PRESENTATION 10 · LEARNING WITH STATEMENTS

Avoid the traps

See the warning band, back away, and find the way back to FINISH.

TheBotCup 2026 · AiBotCup Simulator



RECAP · COLOUR SENSORS

Every colour on the floor means something

Metals

collect them (P6–P8)

Green

deposit there (P9)

Pink

FINISH or a target

Red

a trap: stay away! (today)

Today the colour sensors are used for **safety**, not for collecting.

PART 1

The mission: Session 10

START to FINISH, traps in the way

SESSION 10 · AVOID THE TRAPS

Reach FINISH without touching a trap

What happens	Points
Pass trap 1 without touching	+50
Pass trap 2 without touching	+50
Touch a trap	−20
Reach FINISH	+100

Time limit **4:00**. Best score: **200**.

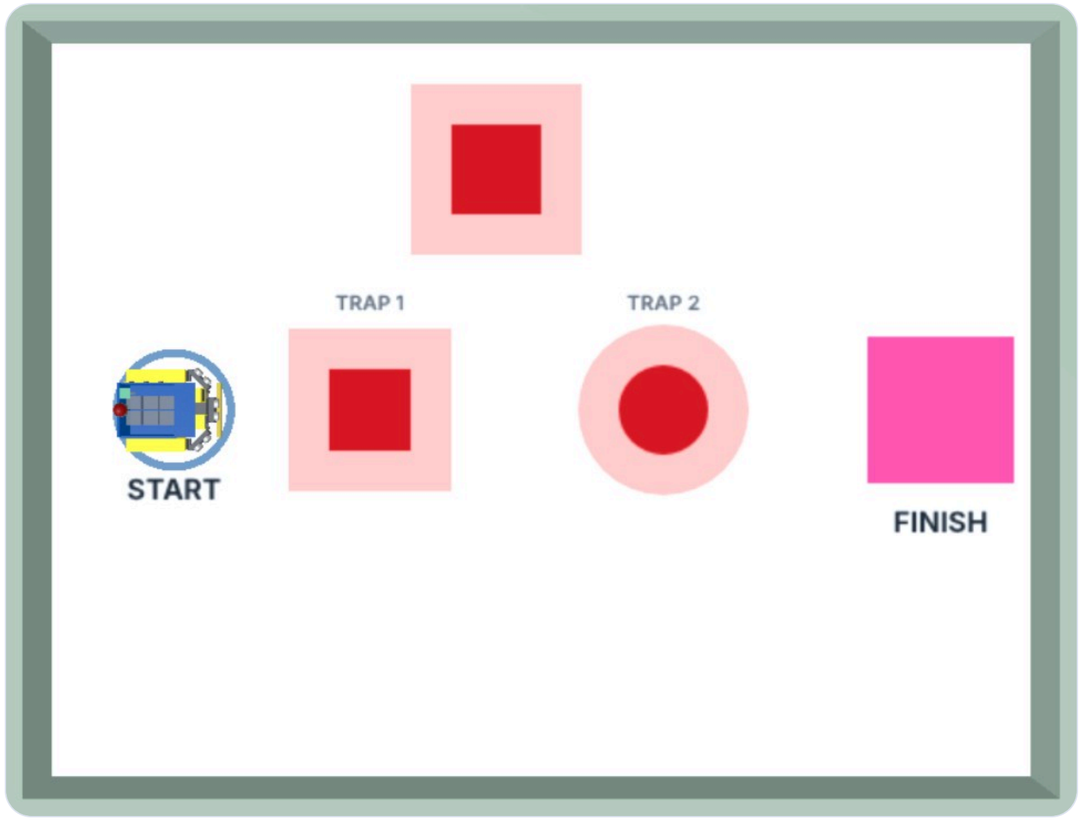
10

Session 10 · Avoid the traps

Drive from START to the pink FINISH pad. Two unsafe areas (traps) are on the straight route and a third is nearby: go around them.

Each of the two traps passed without touching a trap: +50. Touching a trap: −20. Reach FINISH: +100. Time limit 4:00.

Not done yet



THE FIELD

Straight ahead is blocked twice

START on the left, facing **FINISH** on the right.

Trap 1 (square) and **trap 2** (round) sit right on that line.

A **third trap** waits above: going round the top is risky.



