Bits & Bots

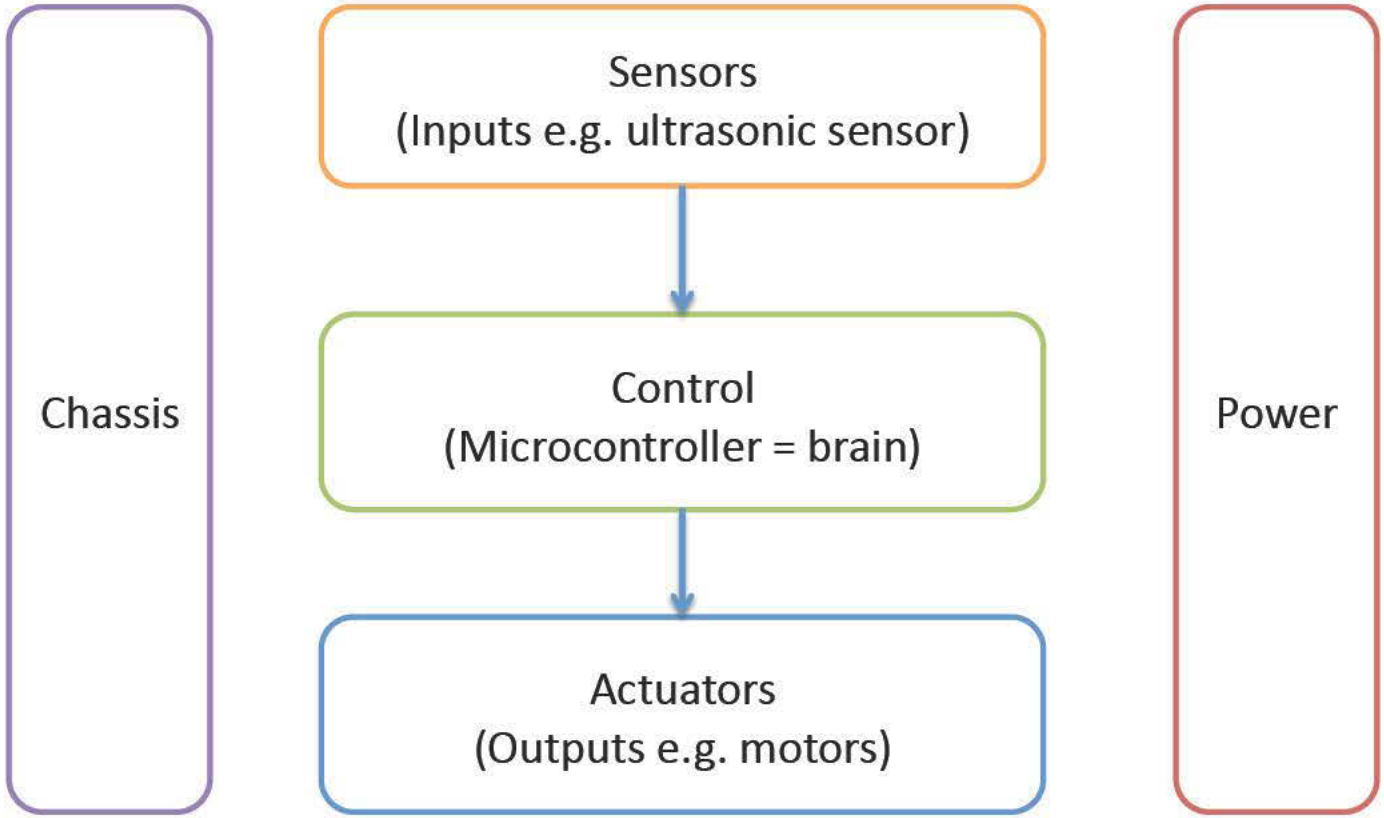
Anna Gerber

Bits & Bots Sessions

Session	Topic
Tuesday 20th May, 6 – 8pm	**Intro to 3D Design**: Design custom robot parts to print on the 3D printers
Tuesday 27th May, 6 – 8pm	**Intro to Electronics**: Learn how the electronic parts in the kit work, design our robot circuits
Tuesday 3rd Jun,e 6 – 8 pm	**Intro to Arduino**: Write NodeJS programs to read from sensors and control actuators
7th June, 1 – 5 pm	**Intermediate 3D Design**: Design more complex robot parts: gears, claws etc
14th June, 1 – 5 pm	**Intermediate Arduino**: Develop our robots' locomotion, sensing and responding behaviours
21st June, 1 – 6 pm	**Advanced Bits & Bots**: Finalise robot design and assembly, develop advanced robot control programs

A robot is an autonomous system that senses and responds to, or acts upon the physical world

ROBOT DESIGN


Chassis
Sensors
(Inputs e.g. ultrasonic sensor)
Control
(Microcontroller = brain)
Actuators
(Outputs e.g. motors)
Power

