PRESENTATION 20 · LEARNING WITH STATEMENTS

Final challenge

The full Juniors mission: six objects, water and land, two trips home, and unsafe areas to keep away from.

TheBotCup 2026 · AiBotCup Simulator



RECAP · THE JUNIORS TOOLBOX

Everything we can already do

Walls
Ahead turns away

Colours
metals, green, bands

Position
is it the pond?

Key Actions
red, blue, green LED

LoadedObjects
when to go home

Order
first match wins

PART 1

The mission: Session 20

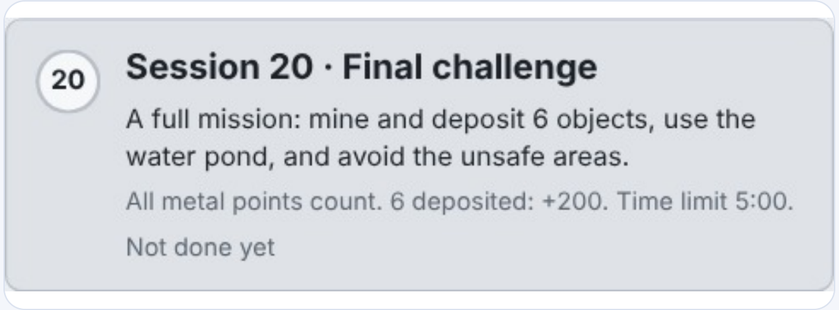
Six objects, safely

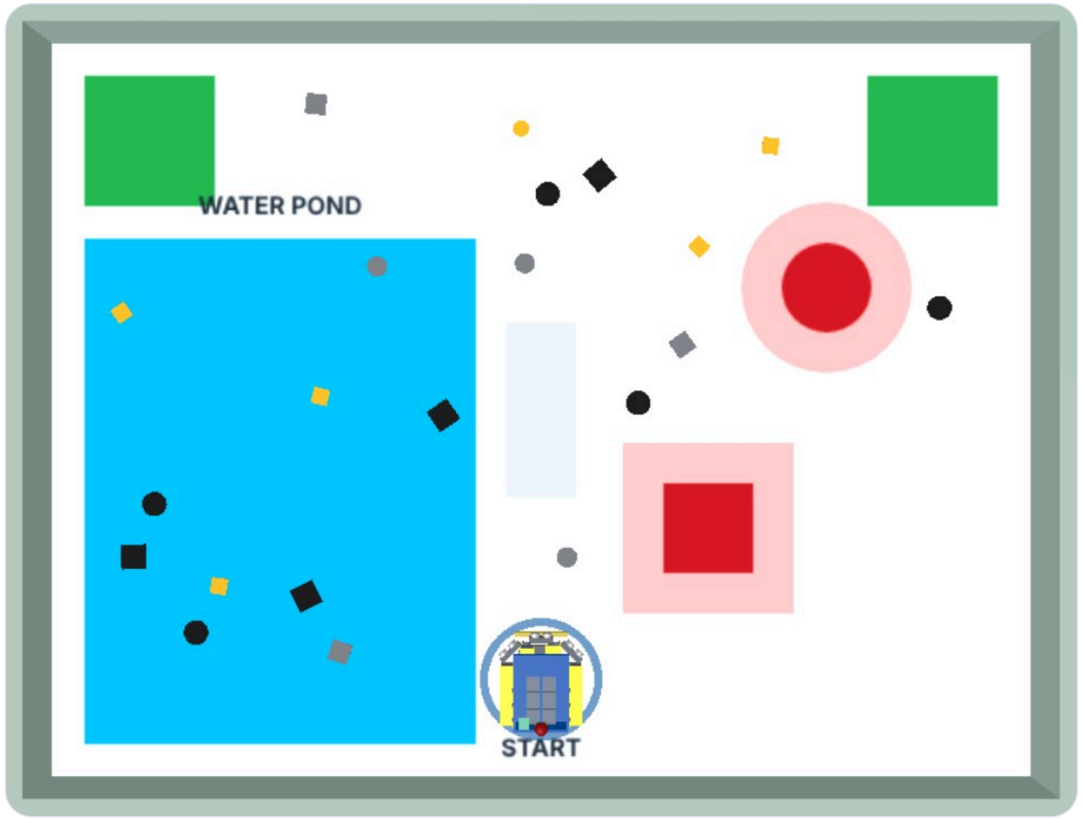
SESSION 20 · FINAL CHALLENGE

Mine and deposit 6, avoid the unsafe areas

Use the water pond. All metal points count. 6 deposited: **+200**.

