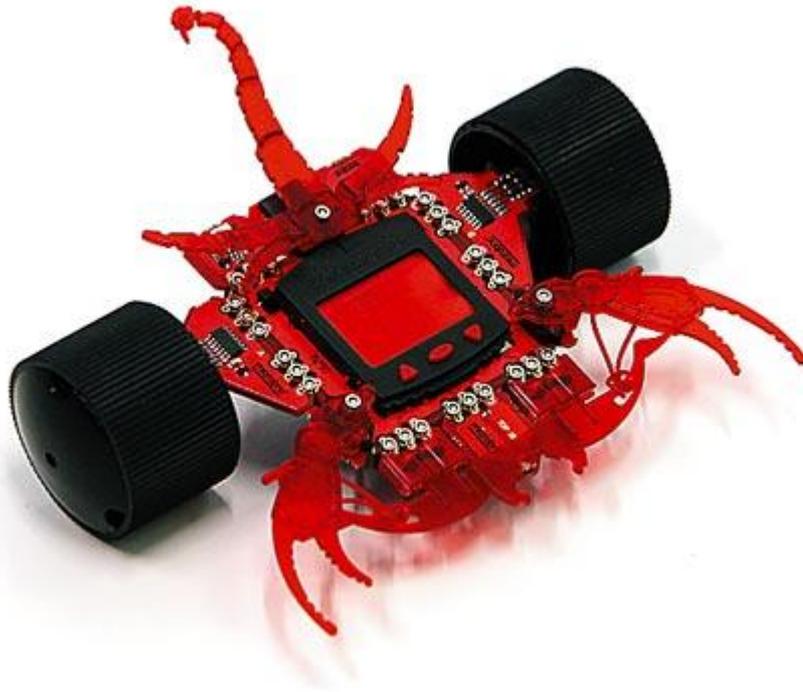


Ai2 Robot



Educational Activities

This document is designed to be a guide for teachers incorporating the Ai2 robot in to the classroom and to help give teachers inspiration when creating activities for their students. The document is not targeted at any age or year level and should simply be used as a guide or starting point.

1.0 Construction

Construction of the Ai2 is an enjoyable and challenging activity. Instructions are available in two formats:



1. Online step by step (page by page)

<http://www.microbric.com/ai2/page.php?sld=11>

2. Downloadable PDF document, which can be printed

<http://www.microbric.com/ai2/Ai2AssemblyInstructions.pdf>

2.0 Screen Programming

2.1 The Ai2 has many pre-programmed functions:

- Drive manoeuvres
- Line tracking
- Drive within a line (border)
- Tunes (inc. Yankee Doodle)
- Bump robot
- Sumo fight
- Speak – Communicate with another Ai2 via infrared



2.2 Activities

2.2.1 Line Following

Using a large white table and black insulation tape (pictured) students can make a track for the Ai2 to follow. They can discover the limitations of the Ai2 and try to figure out why the Ai2 can't make 90 degree turns.



2.2.2 Staying within a border

Students can make an activity mat for the Ai2 (instructions can be found here: <http://www.microbric.com/ai2/page.php?sld=51>) Students can observe how the Ai2 detects the edge and turns around to stay within the border. Note that this feature must be started while the Ai2's sensor is above the white border.

2.2.3 Sumo Fight

The above activity mat can be used for sumo fighting Ai2 robots against each other also. Again note that this feature must be started while the Ai2's sensor is above the white border.

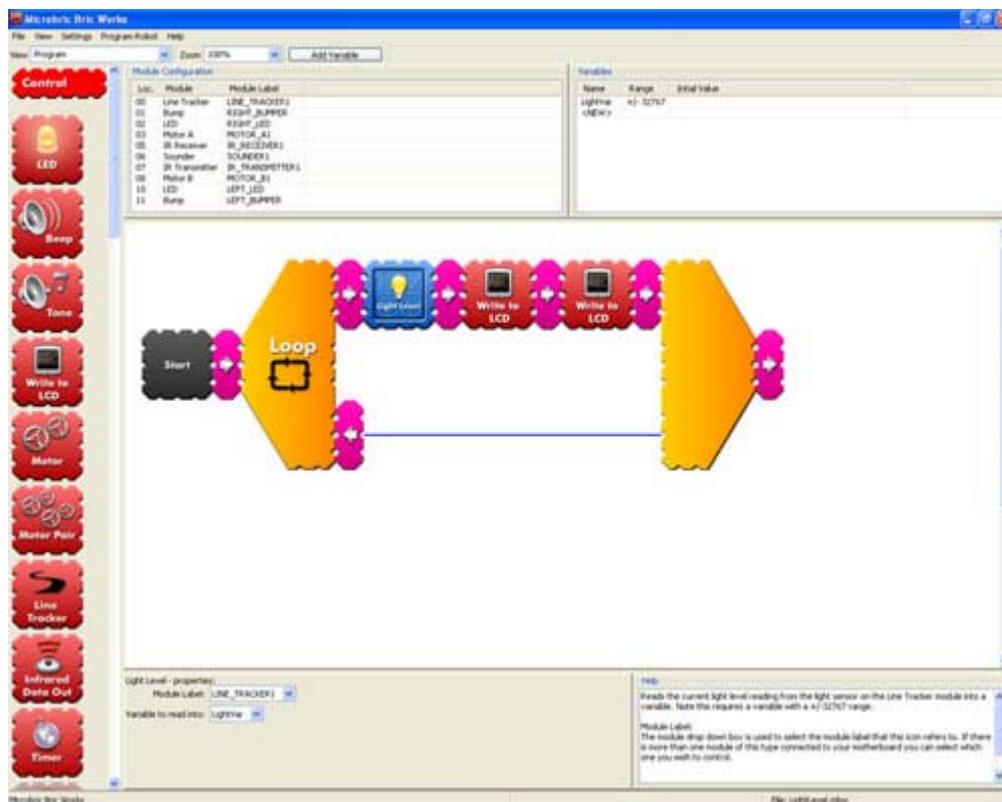
2.2.4 Obstacle course (bump robot)

Students can build an obstacle course for their Ai2 using text books etc and then send the robot in to see if it gets out.

3.0 Computer Programming

The Ai2 can be programmed from a computer using BricWorks, which can be downloaded from the Microbric website free of charge.

BricWorks is an icon based graphical programming software package specifically designed for the Ai2.



Students write their program by dragging and dropping icons to form a flow chart. They then download their program into the robot. There are two ways of doing this:

- 1. Screen download** – The robot's light sensor picks up special flashing from the computer screen. The special flashing contains the program that the student wrote.
- 2. Cable Download** – The above method has some limitations like speed (very slow) and that not all features of the software are available. A data transfer cable is available which allows

programs to be downloaded almost instantly and opens up all the features of the software.

For more details see <http://www.microbric.com/ai2/page.php?sld=27>

3.1 Programming activities using the screen or cable download method

Students can write simple drive routines for their robot. Eg:

- Zig-zag pattern
- Square pattern
- Circle (one wheel spinning faster than the other)
- Dance

A short course or track can be made for the robot using a large sheet of paper and marking out a path that the robot must stay on. The students must then program the robot to stay on the course and not go outside of the boundaries of the path. This could be a competition amongst the students.

3.2 Programming activities using the cable download method (Advanced)

3.2.1 Light level meter

The Ai2 has a light sensor and a screen, using these resources students can make a light level meter. An addition to this would be to incorporate an alarm that sounded (buzzer) if the light level was to get to high or too low.

3.2.2 Robot customisation

Students can modify the Ai2 (move the modules around) to create their own robot design. They can then program it to drive or do any other activity of even make their own inventions.