DESIGNING 3D PRINTABLE CUSTOM ROBOT PARTS

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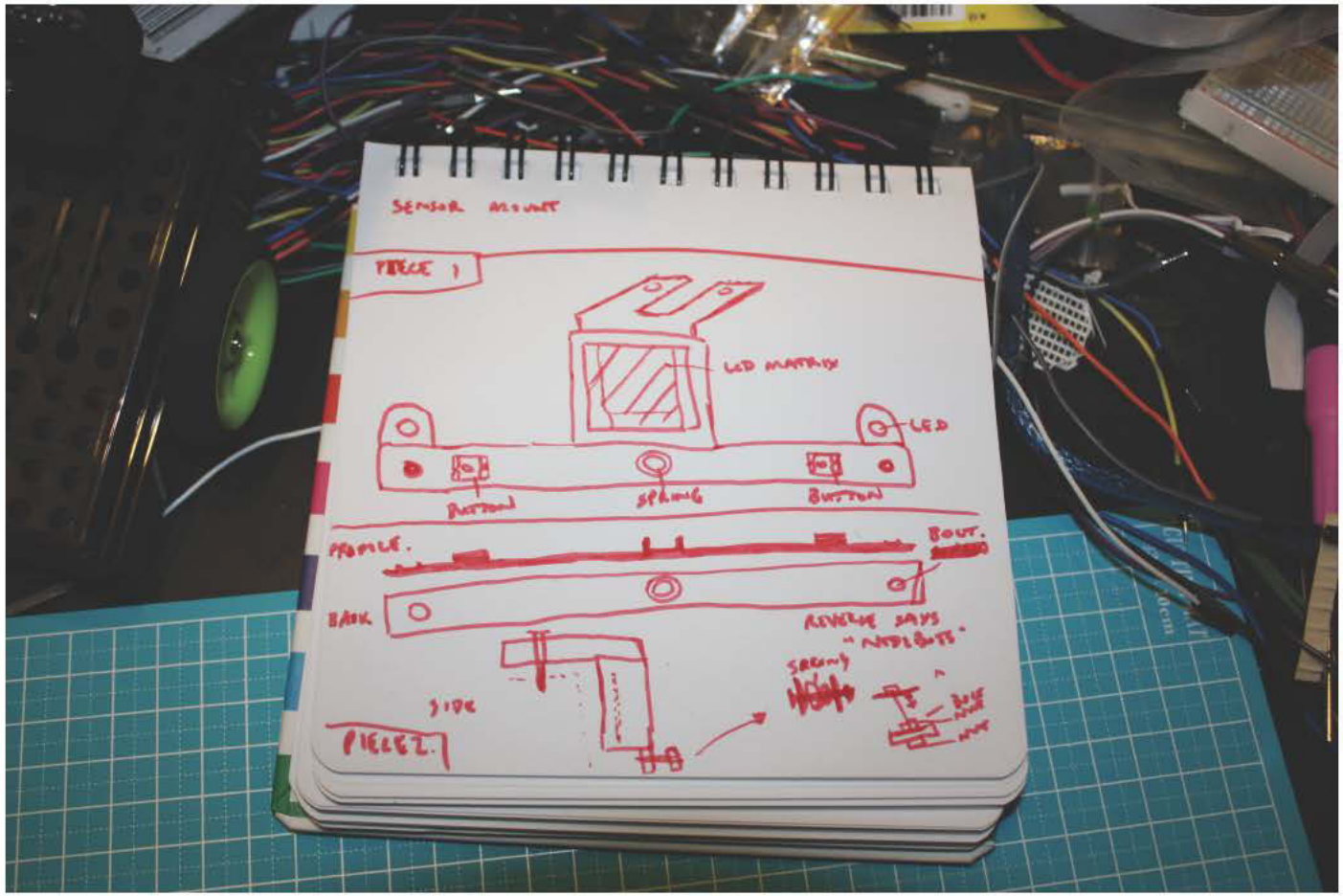
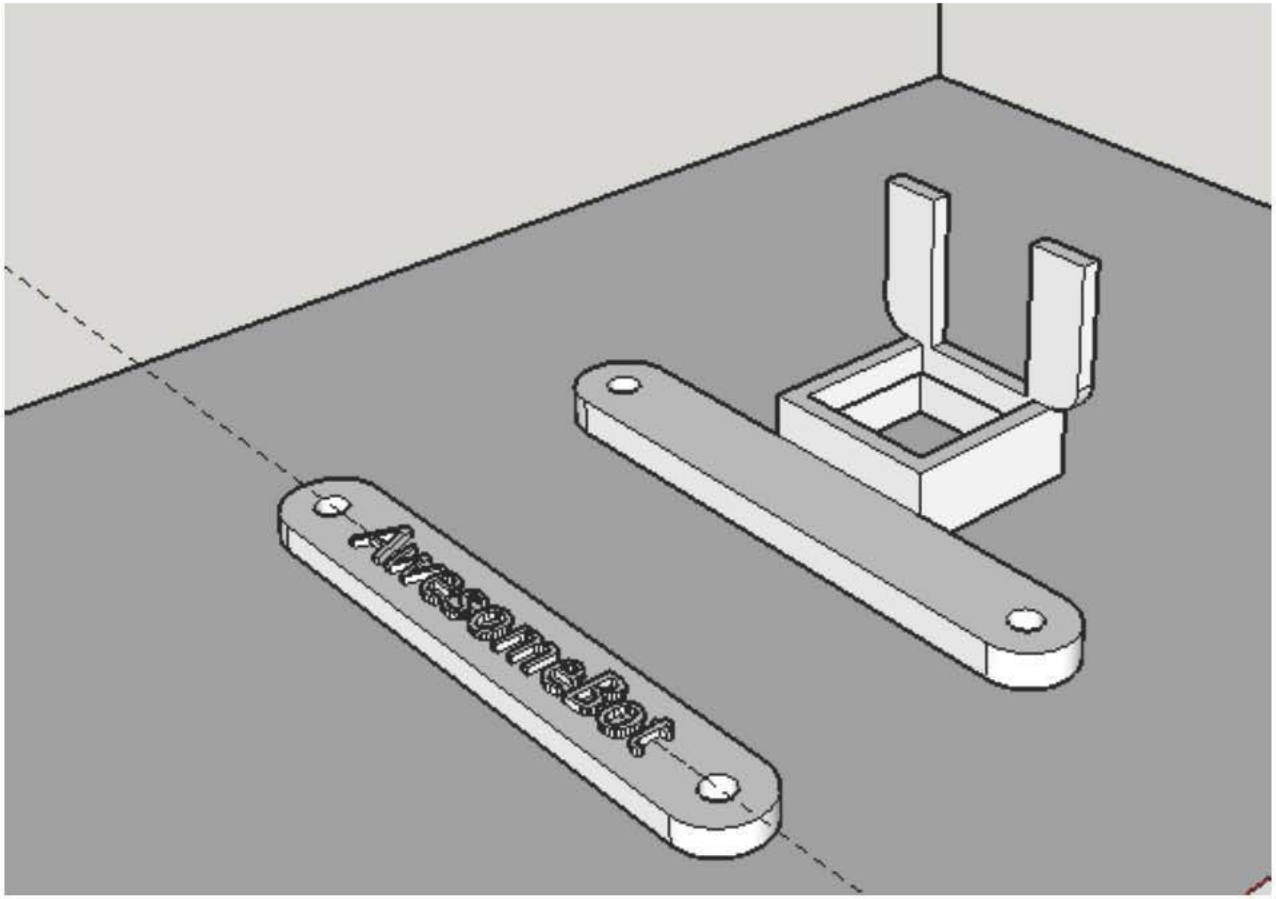
Plan function and layout of part



