PRESENTATION 13 · LEARNING WITH STATEMENTS

# Water pond

Mining inside the water: a blue LED, double points, and statements that know where the pond is.

**TheBotCup 2026 · AiBotCup Simulator**



RECAP · COLLECTING METALS

# A colour range finds the metal

**Iron**

R, G, B all 0–60

**Silver**

R 90–135 · G 92–137 · B 98–142

**Gold**

R 195–255 · G 135–200 · B 0–80

One statement per metal and per sensor, with a **Key Action** that stops and collects. Today the metals are **under water**.

PART 1

# The mission: Session 13

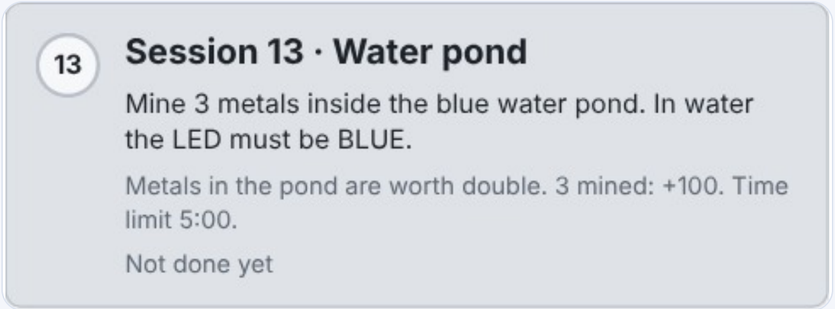
## Three metals from the water

SESSION 13 · WATER POND

# Mine 3 metals inside the pond

In water the LED must be **BLUE**. Pond metals are worth **double**.

3 mined: **+100**. Time limit **5:00**. Code challenge: at most **12** statements.






THE FIELD

# A big blue pond

The **pond** fills the left side, with iron, silver and gold inside.

**START** is just right of the pond.

Metals on **dry land** do not help this mission.

PART 2

# Two new ideas

## A water collect, and knowing where the pond is

IDEA 1 · A NEW KEY ACTION

# In water, collect with a blue LED

ON DRY LAND

## Collect

Red LED. Normal points.

IN THE POND

## Collect in water

Blue LED. **Double** points: iron 20, silver 30, gold 40.

A red-LED collect in the pond is **not counted**. The Key Action must match the place.

IDEA 2 · POSITION CONDITIONS

# Is the robot in the pond?

### The pond’s box

The pond covers **X 8–104** and **Y 8–132**. Add **X 0–104** and **Y 0–132** to every pond collect.

### Stay in the water

Near the pond, if the left sensor sees **white floor**, turn back in.

