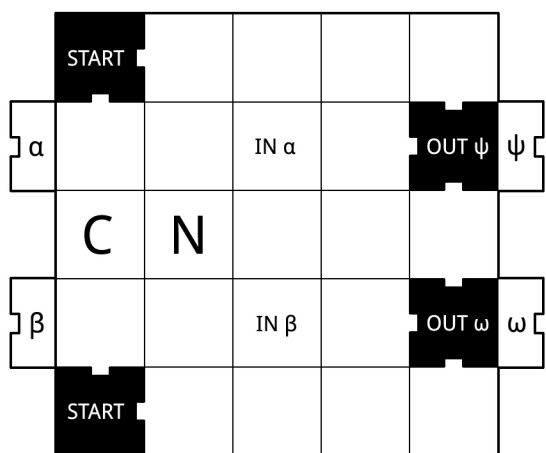
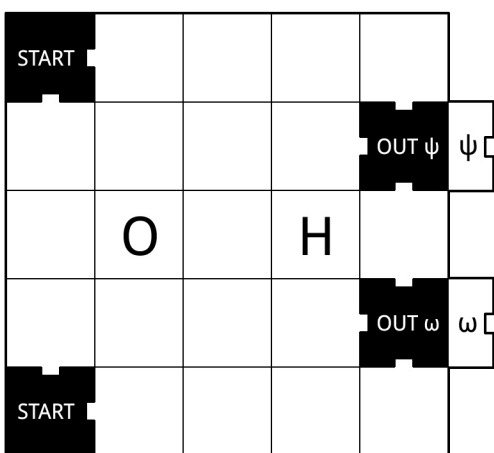
GOAL Ethanol (C₂H₅OH)
CHHHCHHOH



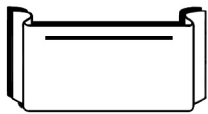
GOAL Acetaldehyde (CH₃CHO)
CHHHCHO



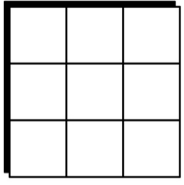
GOAL Acetone (CH₃COCH₃)
HHHCCOCHHH



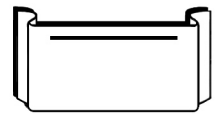
GOAL Glycine (NH₂CH₂COOH)
HHNCHHCOOH



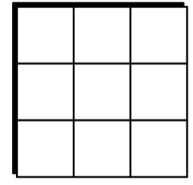
ROUND SCORE



ACTION POINTS

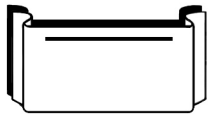


ROUND SCORE

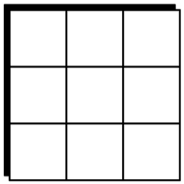


ACTION POINTS

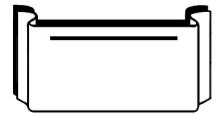
ROUND THREE



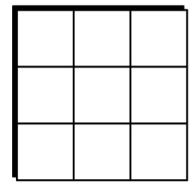
ROUND SCORE



ACTION POINTS

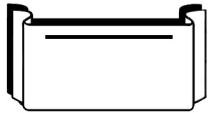


ROUND SCORE

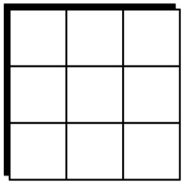


ACTION POINTS

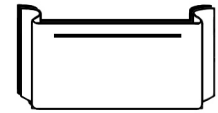
ROUND TWO



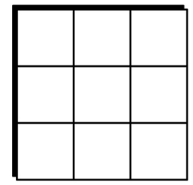
ROUND SCORE



ACTION POINTS



ROUND SCORE



ACTION POINTS

ROUND ONE



SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

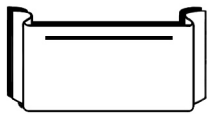
SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

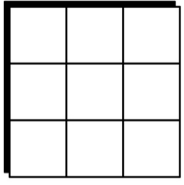
 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