Time limit **5:00**. At most **12** statements.





THE FIELD

Two red danger zones

Pond on the left, green corners at the top.

Two **unsafe areas** on the right, each inside a **pink warning band**.

The band is the signal: **turn back** before the red.

PART 2

Safety first, then the job

Warning statements on top, two trips

IDEA 1 · WARNING STATEMENTS ON TOP

Pink seen? Back away first

Warning band

R 230–255 · G 145–205 · B 145–205, on either sensor.

Back away, turning

Both wheels backwards, one faster, for **500 ms**.

At the **top** of the list, nothing can beat them: not even a metal or a deposit.

IDEA 2 · THE PLAN

Two trips of three

1

Collect while **LoadedObjects < 3**

→

2

Deposit at **3 or more** (≥ 3)

→

3

Load back to 0: **repeat**

Statement budget: 2 warnings + Deposit + 2 pond iron + 4 land (iron, gold) + Ahead + Forward = **11**.

PART 3

Step by step in statements

Eleven statements

STEP 1 · THE WHOLE PROGRAM

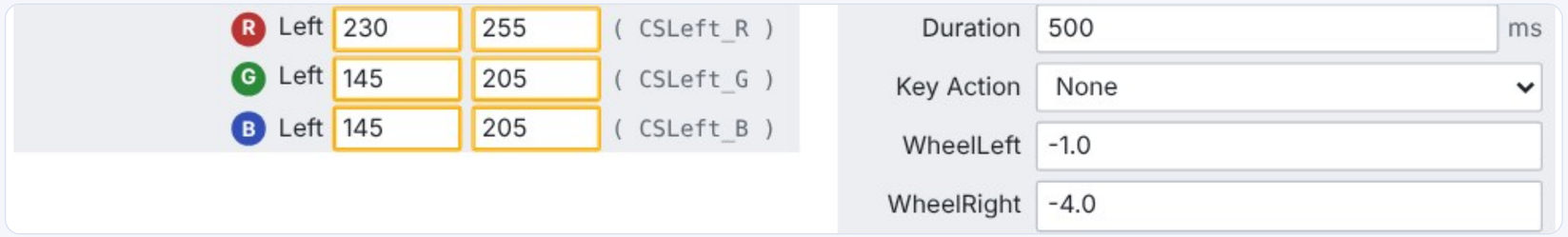
Safety, home, water, land, drive

Statement	Condition	Advanced	Action
1 WarnLeft	left sees pink band	none	−1 / −4 · 500 ms
2 WarnRight	right sees pink band	none	−4 / −1 · 500 ms
3 Deposit	both sensors green	LoadedObjects >= 3	Deposit
4 PondIronLeft	left iron · X 0–104 · Y 0–132	LoadedObjects < 3	Collect in water
5 PondIronRight	right iron · X 0–104 · Y 0–132	LoadedObjects < 3	Collect in water
6 IronLeft	left iron	LoadedObjects < 3	Collect
7 IronRight	right iron	LoadedObjects < 3	Collect
8 GoldLeft	left gold	LoadedObjects < 3	Collect
9 GoldRight	right gold	LoadedObjects < 3	Collect
10 Ahead	US_Front 0–20	none	−2 / 2 · 700 ms
11 Forward	none	none	4.5 / 4.5

