Worksheet 4
Braitenberg Vehicles

Purpose.

To investigate Braitenberg Vehicles 2a and 2b using the Parallax Robot and Procedural Drive.

Learning Outcome 1, 3

Book Chapter 6

1. Measuring the Eye Response

We need to measure the response of the LDR eyes, especially their outputs for low (background) light levels and high (close to a light source) levels.

(a) Open the sketch **BBDrive_R_Proc_1a** and upload to the robot. Fire up the Serial Monitor and make sure the baud rate is set to 9600.

(b) Glance over the code. Note that in the loop the inputs to the left and right eyes are separately averaged, and the averages are printed out. Can you see how many samples are included in the average?

(c) Run the sketch. Place the robot in ambient lighting, away from the point light. Record the output from one eye.

(d) Repeat near the point light, say 15 cm from it.

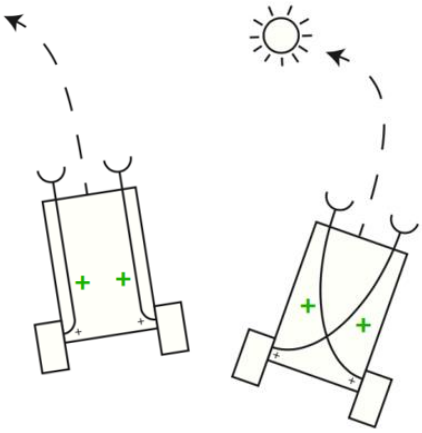
2. Driving the Motors

Here we shall apply the following drives to both motors to test for the maximum allowed drive: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90.

(a) Open the sketch **BBDrive_R_Proc_1b** and upload it. Take the robot into the arena and put the switch into position 2 while holding down reset. Release reset.

Observe the LED which flashes when the drive increments by 10.

(b) Find out the maximum possible drive. You may wish to repeat your observations.



2a fear 2b aggression

3. Coding Aggression (Vehicle 2b)

Vehicle 2b is excited by the light source, it turns towards the source then increases its speed until it hits the light at a high speed and comes to a sudden stop. That's aggression. You will need to open the sketch **BBDrive_R_Proc_1c**

(a) Decide on the values for the interpolation. You will need to set values for **eyeLow** and **eyeHigh**. Get these from your work in activity 1.

(b) Set values for **driveLow** and **driveHigh**. You will get **driveHigh** from activity 2. Think about **driveLow**, perhaps this should not be 0 but something like 10, so the robot will still move in ambient light conditions.

(c) Now make the *connexions* for vehicle 2b. You will need to assign the interpolator inputs **interpInL** and **interpInR** from the eye outputs **eyeL** and **eyeR**. Which is assigned to which?

(d) Upload your code and run the robot in the arena. Check that your code works. It should work well closer to the light than further away.

(e) When the robot is close to the light (say around 10cm) move the light around and the robot should track it.

4. Coding Fear (Vehicle 2a)

Makea simple change to your above sketch and test out your robot.

5. Increased Sensitivity at low light levels

This is experimental. That's right, you heard right. You probably found that the robot may fail to 'capture' the point light at large distances from it. This is because the eyes are not sensitive to small changes in light, and may get confused by other diffuse light sources in the arena.

To make the light more sensitive *at low light levels* then we can use a logarithmic interpolation instead of the linear one.

This is found in sketch **BBDrive_Proc_1d** which you should experiment with for, say, Vehicle 2b.

You could even do a controlled experiment, making a video recording of the robot for both linear and logarithmic interpolation. Now that would be fun!