THE SOUTH

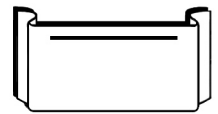
THE NORTH



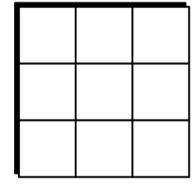
ROUND SCORE



ACTION POINTS

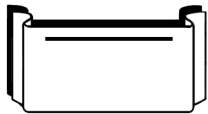


ROUND SCORE

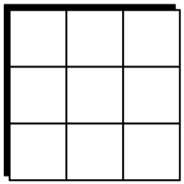


ACTION POINTS

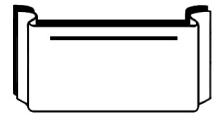
ROUND THREE



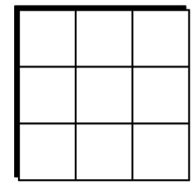
ROUND SCORE



ACTION POINTS

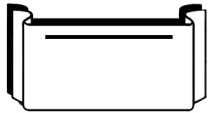


ROUND SCORE

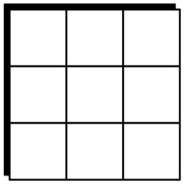


ACTION POINTS

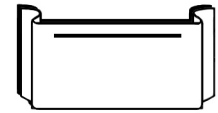
ROUND TWO



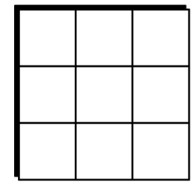
ROUND SCORE



ACTION POINTS



ROUND SCORE



ACTION POINTS

ROUND ONE



SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

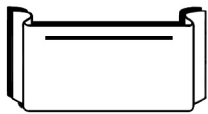
SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

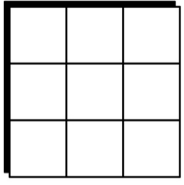
 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

THE SOUTH

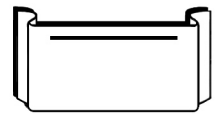
THE NORTH



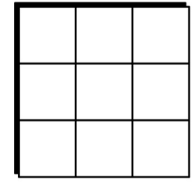
ROUND SCORE



ACTION POINTS

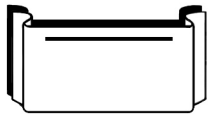


ROUND SCORE

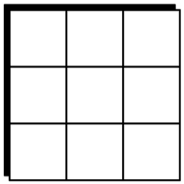


ACTION POINTS

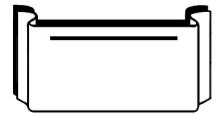
ROUND THREE



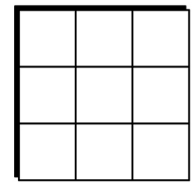
ROUND SCORE



ACTION POINTS

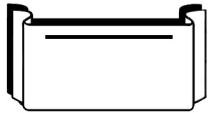


ROUND SCORE

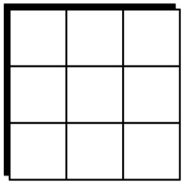


ACTION POINTS

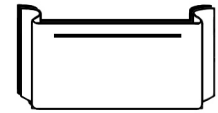
ROUND TWO



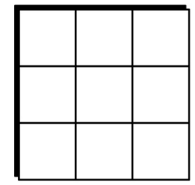
ROUND SCORE



ACTION POINTS



ROUND SCORE



ACTION POINTS

ROUND ONE



SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

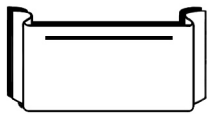
SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

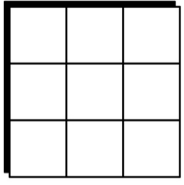
 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

THE SOUTH

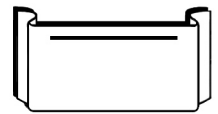
THE NORTH



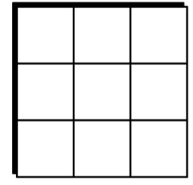
ROUND SCORE



ACTION POINTS

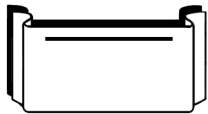


ROUND SCORE

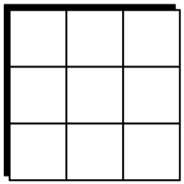


ACTION POINTS

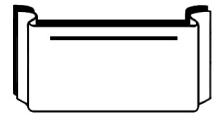
ROUND THREE



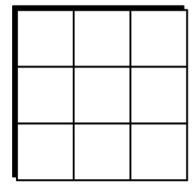
ROUND SCORE



ACTION POINTS

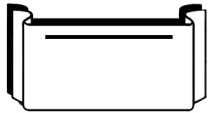


ROUND SCORE

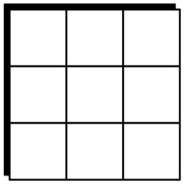


ACTION POINTS

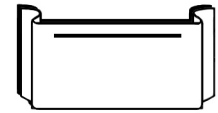
ROUND TWO



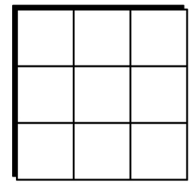
ROUND SCORE



ACTION POINTS



ROUND SCORE



ACTION POINTS

ROUND ONE



SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

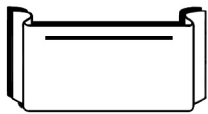
SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