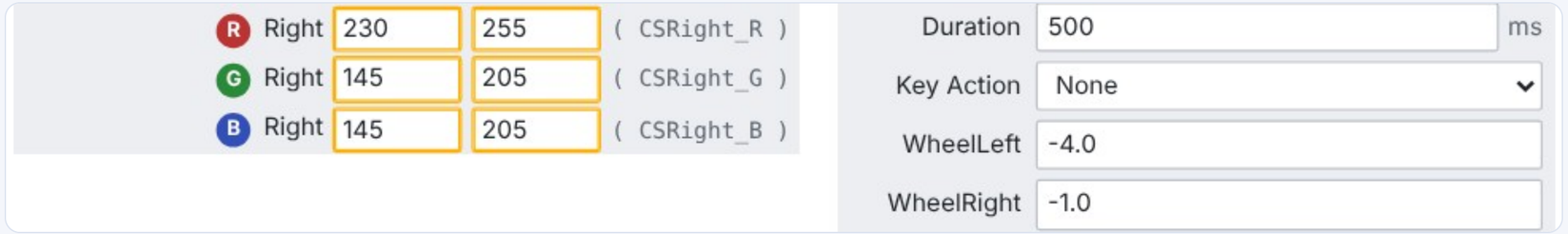
STEP 2 · STATEMENTS 1 AND 2

WarnLeft and WarnRight

1 WarnLeft
left sees pink



2 WarnRight
right sees pink

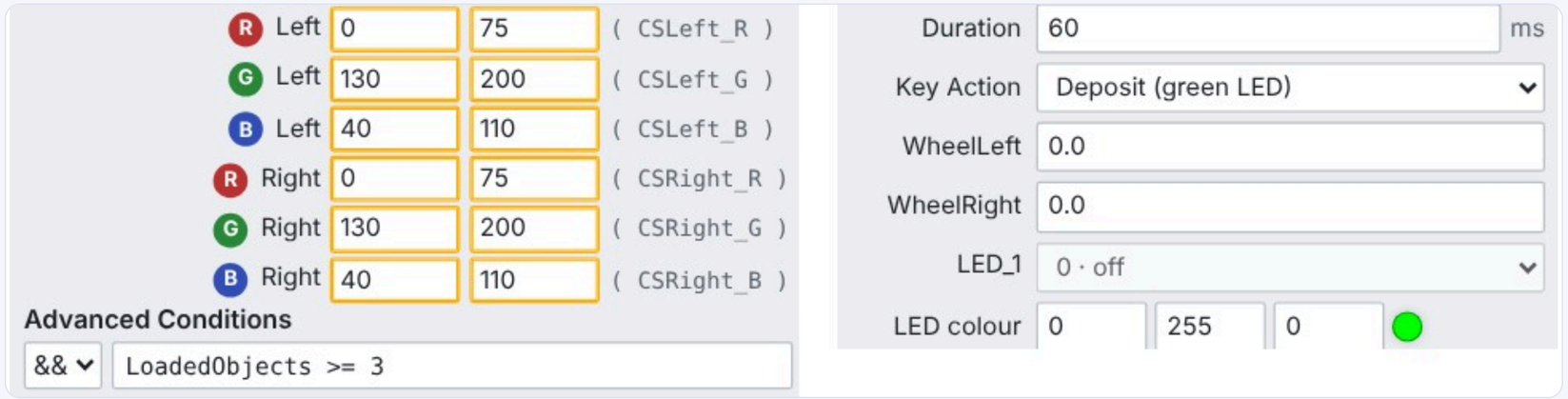


Duration **500 ms**: long enough to get clear of the band.

STEP 3 · STATEMENT 3

Deposit at 3 or more

3 Deposit
both green · ≥ 3

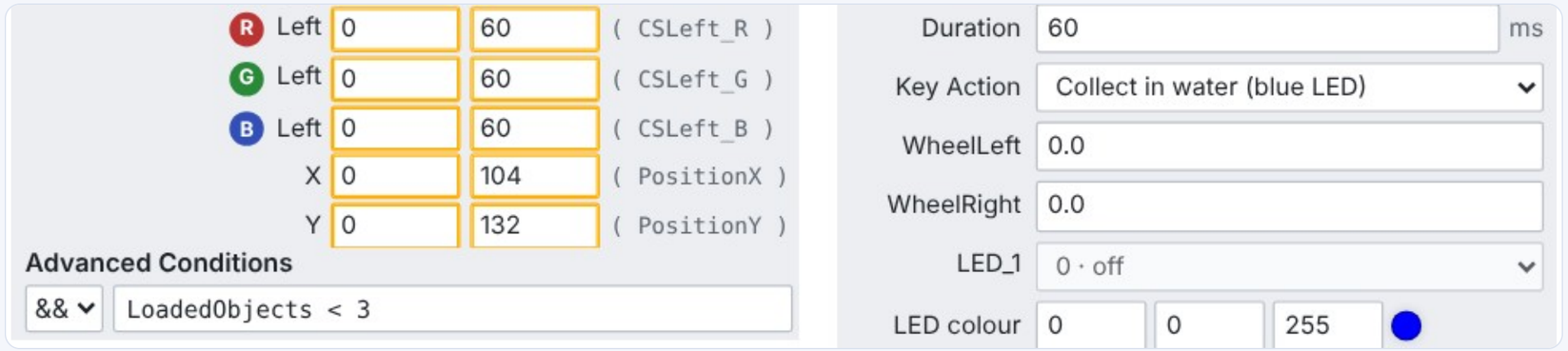


>= means “3 or more”. After the deposit the load is 0 again, ready for trip 2.