PART 3

# Step by step in statements

## Nine statements

STEP 1 · THE WHOLE PROGRAM

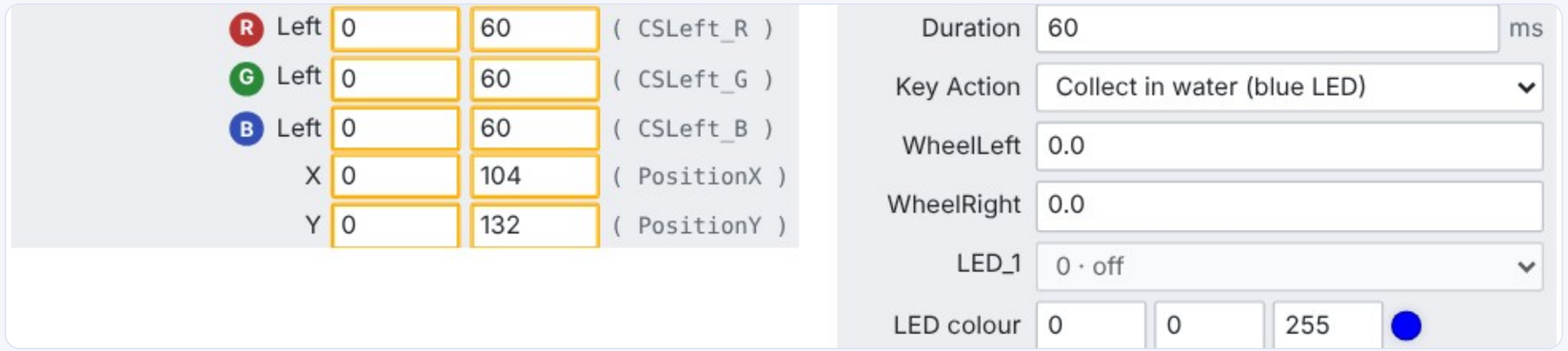
# Six pond collects, then three drivers

| Statement | Condition | Action |
|---|---|---|
| **1 PondIronLeft** | left iron · X 0–104 · Y 0–132 | Collect in water · 0 / 0 |
| **2 PondIronRight** | right iron · X 0–104 · Y 0–132 | Collect in water · 0 / 0 |
| **3 PondSilverLeft** | left silver · X 0–104 · Y 0–132 | Collect in water · 0 / 0 |
| **4 PondSilverRight** | right silver · X 0–104 · Y 0–132 | Collect in water · 0 / 0 |
| **5 PondGoldLeft** | left gold · X 0–104 · Y 0–132 | Collect in water · 0 / 0 |
| **6 PondGoldRight** | right gold · X 0–104 · Y 0–132 | Collect in water · 0 / 0 |
| **7 StayIn** | left white 200–255 · X 0–112 · Y 0–140 | −2 / 2 · 700 ms |
| **8 Ahead** | US_Front 0–20 | −2 / 2 · 700 ms |
| **9 Forward** | none | 4.5 / 4.5 |

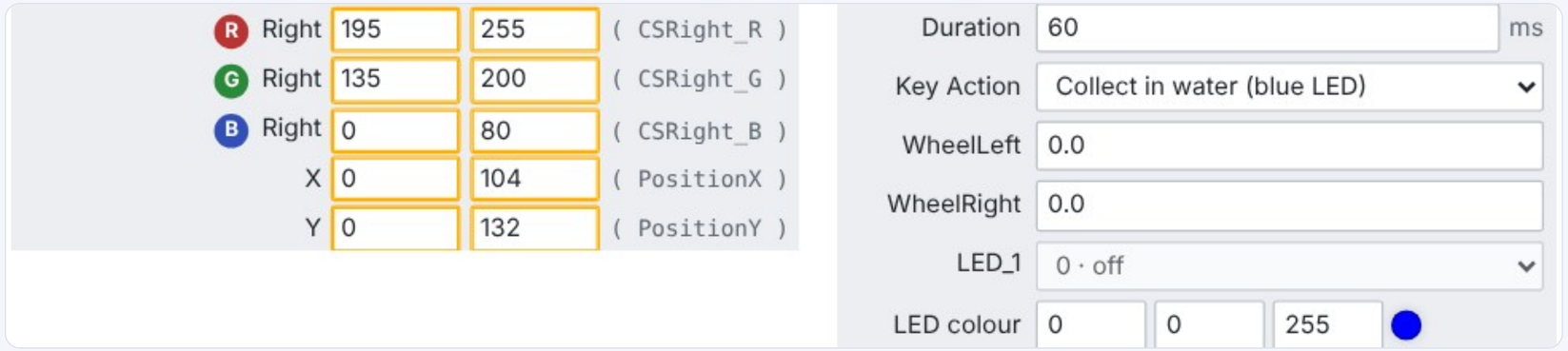
STEP 2 · STATEMENTS 1 TO 6

# Colour + position + Collect in water

**1 PondIronLeft**
left 0–60 · in the pond




**6 PondGoldRight**
right gold · in the pond




Build all six the same way: change only the **sensor** and the **metal range**.