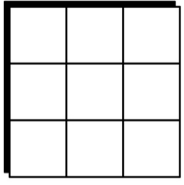
 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

THE SOUTH

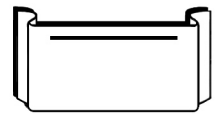
THE NORTH



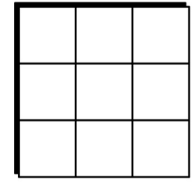
ROUND SCORE



ACTION POINTS

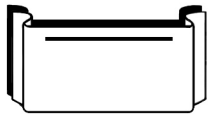


ROUND SCORE

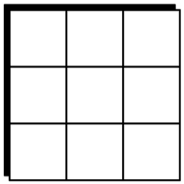


ACTION POINTS

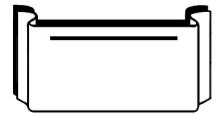
ROUND THREE



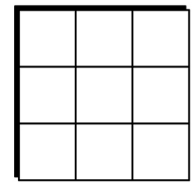
ROUND SCORE



ACTION POINTS

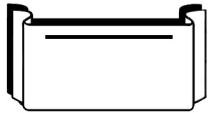


ROUND SCORE

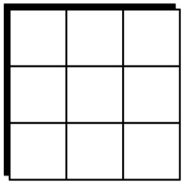


ACTION POINTS

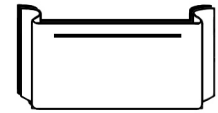
ROUND TWO



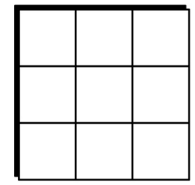
ROUND SCORE



ACTION POINTS



ROUND SCORE



ACTION POINTS

ROUND ONE



SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

SELECT 5 ACTIONS TO KEEP, THEN STRIKE 3 OUT

 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

 SABOTEUR CHASSIS 2AP SCORES TWO EXTRA VP	 RIFLED MUSKET 2AP	 CAVALRY SABER 1AP	 REVOLVER 1AP
 HEAVY CHASSIS 2AP NEGATES ONE DAMAGE	 LIGHT CANNON 1AP	 CARBINE MUSKET 1AP	 LIGHT CHASSIS 1AP

THE SOUTH

THE NORTH

What is Ironclad Tactics?

Ironclad Tactics: Battle Book is a paper adaptation of the video game *Ironclad Tactics* by Zachtronics. The game is similar to Tic-tac-toe or Battleship, as it is a two-player paper and pencil game that involves taking turns making marks on a grid to simulate an epic battle between Civil War era robots! You will need a pen or pencil.

Objective

Your goal is to score points by deploying ironclads (steam-powered robots) to the battle grid and reaching the enemy's side. Ironclads are represented by circles (○) for the North and squares (□) for the South. Weapon ranges are represented with X's.

Each battle consists of three rounds, and each round has three phases: deploy, attack, and score. During the deploy phase, players take turns deploying units to the battle grid and equipping weapons. During the attack phase, units hit by weapons are dealt damage and destroyed. During the score phase, remaining units are checked to see if they scored points. At the end of the third round, the player with the most points wins.

The Deploy Phase

Actions

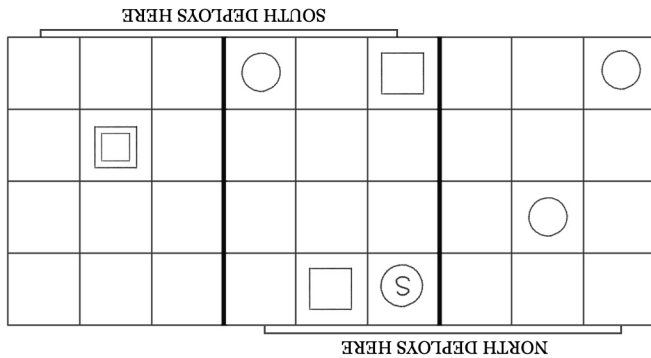
Each player has a list of actions that they can play. During their turn, they must pick an action from their list and draw the corresponding symbols on the battle grid.