WHAT IS A TRAP?

A red danger zone with a warning band

The **dark red** middle is the trap. A colour sensor on it: **−20**.

Around it is a **10 cm light-red band**. Driving on the band is safe: it is a warning.

React to the **band**, and the robot never reaches the trap.

COLOUR SENSORS · LIGHT RED

The band in numbers

	R	G	B
Floor	about 226	about 232	about 238
Warning band	250	175	175
Trap	185	20	30
Range we use	230 – 255	145 – 205	145 – 205

Red as high as the floor, but green and blue clearly lower. The range comes from the simulator’s own tip.

PART 2

The plan

Back off, then get back on course

THE PLAN

Three rules, most important first

1. A sensor sees the **warning band** → **back away** and turn away from it.
2. Off course → **curve back** towards FINISH (compass and position).
3. Anything else → **drive forward**.

RULE 2 · TWO SENSORS WE KNOW

Which way? How high?

Compass

270 = facing FINISH (east). Below 270 = turned right, towards the bottom. More in Presentation 11.

PositionY

START and FINISH are at about **Y = 90**. Below 80 = too low; above 100 = too high.



PART 3

Step by step in statements

Six statements: the code challenge limit

STEP 1 · THE WHOLE PROGRAM

Safety, then course, then forward

Statement	Conditions	Wheels	Duration
1 WarnLeft	CSLeft band (R 230–255, G/B 145–205)	−1 / −4	500 ms
2 WarnRight	CSRight band (same ranges)	−4 / −1	500 ms
3 Low	PositionY 0–79 · Compass 240–299	3 / 4.5	60 ms
4 High	PositionY 101–255 · Compass 241–300	4.5 / 3	60 ms
5 TooRight	Compass 90–262	3.5 / 4.5	60 ms
6 Forward	none	4.5 / 4.5	60 ms

No Advanced Conditions, no variables: only the Min–Max boxes.

