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technocamps

Inspiring | Creative | Fun
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Prifysgol Abertawe

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Prifysgol Bangor University

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ESF

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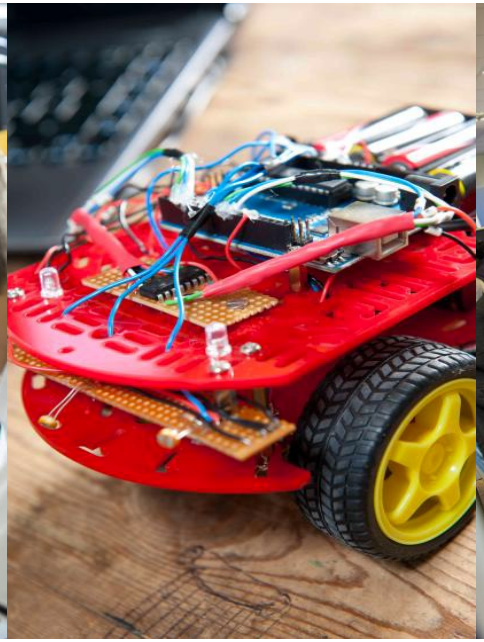
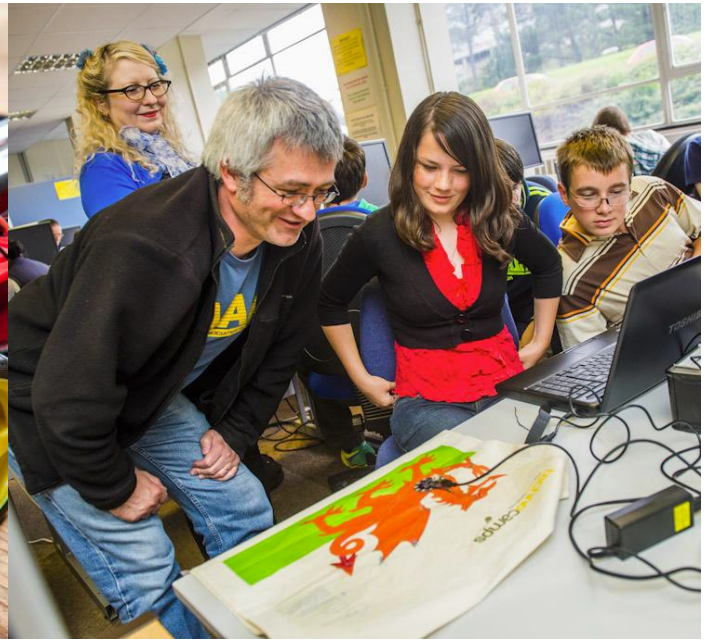
About Technocamps

We go around schools like yours and show you lots of interesting stuff!

We also do things we call “bootcamps” during holidays!

What is a STEM subject?

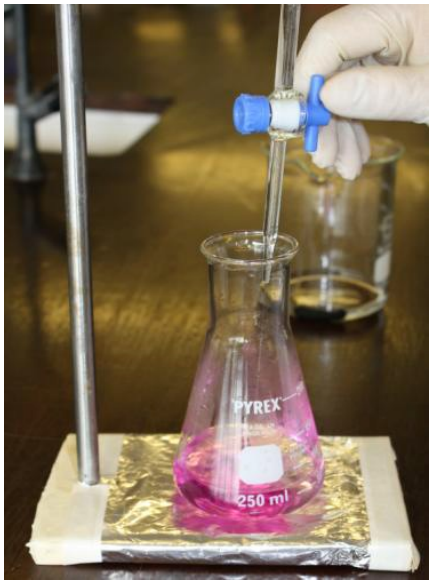
Science

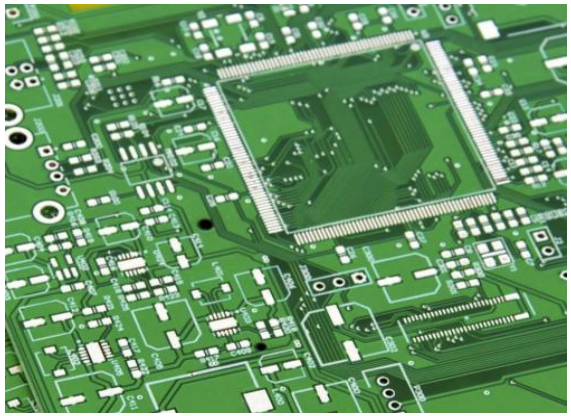
Technology

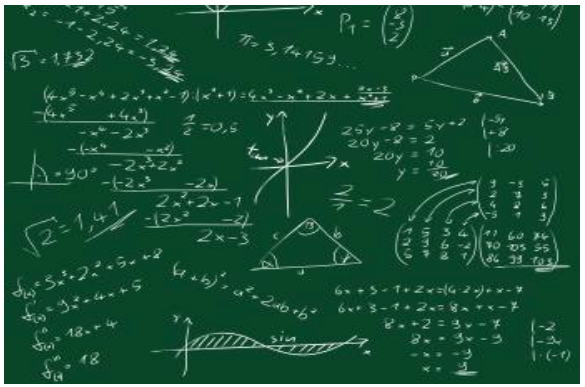
Engineering

Maths

They all link with each other!