At the beginning of a battle, each player picks a side (North or South) and selects 5 actions from their action list. The remaining 3 actions should be crossed out to show that they are not usable.

Players begin each round with 9 action points (AP), which are spent to play actions. Each action has a cost, which must be deducted from a player's AP counter when played. If a player does not have enough AP to afford an action, they cannot play it.

Deploying Units

Units are deployed by drawing the corresponding symbol in a square on the battle grid. Players may only deploy units to their side of and in the center of the battle grid, not to their opponent's side. A square can contain no more than one unit.

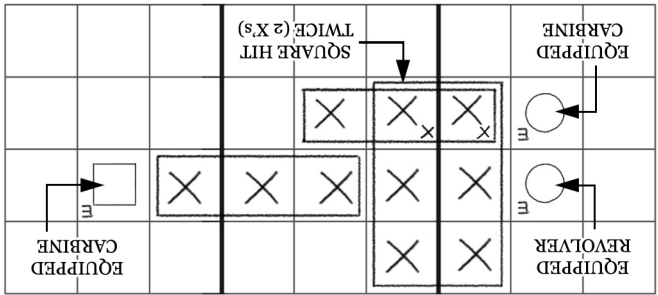


Equipping Weapons

To equip a weapon to a unit, draw an E in the top-right of the unit's square. Then draw all X's, as shown in the action diagram, relative to the unit. Units may not equip more than one weapon, and weapons cannot be removed or replaced.

The Attack Phase

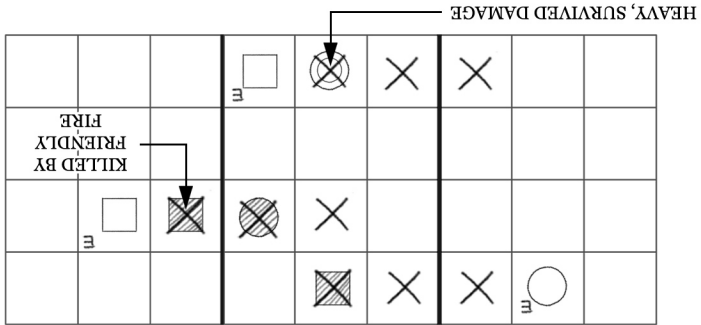
Squares may contain more than one X where weapon ranges overlap. Additional X's after the first should be drawn in the top-left corner of the square.



The Attack Phase

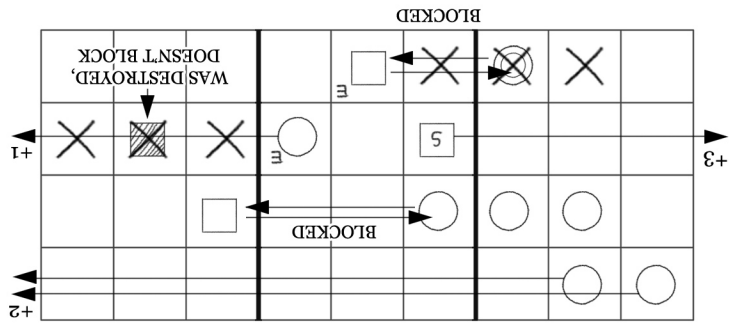
During the attack phase, all weapons fire simultaneously and all units take damage simultaneously. Players evaluate whether each deployed unit has been destroyed or not. All units taking damage (with at least one X in their square) will be destroyed. An exception to this rule is the Heavy Chassis, which negates one point of damage (one X) and requires two points (two X's) to be destroyed.

If a unit is destroyed, scratch it out. The unit is no longer active and cannot score or block during the score phase. Weapons equipped to a destroyed unit still do damage to units in range.



The Score Phase

During the score phase, players determine which remaining units score points and total their scores for the round. A unit scores if you can draw a horizontal line from the unit to the opponent's edge of the battle grid without being blocked by an enemy unit. A single undamaged enemy unit can block any number of units in the same row. Friendly units do not block each other. Each successful unit scores 1 point. If the unit is a Saboteur Chassis, you gain 3 points instead of 1.





BATTLE BOOK

IRONCLAD TACTICS