STEP 2 · STATEMENTS 1 AND 2 · SAFETY

Back away, nose turning away from the band

1 WarnLeft
−1 / −4 · 500 ms



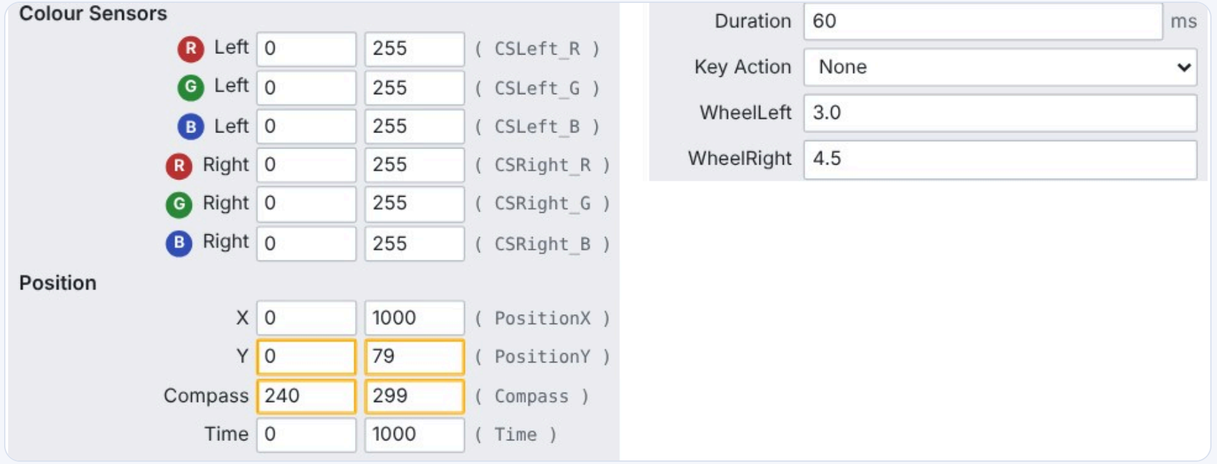
2 WarnRight
−4 / −1 · 500 ms



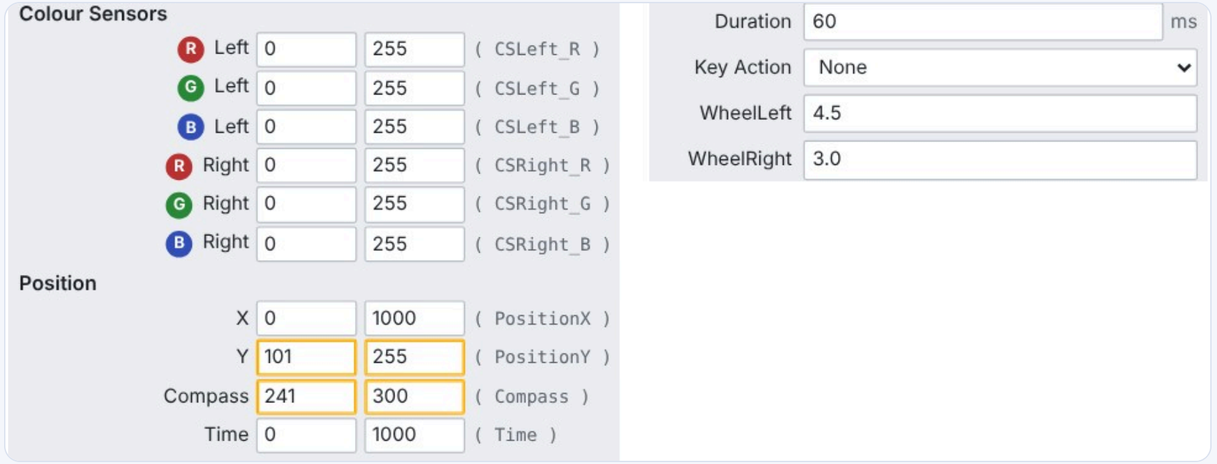
STEP 3 · STATEMENTS 3 AND 4 · HEIGHT