STEP 3 · STATEMENTS 7 TO 9

# StayIn, Ahead and Forward

**7 StayIn**
white floor at the edge

| | | | |
|---|---|---|---|
| R Left | 200 | 255 | ( CSLeft_R ) |
| G Left | 200 | 255 | ( CSLeft_G ) |
| B Left | 200 | 255 | ( CSLeft_B ) |
| X | 0 | 112 | ( PositionX ) |
| Y | 0 | 140 | ( PositionY ) |

| | |
|---|---|
| Duration | 700 ms |
| Key Action | None |
| WheelLeft | -2.0 |
| WheelRight | 2.0 |

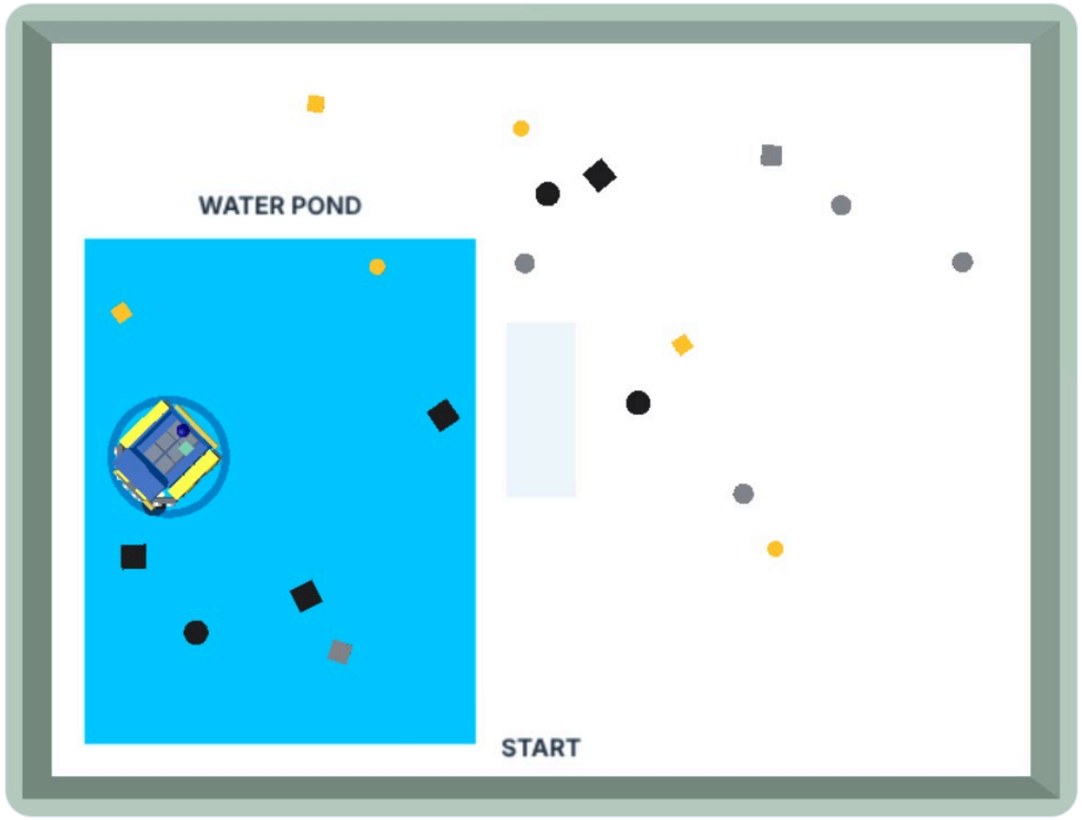
**8 Ahead**
US_Front 0–20

| | | | |
|---|---|---|---|
| Front | 0 | 20 | ( US_Front ) |
| Left | 0 | 255 | ( US_Left ) |
| Right | 0 | 255 | ( US_Right ) |

| | |
|---|---|
| Duration | 700 ms |
| Key Action | None |
| WheelLeft | -2.0 |
| WheelRight | 2.0 |