What are Robots?

Task

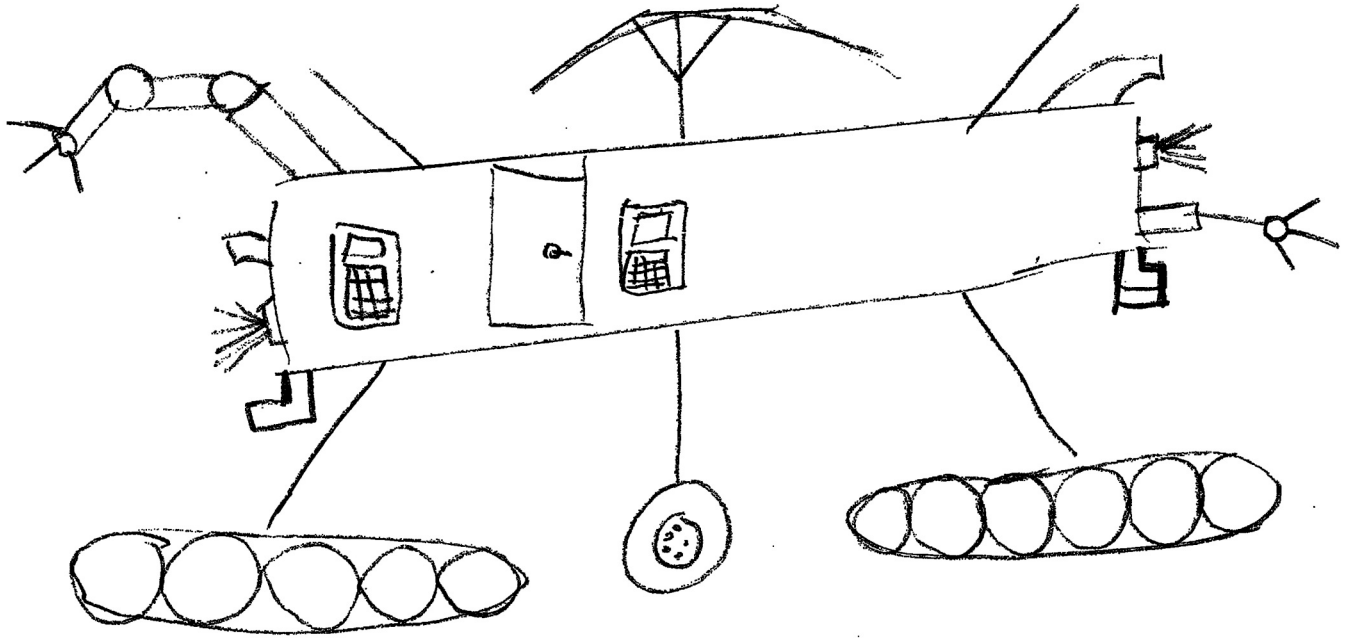
Draw a Robot.

What will it look like?

What will it do?

How will you interact with it?