Too low or too high: aim up or down a bit

3 Low
Y 0–79 · curve left



4 High
Y 101–255 · curve right



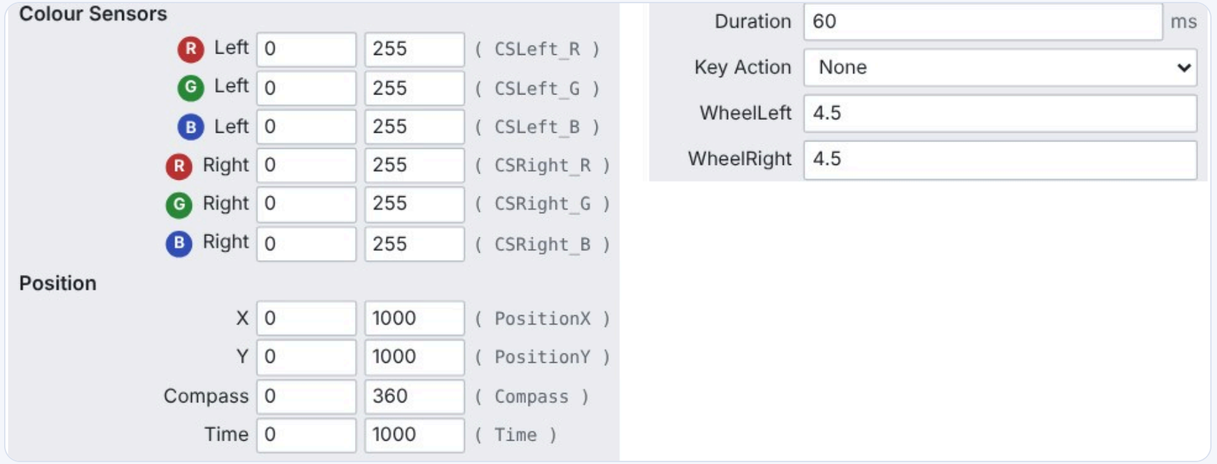
STEP 4 · STATEMENTS 5 AND 6 · HEADING

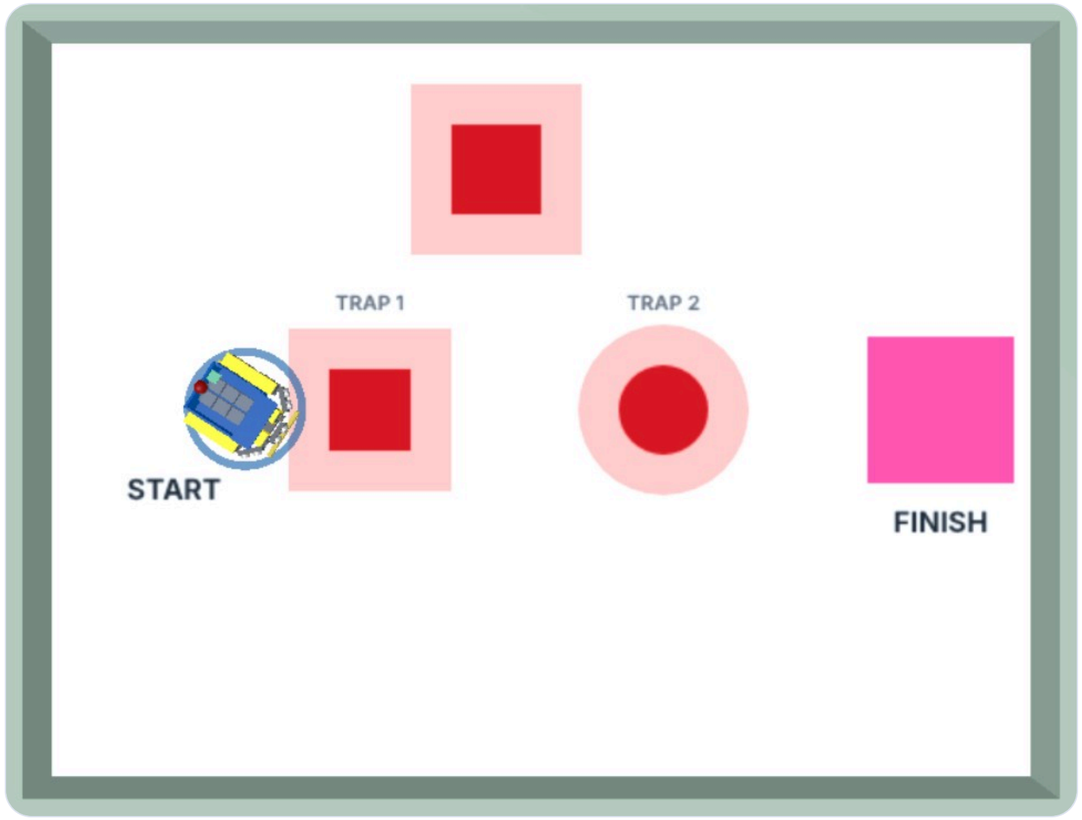
Turned too far right? Curve back. Else drive.