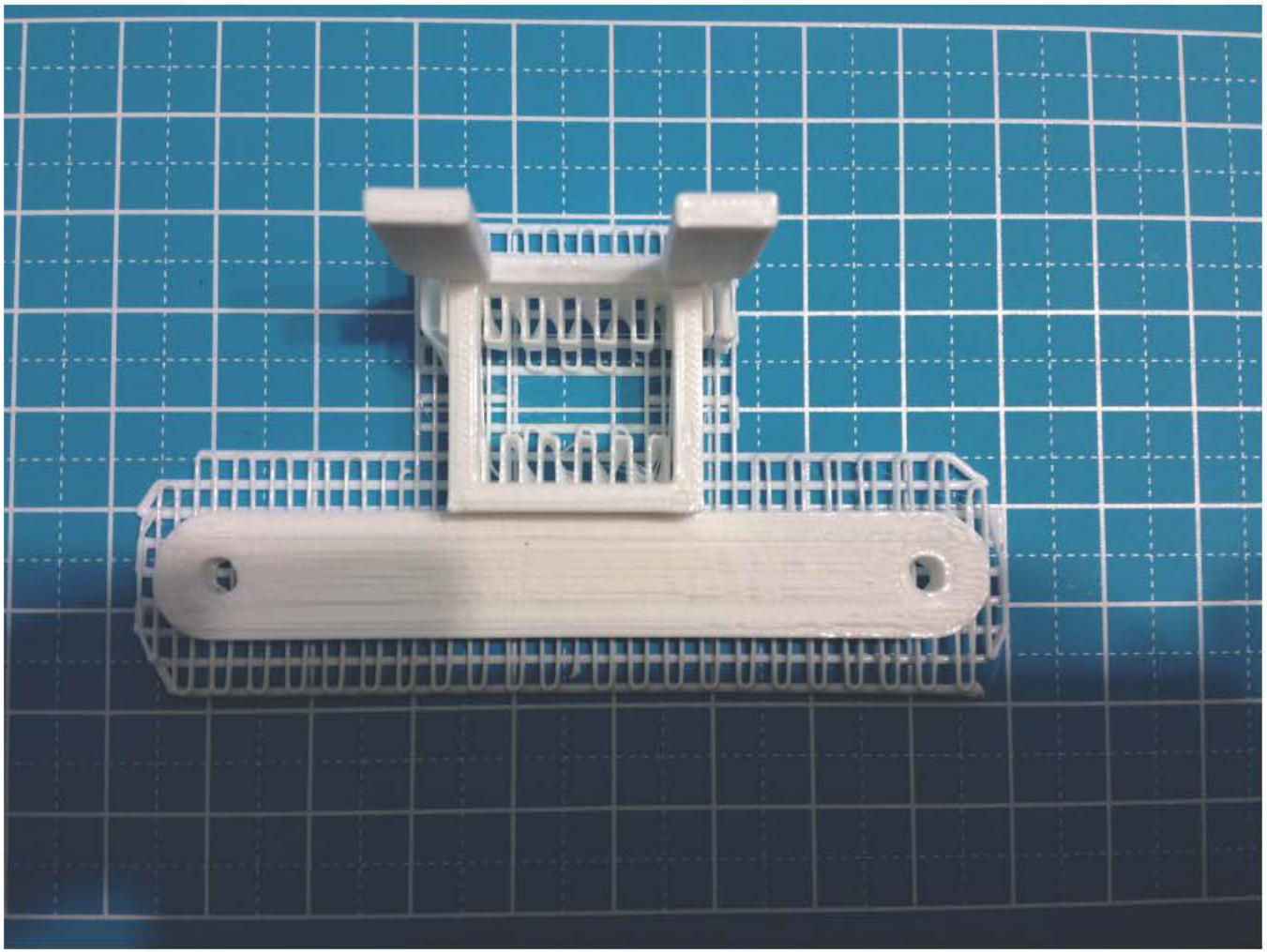
Use calipers and ruler to measure precise dimensions required

