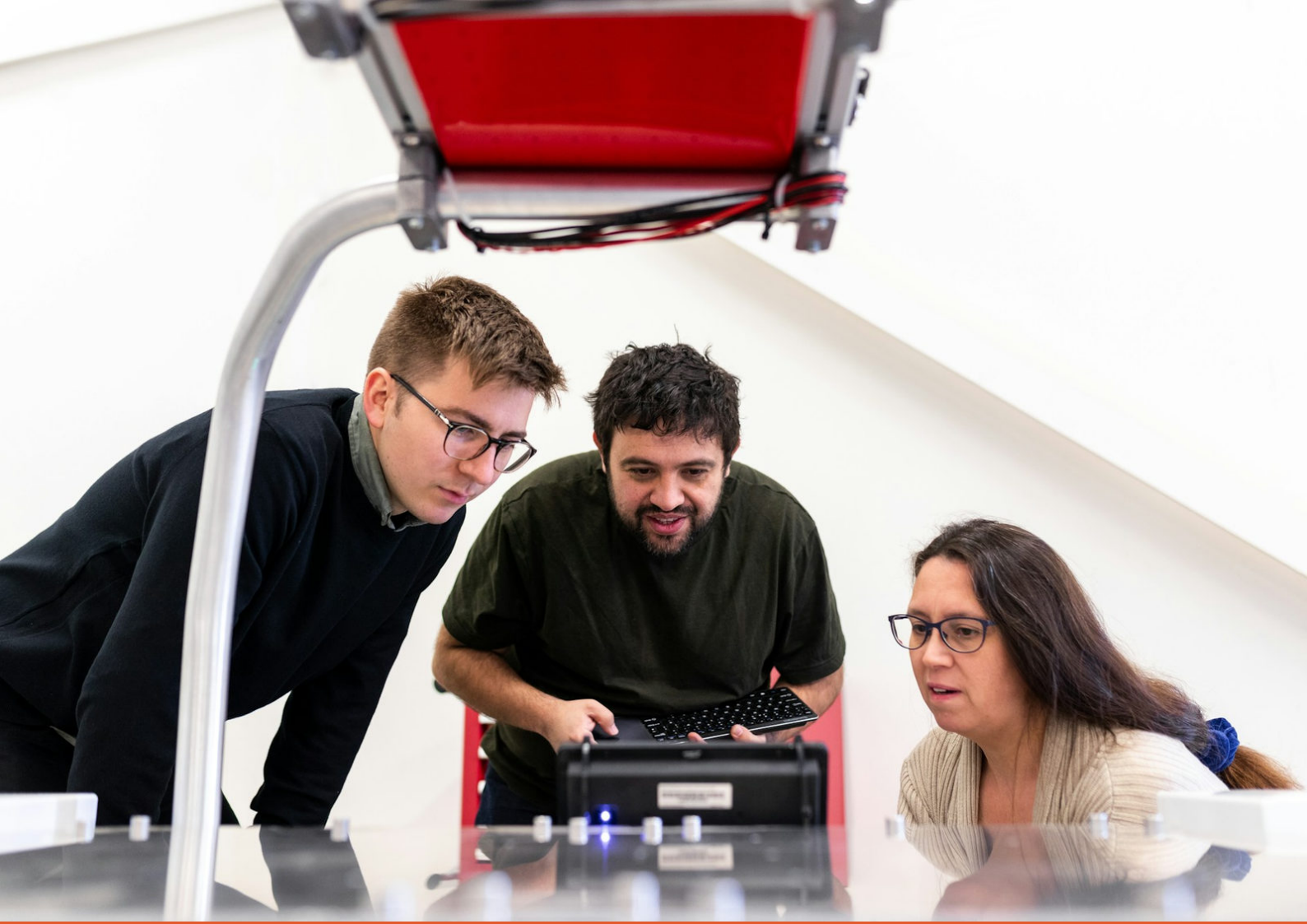




EduTrend Contents

EDUTECH · LEARNING TO PROGRAM ROBOTS · HIGH SCHOOL

Debug Like an Engineer

Find faults in hardware and code systematically

Ages 15–18

Level: Advanced

75 minutes

Pairs · up to 30

Activity 05

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 student worksheets · assessment checklist

ACTIVITY 05 · AT A GLANCE

Debug Like an Engineer

Each pair receives a robot with a hidden fault: a swapped port, a reversed sensor, a wrong threshold or a logic error. Using a checklist (batteries, cables, ports, sensor direction), printed sensor readings and testing short sections of code separately, they locate and fix the fault, then document the process in a debugging report.

Learning outcomes

By the end of the session students can:

- use a systematic debugging checklist;
- log sensor values to diagnose;
- isolate faults by testing sections;
- document debugging.

KEY WORDS

debugging · hypothesis · logging · isolation · hardware fault · logic error

CURRICULUM LINKS

Science: hypothesis testing.
Engineering: fault finding. English: technical writing.

1**SENSE**

What can it detect?

2**THINK**

What should it decide?

3**ACT**

What should it do?

4**TEST**

Run it

5**DEBUG**

Find and fix

6**IMPROVE**

Make it better

Materials (per pair)

- Robots with prepared faults
- Devices
- Debugging checklist
- Worksheets 1, 2 and 3

Before the session

- Prepare four different faults.
- Label robots A–D.
- Print checklists.
- Print worksheets.

SAFETY

Power off before changing cables. Report damaged cables or batteries.

ACTIVITY 05 · SESSION PLAN

Step by step

A printed checklist on each table (batteries, cables, ports, sensor direction) saves a lot of time.

Time	What happens	Say or ask
0–10 min Hook	A robot that “should” work.	<i>“Where would you start?”</i>
10–20 min Checklist	Hardware checks.	<i>“Is it hardware or code?”</i>
20–45 min Diagnose	Log values, test sections.	<i>“What is your hypothesis?”</i>
45–60 min Fix and swap	Fix, then try another robot.	<i>“Was the fix confirmed?”</i>
60–75 min Report	Write a debugging report.	<i>“What did you learn?”</i>

CHALLENGE CARD (print or copy onto the board)

Diagnose and fix two faulty robots systematically, and write a debugging report describing hypotheses, tests and the confirmed fix.

ACTIVITY 05 · FACILITATOR NOTES

The programming know-how in brief

Systematic debugging treats a fault like an experiment: form a hypothesis, test it, and change one thing at a time. Hardware checks come first because code cannot fix a loose cable.

Logging sensor values shows what the robot actually “sees”. Testing short sections of code separately isolates where a logic error lies.

Common ideas to listen for

- “It must be the code.” Check hardware first.
- “Change everything and retry.” Change one thing at a time.
- “It works once, so it is fixed.” Confirm with repeated tests.

Adapting the activity

Support

Give hints for the first fault.

Stretch

Design a fault for another pair.

WORKSHEET 1

Checklist

Name: _____

Class: _____ Date: _____

Tick each check.

Checklist

Check	Result
Batteries	
Cables	
Ports	
Sensor direction	
Code runs	

WORKSHEET 2

Debug log

Hypotheses and tests.

Debug log

Hypothesis	Test	Result
1		
2		
3		
4		

WORKSHEET 3

Debugging report

Summarise.

Fault, how we found it and how we confirmed the fix

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight students; copy as needed.

Student	Uses checklist	Tests hypotheses	Documents clearly

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Debug Like an Engineer is a sample activity from the EduTrend Contents Edutech Learning to Program Robots programme (high school, level: advanced). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

© 2026 EduTrend Contents. This activity may be printed and copied for use with students in your own school, club or home. It may not be resold or published elsewhere. Photos: ThisIsEngineering / Unsplash.