5 TooRight
Compass 90–262



6 Forward
no conditions





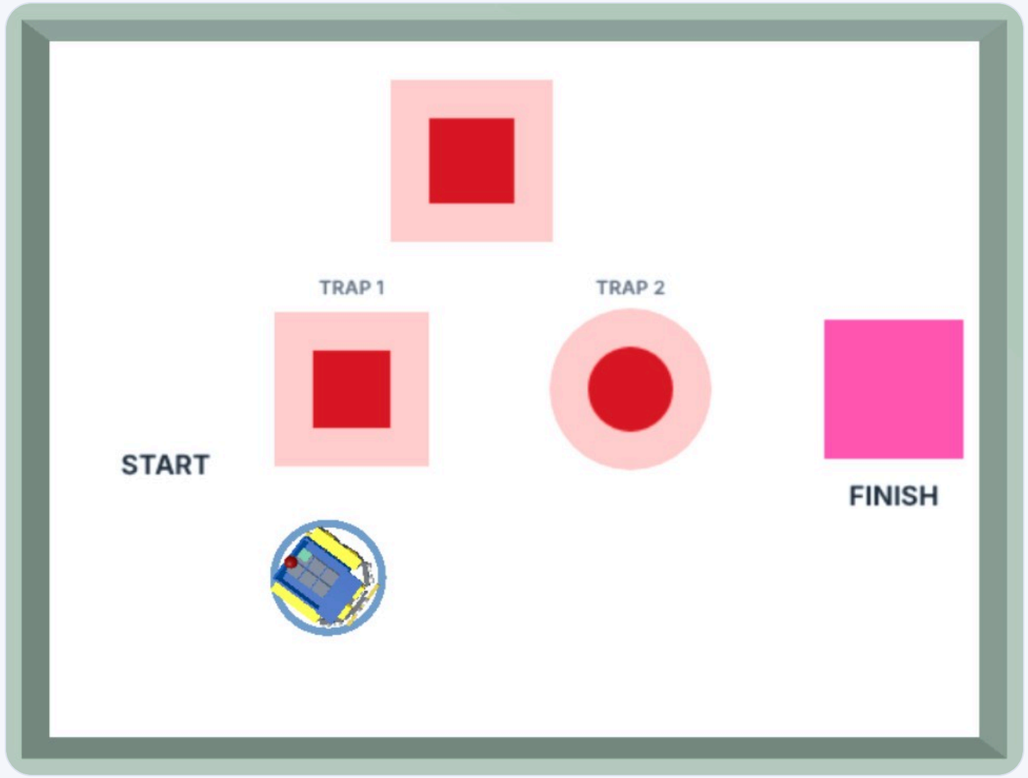
STEP 5 · RUN · 0 TO 3 S

Band ahead: WarnLeft

After about 1 s the sensors reach the band of trap 1.

WarnLeft backs away, and again if needed. The compass drops from 270 to about **180**: now facing down.

The trap itself is **never touched**.



STEP 6 · RUN · 3 TO 11 S

TooRight, then Low, then Forward

Colour Sensors

Left R	224	(CSLeft_R)
G	229	(CSLeft_G)
B	240	(CSLeft_B)
left sees this colour		
Right R	228	(CSRight_R)
G	232	(CSRight_G)
B	240	(CSRight_B)
right sees this colour		

Position

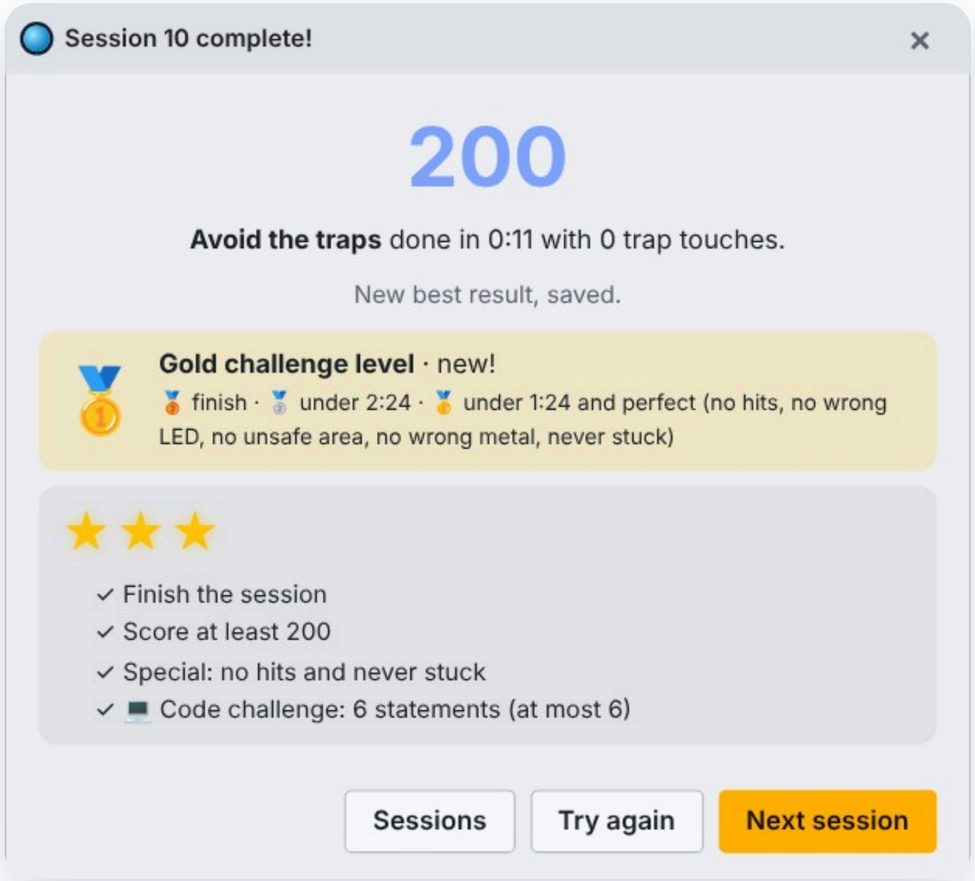
X	82	(PositionX)
Y	36	(PositionY)