**9 Forward**
no conditions

| | |
|---|---|
| Duration | 60 ms |
| Key Action | None |
| WheelLeft | 4.5 |
| WheelRight | 4.5 |




**Colour Sensors**

| | | |
|---|---|---|
| Left R | 21 | (CSLeft_R) |
| G | 25 | (CSLeft_G) |
| B | 25 | (CSLeft_B) |

left sees this colour

| | | |
|---|---|---|
| Right R | 0 | (CSRight_R) |
| G | 169 | (CSRight_G) |
| B | 238 | (CSRight_B) |

right sees this colour

**Robot**

Wheels L **0.0** · R **0.0** · LED **2**

Load **0**/6 · Fe 0 Ag 0 Au 0

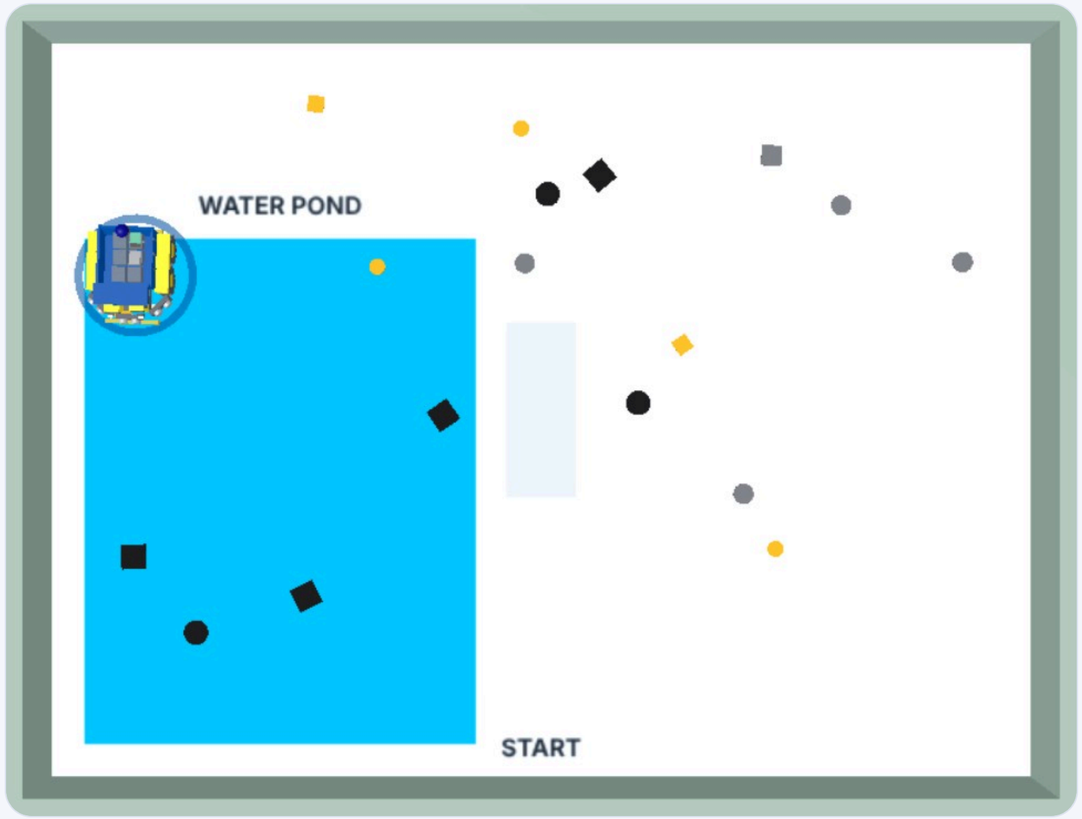
On **water pond · collecting 1.8 / 3 s**

**STEP 4 · RUN · 0:08**

# First iron

Left **21, 25, 25** = iron. X 29, Y 79 = in the pond.