STEP 4 · STATEMENTS 4 TO 11

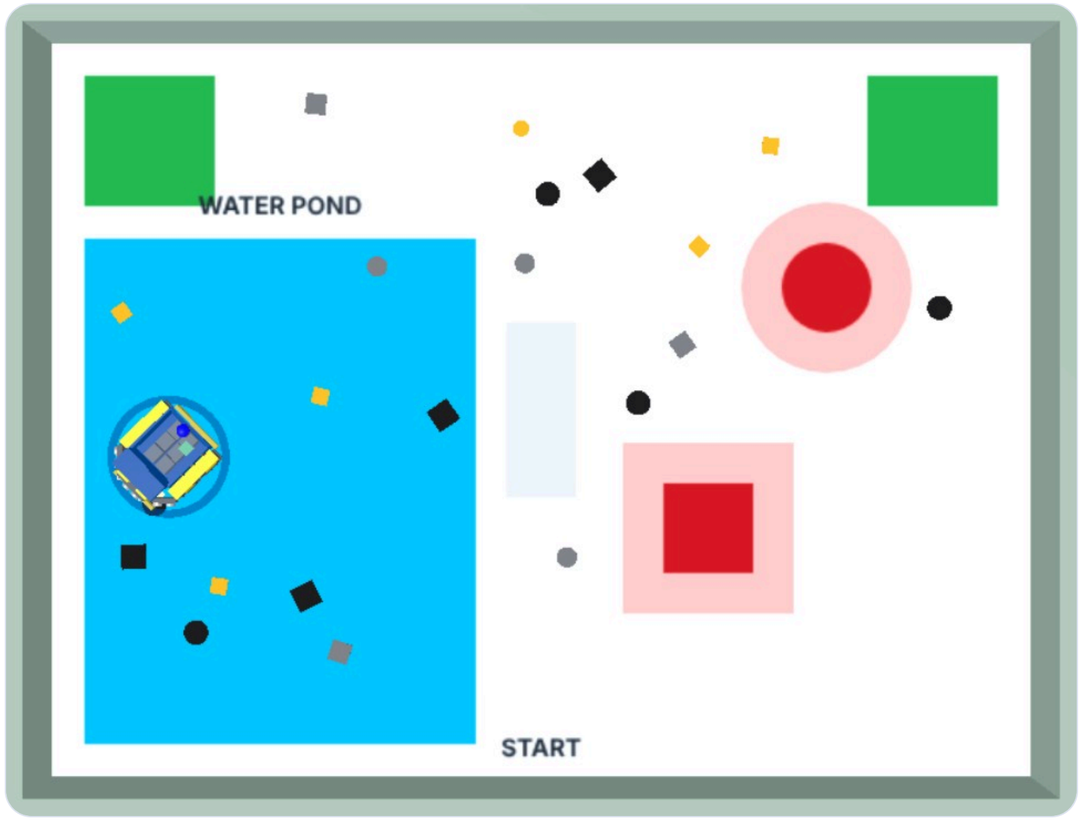
Water above land, as in Presentation 19

4 PondIronLeft
in the pond · < 3



PondIronRight, then the four land collects: all with **< 3**.

Ahead and **Forward** at the bottom.



Colour Sensors

Left R	23	(CSLeft_R)
G	22	(CSLeft_G)
B	25	(CSLeft_B)

left sees this colour

Right R	0	(CSRight_R)
G	173	(CSRight_G)
B	240	(CSRight_B)