Compass

246 (Compass)

Time

6 (Time)



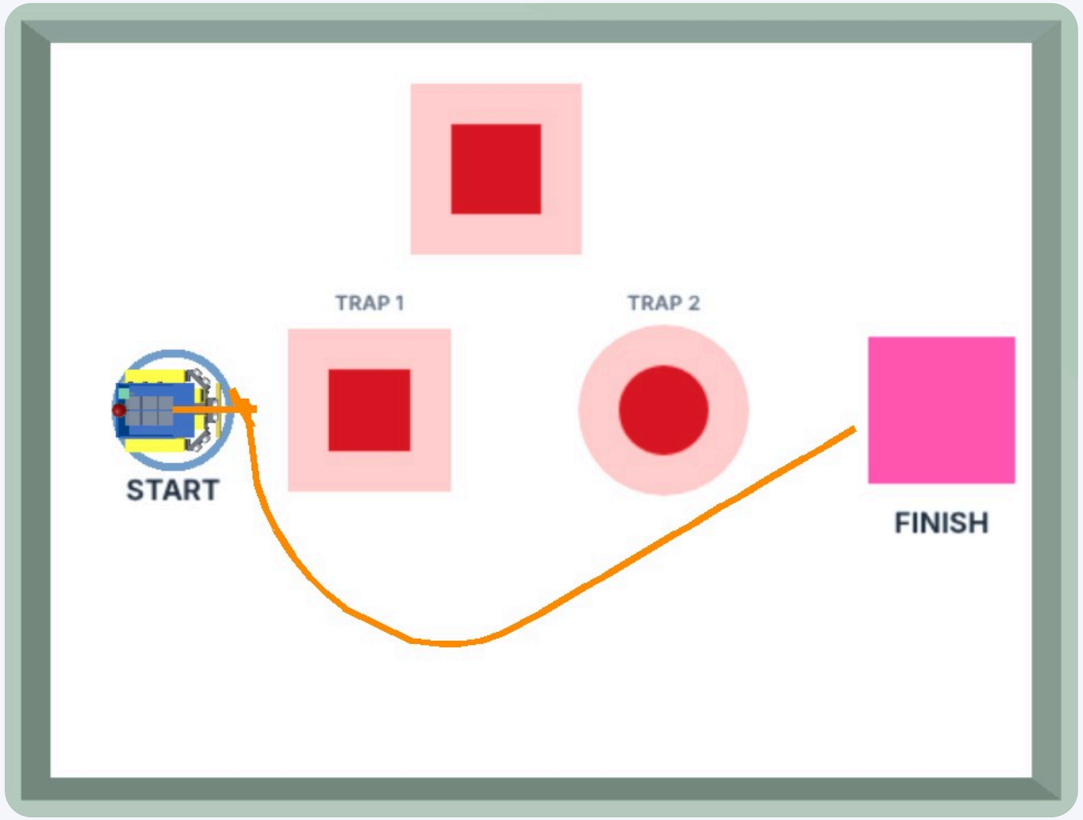
RESULT · TESTED

200 points in 0:11 · Gold

Score · trap 1 +50 · trap 2 +50 · FINISH +100. **0 trap touches.**

Medals · Silver: under 2:24 · Gold: under 1:24 and perfect.

Code challenge · at most 6 statements. We used exactly 6.



THE PATH · RECORDED

Round the bottom, then a diagonal

One bounce off the band of trap 1. Then the course rules did the rest.

React to the **warning**, not the danger.

DID NOT WORK?

Check first, then tune carefully

What you see	What to do
Drives into the trap (−20)	Band ranges: R 230–255, G and B 145–205
Spins on the band for a long time	Back away (negative wheels), don’t spin on the spot
Ends in a corner	Low and TooRight missing, or Compass ranges wrong
Misses FINISH by a little	Check Low: PositionY 0–79 and Compass 240–299
Old program still on the robot	**Build** again, then **Load** on BLUE

NEXT TIME

Presentation 11 · Compass targets

What a compass is, how it works, and how to turn to **any heading** with statements.