This is a league based challenge.

For this challenge, multiple leagues for the same game are available. Once you have proven yourself against the first Boss, you will access a higher league and harder opponents will be available.

Goal

End the game with more crystal than your opponent.

Crystal

The game takes place in a **lab**, in which two scientists in charge of **robot ants** are competing to find the most efficient way of gathering crystals.

However, the ants **cannot be controlled directly**. The ants will respond to the presence of **beacons**.

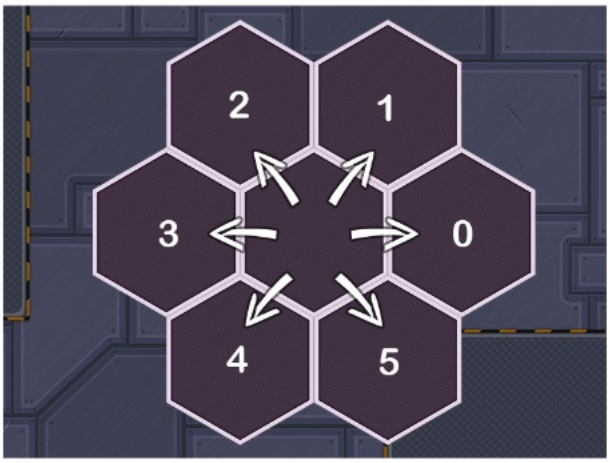
Rules

The game is played in turns. On each turn, both players perform any number of actions simultaneously.

The Map

On each run, the map is **generated randomly** and is made up of **hexagonal cells**.

Each cell has an **index** and up to six neighbors. Each direction is labelled `0` to `5`.



Hex directions

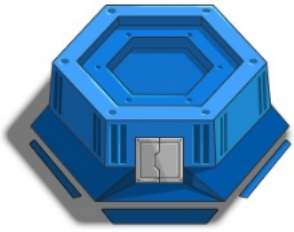
Each cell has a **type**, which indicates what the cell contains:

- `0` if it does not contain a resource.
- `1` *will appear in later leaguesand can be ignored for now.*
- `2` if it contains the **crystal** resource.

The amount of resources contained in each cell is also given, and is subject to change during the game as the ants **harvest** cells.

A cell may also have a

A cell may also have a **base** on it. The players' ants will start the game on these bases.



Blue base

Ants & Beacons

Both players start with several ants placed on their **base**. The players cannot move the ants directly but can place **beacons** to affect their movement.

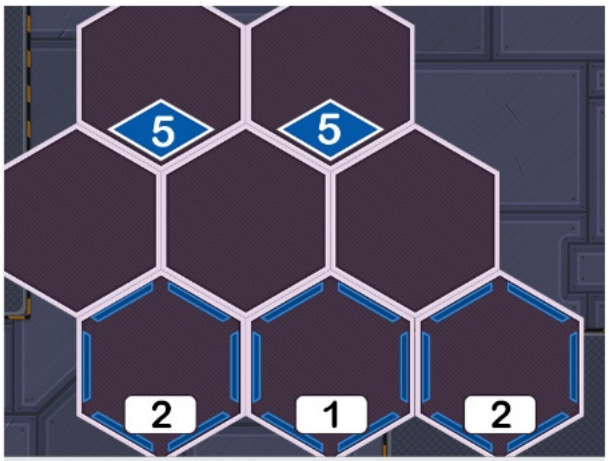
Players can place **any number** of beacons per turn but can only place **one each per cell**.

When placing a beacon, players must give that beacon a strength. These beacon strengths act as **weights**, determining the **proportion of ants** that will be dispatched to each one.

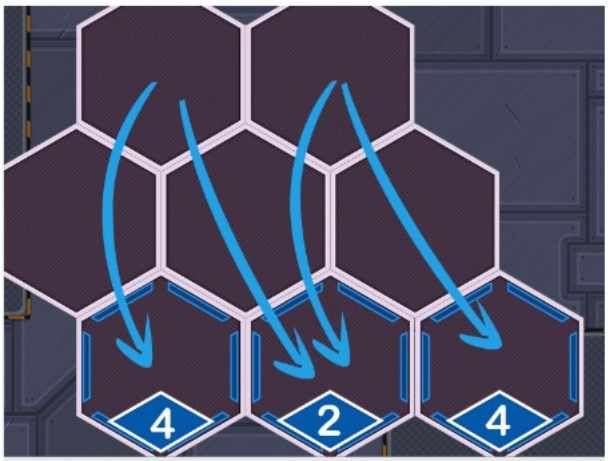
In other words, the **higher** the beacon strength, the greater the **percentage** of your ants that will be sent to that beacon.