right sees this colour

Robot

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

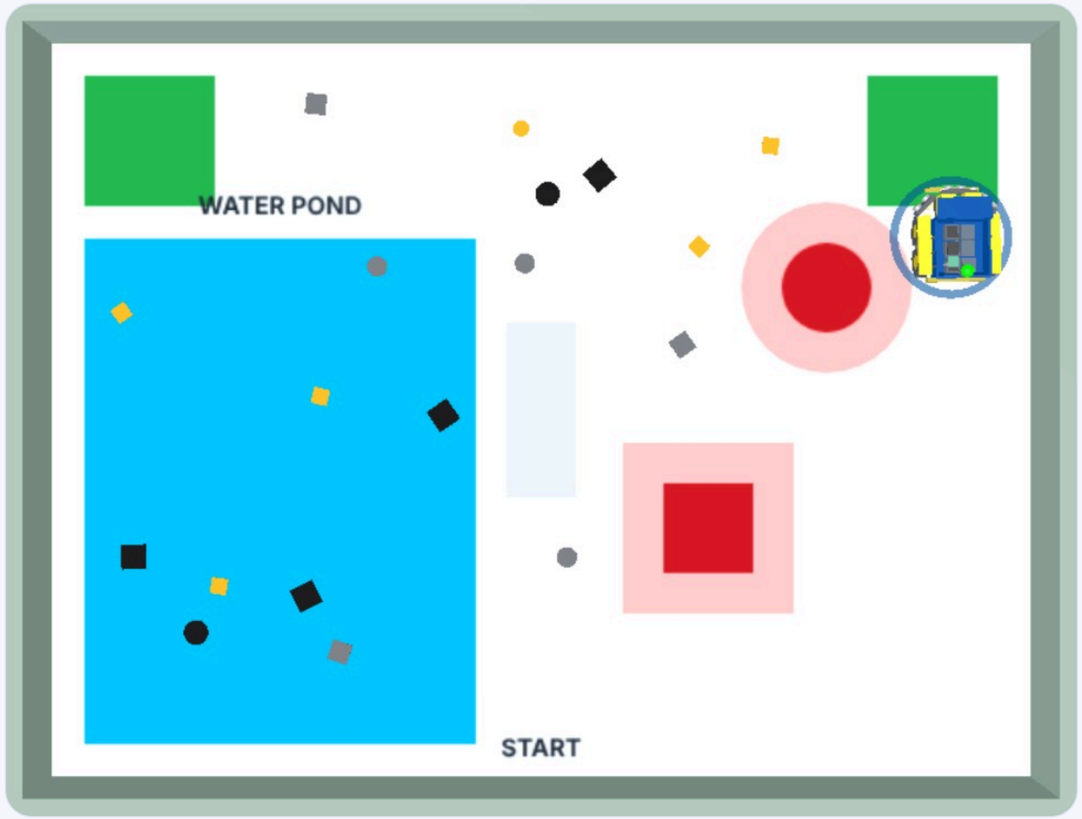
Load **0**/6 · Fe 0 Ag 0 Au 0

On **water pond · collecting 1.7 / 3 s**

STEP 5 · RUN · 0:08

Trip 1 begins

Pond iron: **PondIronLeft**, blue LED, +20.



Colour Sensors

Left R	32	(CSLeft_R)
G	159	(CSLeft_G)
B	69	(CSLeft_B)

left sees this colour

Right R	30	(CSRight_R)
G	161	(CSRight_G)
B	67	(CSRight_B)