Create the 3D model

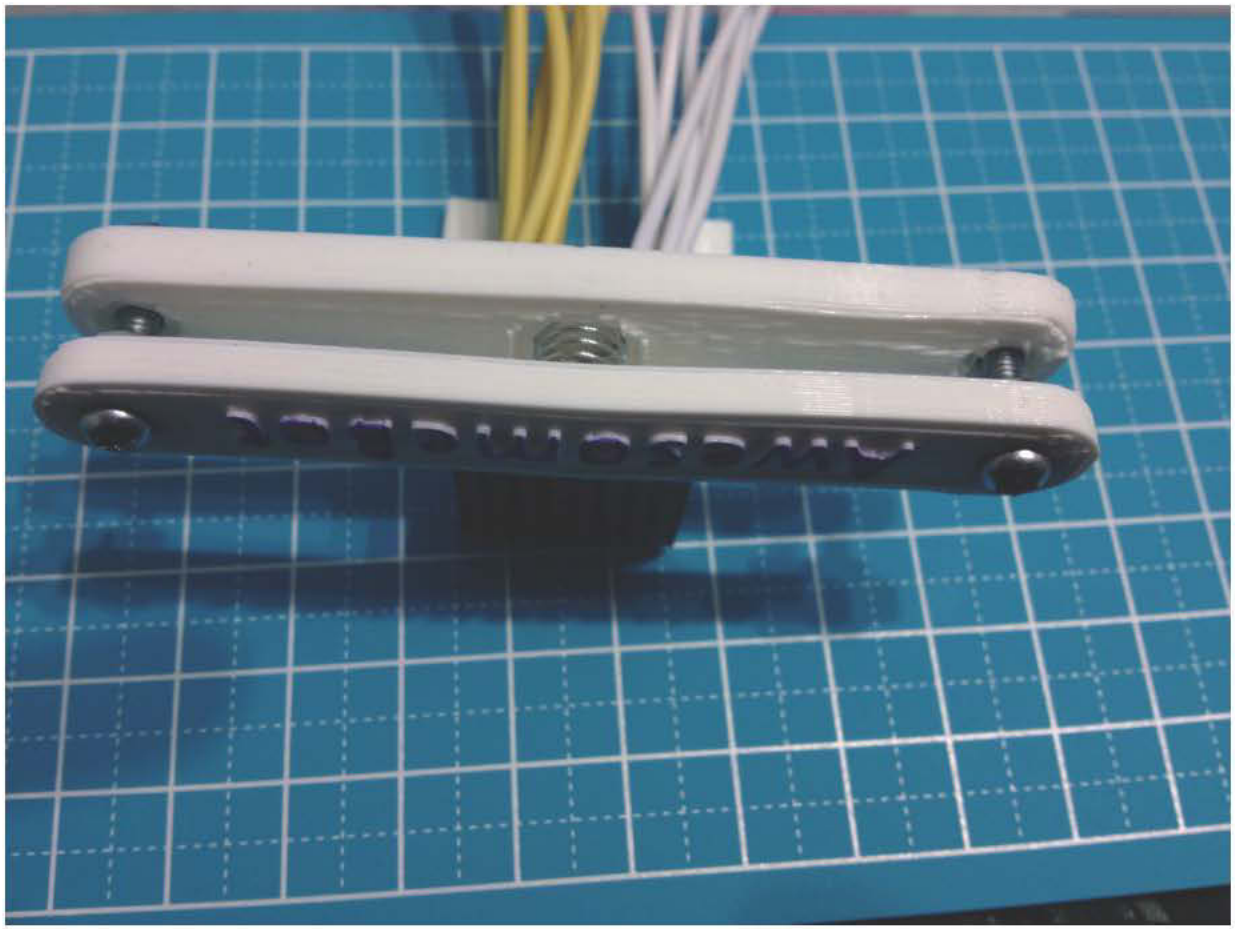


Once you are satisfied that the part will function as required, refine the model to improve the appearance and personalise your design

3D print the part



Test and refine



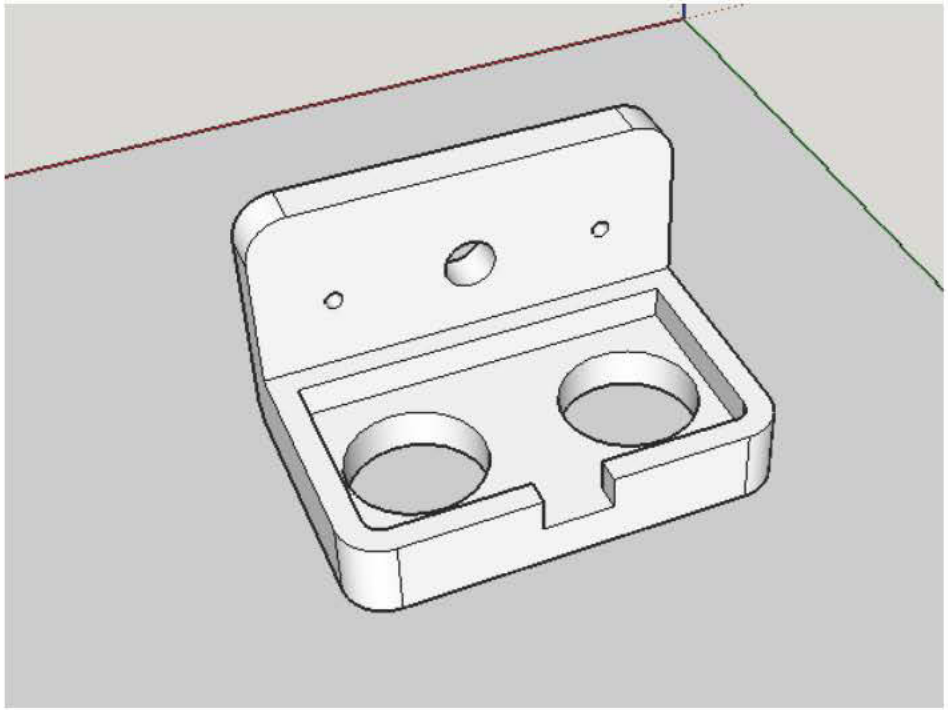
If the part isn't quite right, modify (e.g. using hobby knife, rotary tool) or refine the 3D model and reprint

Bits & Bots Robot Kits

Electronics		Chassis
Arduino Nano microcontroller	20 x jumper wires female – female	small parts box
Mini USB Cable plus USB female to male extension cable	10 x jumper wires male – female	small spring for bumper
3 x 9g servo for arm/head	4 x male-male jumper wires (long)	2 x wheels
ultra sonic sensor	13 x jumper wires male - male (short)	cable ties
piezo element	led matrix	wire for affixing wheels
medium breadboard	photo resistor	plastic chassis frame
mini breadboard	2 x 5mm super bright LEDs	
RGB LED (common cathode)	16 x 330 ohm resistor	
2 x push buttons	2 x continuous rotation servos for wheels	
battery holder with switch	2 x shift registers	
4 x AA Batteries	row of 15 header pins	

Exercise: Designing a 3D Model

We will design a 3D printable mount to attach our ultrasonic sensor to a servo motor to allow it to be rotated



You can download the free Sketchup Make software from http://www.sketchup.com/