**PondIronLeft**: blue LED, collecting.




**Colour Sensors**

| | | |
|---|---|---|
| Left R | 0 | (CSLeft_R) |
| G | 172 | (CSLeft_G) |
| B | 238 | (CSLeft_B) |

left sees this colour

| | | |
|---|---|---|
| Right R | 219 | (CSRight_R) |
| G | 169 | (CSRight_G) |
| B | 37 | (CSRight_B) |

right sees this colour

**Robot**

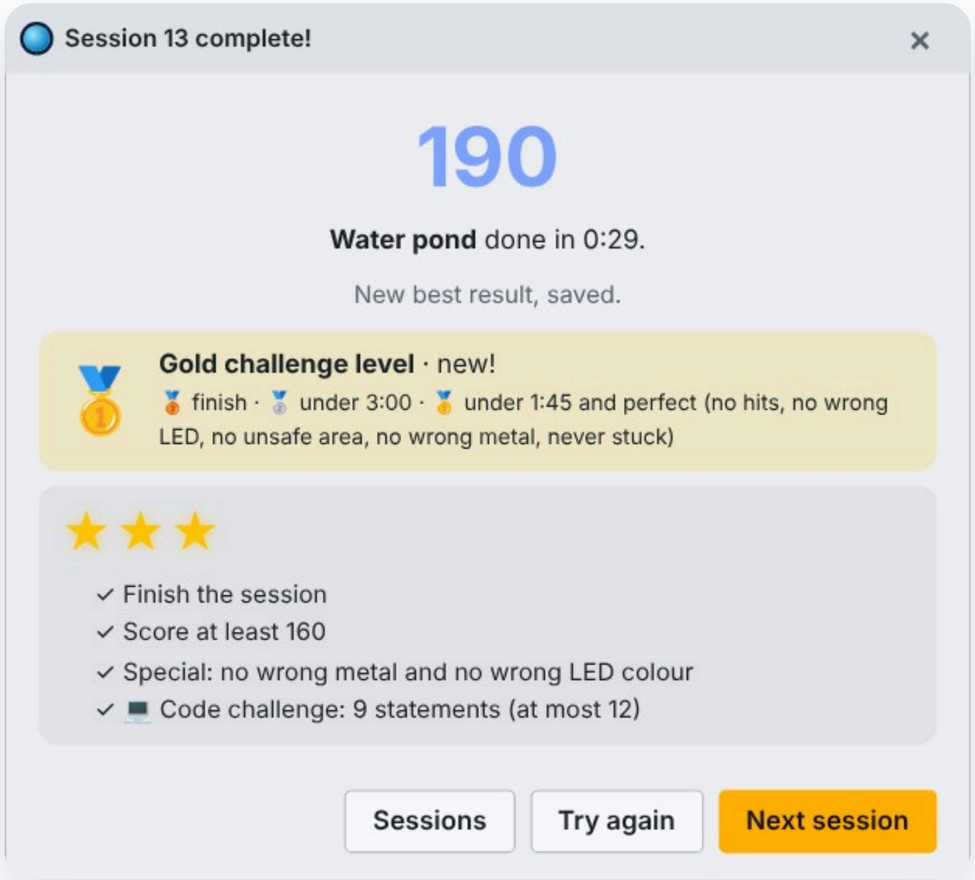
| | |
|---|---|
| Wheels | L **0.0** · R **0.0** · LED **2** |
| Load | **2**/6 · Fe 1 Ag 1 Au 0 |
| On | **water pond · collecting 1.4 / 3 s** |

**STEP 5 · RUN · 0:28**

# The third metal

Iron **+20** and silver **+30** already on board.

Right **219, 167, 31** = gold: **PondGoldRight**.