right sees this colour

Robot

Wheels L **0.0** · R **0.0** · LED **1**

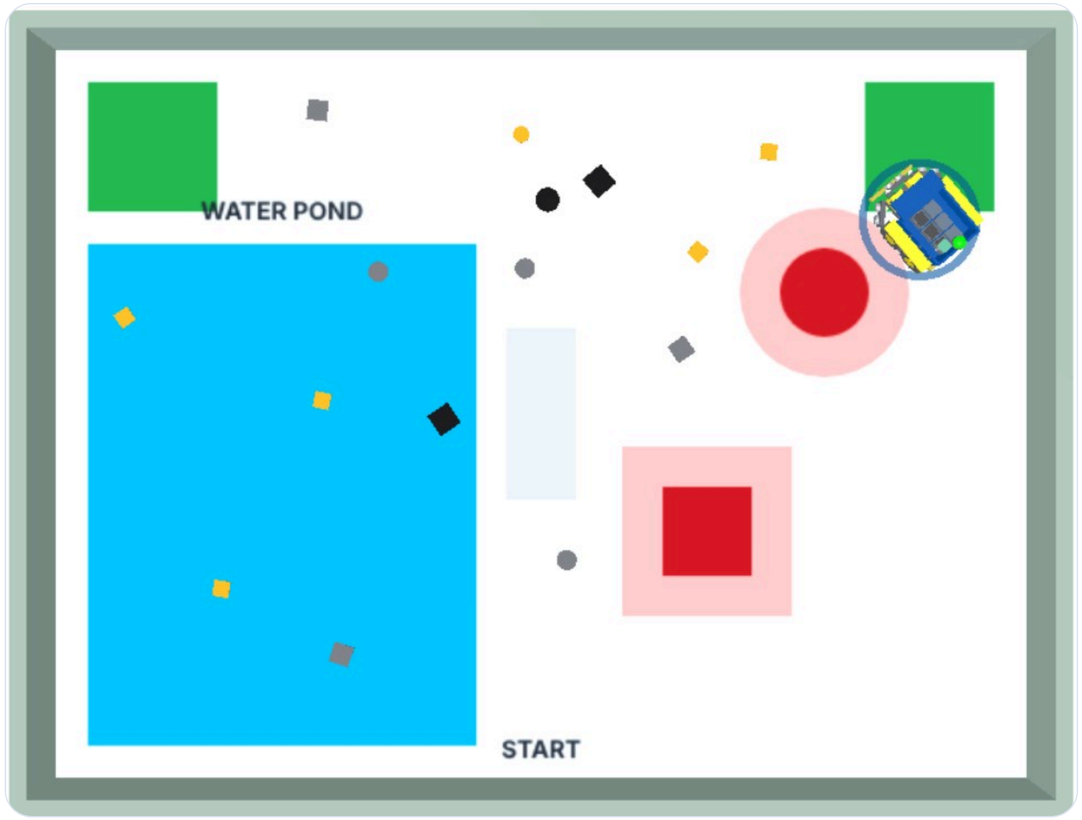
Load **3**/6 · Fe 3 Ag 0 Au 0

On **deposit area · depositing 2.0 / 3 s**

STEP 6 · RUN · 1:23

Trip 1 home

Load **3**, both green: **Deposit** in the top-right corner, right next to the warning band.



Colour Sensors

Left R	31	(CSLeft_R)
G	162	(CSLeft_G)
B	68	(CSLeft_B)

left sees this colour

Right R	32	(CSRight_R)
G	160	(CSRight_G)
B	69	(CSRight_B)

right sees this colour

Robot

Wheels L **0.0** · R **0.0** · LED **1**

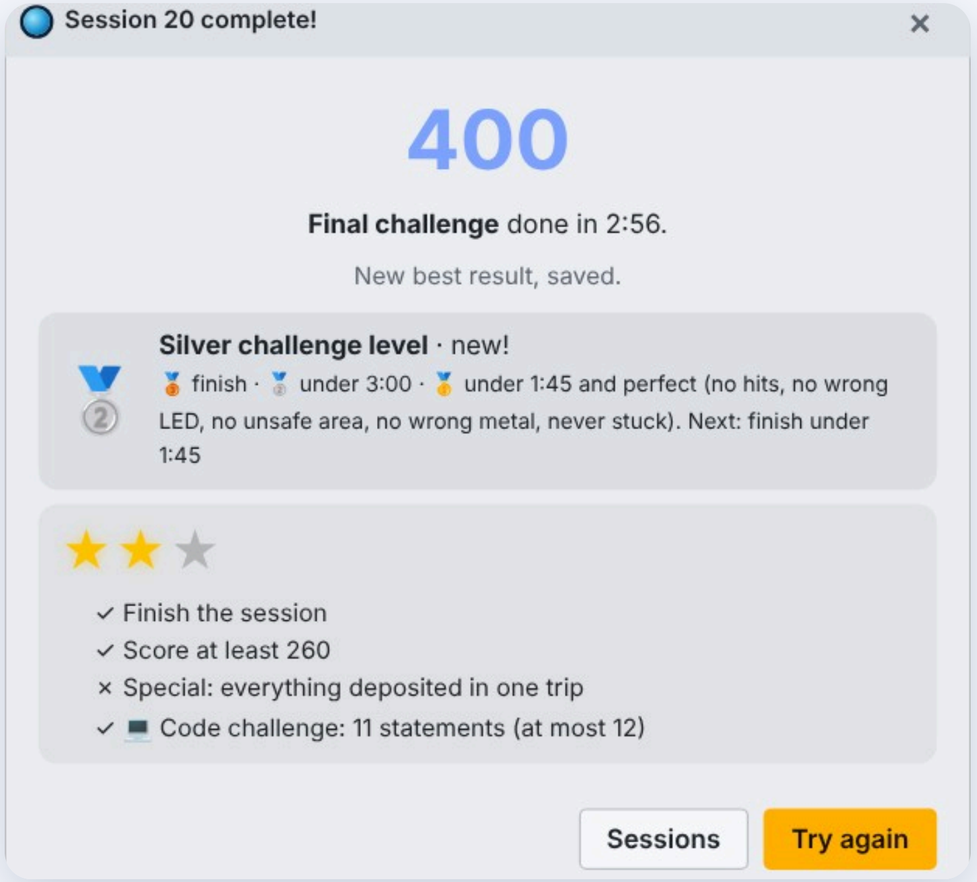
Load **3**/6 · Fe 3 Ag 0 Au 0

On **deposit area · depositing 1.8 / 3 s**

STEP 7 · RUN · 2:54

Trip 2 home

Three pond irons this time (+60), back to the same corner: **Deposit**. Six done.