Here is Tom's Robot

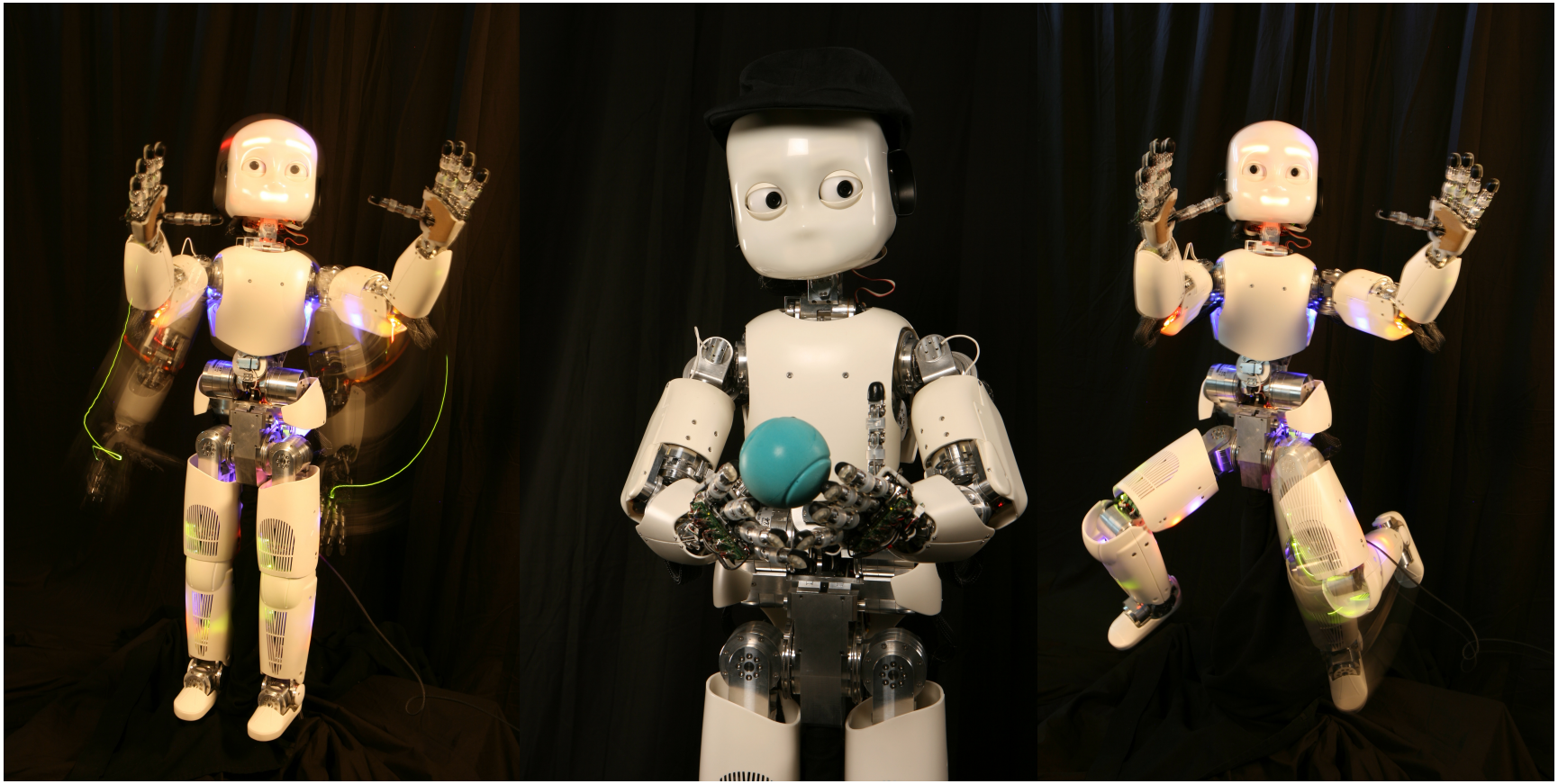


What do you think it does?

Now let's see yours...

Robots

This is the iCub, a robot used in research to simulate infant learning.



Robots!

Sometimes it is better to have machinery performing the dangerous jobs.

This is common in the industry.

Machines may be used instead of humans if a repetitive job is required e.g. assembly lines,

Robots!

In the 80s there was a program called “Knight Rider”. This car was featured in the program called “Kit”.

The car was designed to talk and interact with the driver and to think like a human.

Although this is science-fiction, our cars today are pretty smart too!

Robots!

Idris is a research robot, sent to complex environments where it drives around on its own.

Usually used to research the environment.

Robots!

This is BeagleB, similar to Idris but more suitable for the sea.

It is used for example to measure water quality or listen to dolphins as they communicate to one another.

Robots

Do you think a washing machine is a robot?

Why?

Why not?

Discuss as a group.

Robots...

... are devices.

... are programmable.

...can sense their environment.

...can act on and within their environment.