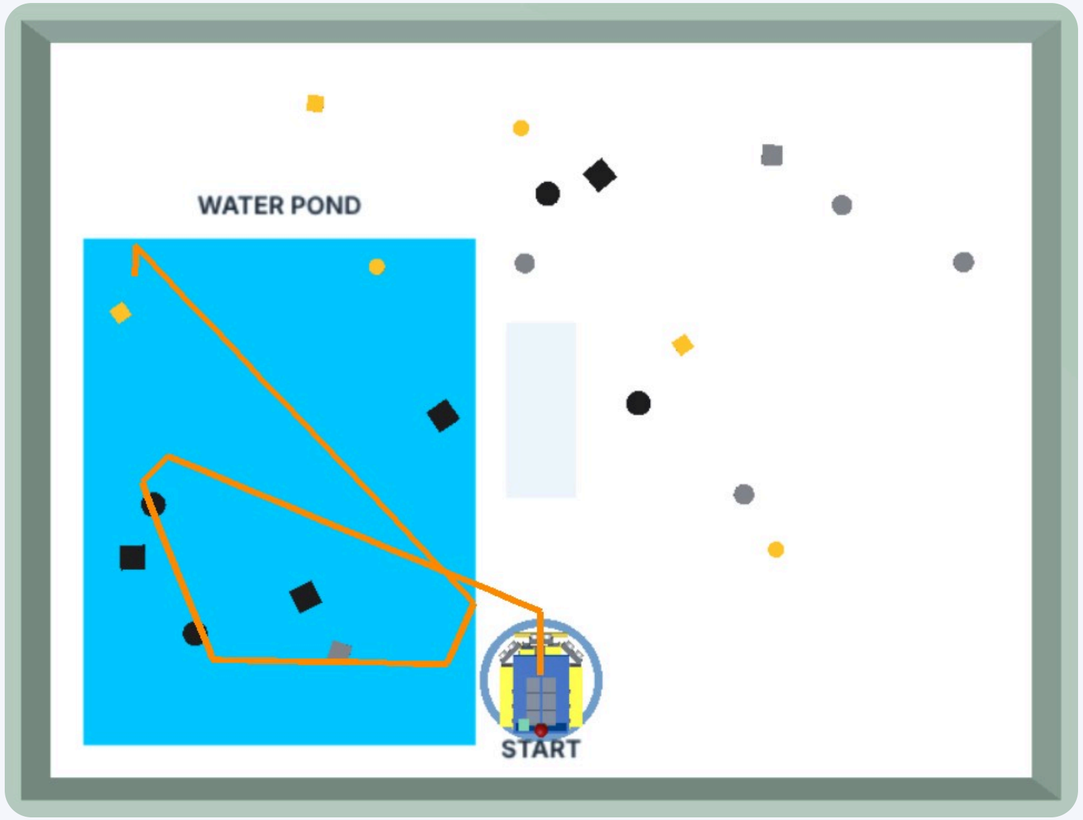

RESULT · TESTED

# 190 points in 0:29 · Gold

**Score** · iron 20 + silver 30 + gold 40 + bonus 100.

**Medals** · Silver: under 3:00 · Gold: under 1:45 and perfect.

**Code challenge** · at most 12 statements. We used 9.




THE PATH · RECORDED

# Into the pond, and kept there

Every bend at the edge of the water is **StayIn** at work.

Position conditions keep the robot **where the points are**.

DID NOT WORK?

# Check first, then tune carefully

| What you see | What to do |
| --- | --- |
| Red LED in the pond, not counted | Key Action must be **Collect in water** |
| Drives out of the pond | Check StayIn: white 200–255, X 0–112, Y 0–140 |
| Drives over pond metals | Check the metal ranges and X 0–104, Y 0–132 |
| Old program still on the robot | **Build** again, then **Load** on BLUE |

NEXT TIME

# Presentation 14 · Green deposit

Bring the metals home: a full load, then the **green deposit** area.