Example

In the following example, there are three beacons of strength 2, 1, and 2.



White numbers in a colored diamond represent the ants. Here, 10 ants in total will be dispatched to the beacons.



The 10 ants will move to the three beacons, keeping the same proportions as the beacon strengths.

The ants will do their best to take the **shortest paths** to their designated beacons, moving at a speed of **one cell per turn**.

In between turns, the **existing beacons** are powered down and **removed from play.**

Use beacons to place your ants in such a way to create **harvesting chains** between your **base** and a **resource**.

Harvesting Chains

In order to harvest **crystal** and score points, there must be an **uninterrupted chain** of **cells containing your ants** between the resource and your **base**.

The amount of crystal harvested per turn is equal to the **weakest link** in the chain. In other words, it is the smallest amount of ants from the cells that make up the chain.

Here, the blue player will harvest 4 crystal per turn.

Harvesting is calculated separately for **each resource**, and for each one the game will automatically choose the **best chain** from its cell to your base.

Actions

On each turn players can do any amount of valid actions, which include:

- `BEACON` `index` `strength`: place a beacon of strength `strength` on cell `index`.
- `LINE` `index1` `index2` `strength`: place beacons all along a path from `index1` to `index2`, all of strength `strength`. A shortest path is chosen automatically.
- `WAIT`: do nothing.
- `MESSAGE` `text`. Displays text on your side of the HUD.

Action order for one turn

1. `LINE` actions are computed.
2. `BEACON` actions are computed.
3. Ants move.
4. Crystal is harvested and points are scored.

Victory Conditions

- You have over half of the total **crystal** on the map.
- You have more **crystal** than your opponent after `100` turns.

Defeat Conditions

Your program does not provide a command in the allotted time or it provides an unrecognized command.

Debugging tips

- Hover over a tile to see extra information about it, including beacon strength.
- Use the MESSAGE command to display some text on your side of the HUD.
- Press the gear icon on the viewer to access extra display options.
- Use the keyboard to control the action: space to play/pause, arrows to step 1 frame at a time.

Game Protocol

Initialization Input

First line: numberOfCells an integer for the amount of cells in the map.
Next numberOfCells **lines:** the cells, ordered by index. Each cell is represented by 8 space-separated integers:

- type: 1 for egg, 2 for crystal, 0 otherwise.
- initialResources for the amount of crystal/egg here.
- 6 neigh variables: *Ignore for this league.*

Next line: one integer numberOfBases which equals 1 for this league.
Next line: numberOfBases integers for the cell indices where a **friendly base** is present.
Next line: numberOfBases integers for the cell indices where an **opponent base** is present..

Input for One Game Turn

Next numberOfCells **lines:** one line per cell, ordered by index. 3 integers per cell:

- resources: the amount of crystal/eggs on the cell.
- myAnts: the amount of ants you have on the cell.
- oppAnts: the amount of ants your opponent has on the cell.

Output

All your actions on one line, separated by a ;

- BEACON index strength. Places a beacon that lasts one turn.
- LINE index1 index2 strength. Places beacons along a path between the two provided cells.
- WAIT. Does nothing.
- MESSAGE text. Displays text on your side of the HUD.

Constraints

numberOfBases = 1
Response time per turn ≤ 100 ms
Response time for the first turn ≤ 1000 ms

What is in store for me in the higher leagues?

- The egg resource will be available.
- Larger maps will be available.
- Ants of opposing teams will interact.

Starter Kit

Starter AIs are available in the Starter Kit. They can help you get started with your own bot. You can modify them to suit your own coding style or start completely from scratch.

Source code

The game's source will be available here.