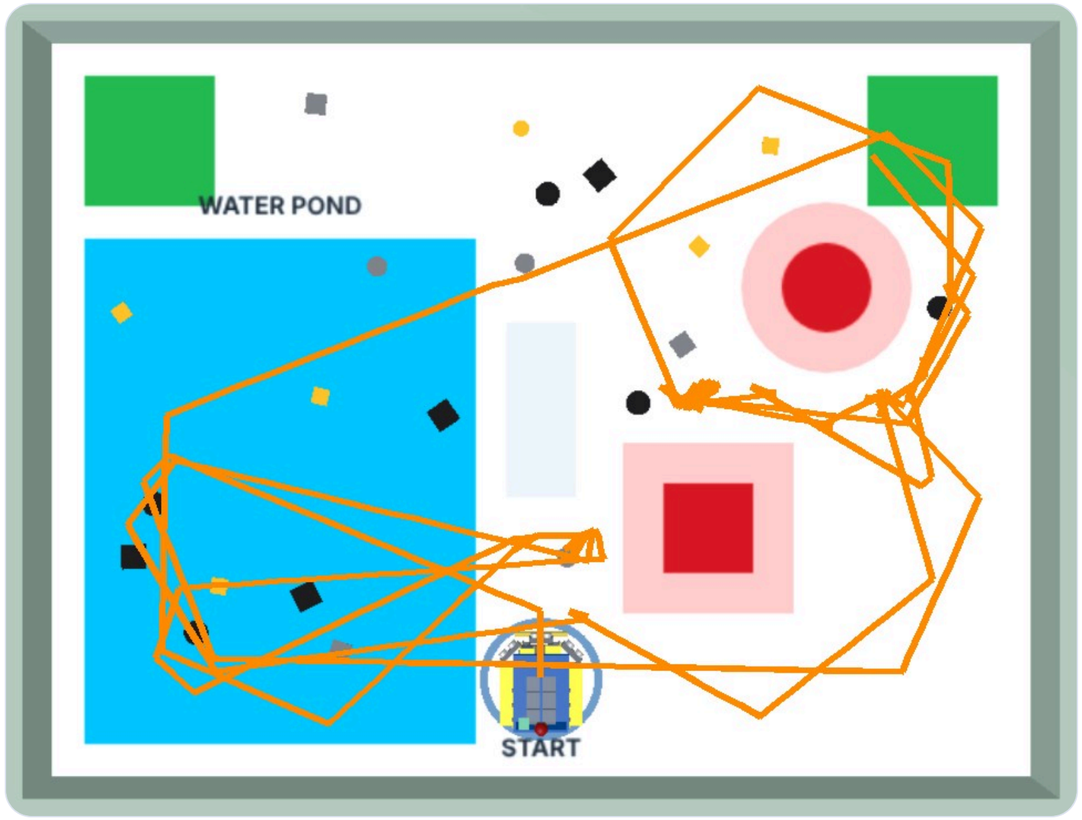
RESULT · TESTED

400 points in 2:56 · Silver

Score · metals 100 + deposited 100 + bonus 200.

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

Still to win · gold, and the one-trip star. Your turn.



THE PATH · RECORDED

Never inside the red

Look for the small **spikes** at the pink bands: that is WarnLeft and WarnRight at work.

Safety first, then the job: **order is a decision**.

DID NOT WORK?

Check first, then tune carefully

What you see	What to do
Drives into a red area	WarnLeft and WarnRight must be the **first two**
Wobbles on the band	Back away (both wheels negative), 500 ms
Stuck flashing red in the pond	A land collect fired on a pond metal: add that metal's **pond statement above** it
Old program still on the robot	**Build** again, then **Load** on BLUE

WELL DONE

Juniors course complete

Now beat our score: **gold** under 1:45, or all six in **one trip**.