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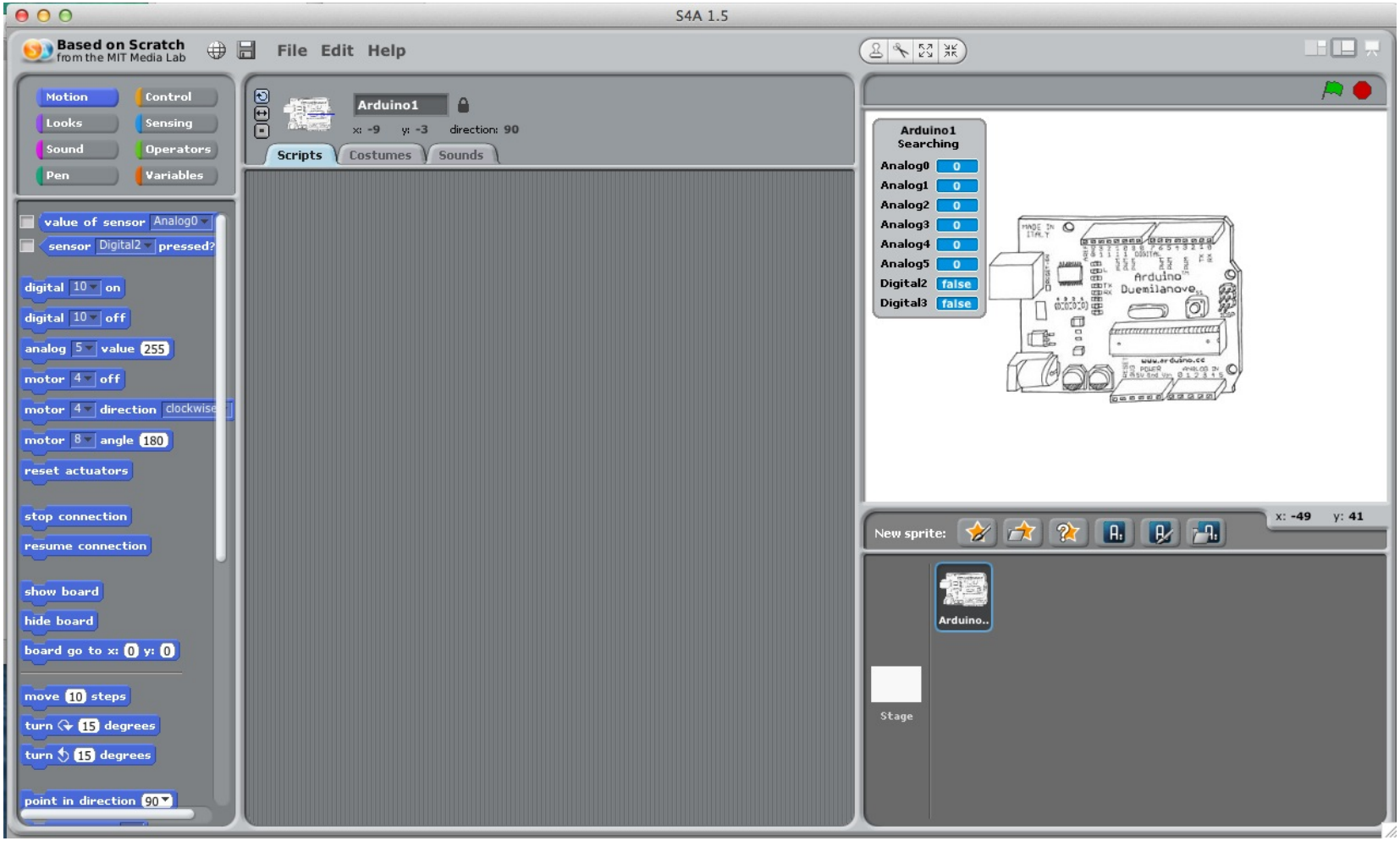
S4A

S4A


S4A 1.5
Based on Scratch
from the MIT Media Lab
File Edit Help
Motion
Control
Looks
Sensing
Sound
Operators
Pen
Variables
value of sensor Analog0
sensor Digital2 pressed?
digital 10 on
digital 10 off
analog 5 value 255
motor 4 off
motor 4 direction clockwise
motor 8 angle 180
reset actuators
stop connection
resume connection
show board
hide board
board go to x: 0 y: 0
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
Arduino1
x: -9 y: -3 direction: 90
Scripts
Costumes
Sounds
Arduino1
Searching
Analog0 0
Analog1 0
Analog2 0
Analog3 0
Analog4 0
Analog5 0
Digital2 false
Digital3 false
Arduino
Duemilanove
New sprite:
x: -49 y: 41
Arduino..
Stage

Flash an LED

First of all we are going to make an **LED** flash.

On the right, are 2 pieces of code blocks you can use to turn the LED on the specified pins **On and Off.**

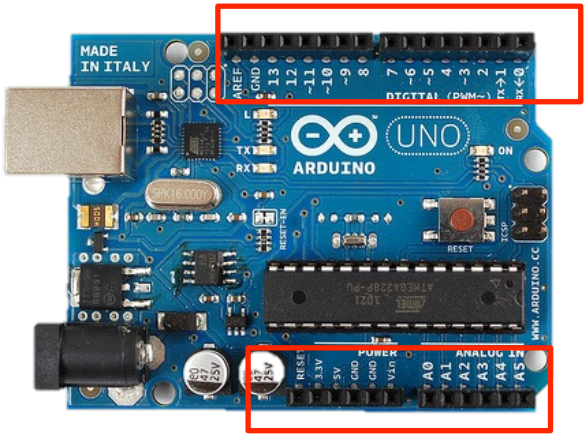
You all know Scratch, so write a script to make **the LED flash continuously**.

Pins

To turn things on and off you tell the **arduino pins** what to do.

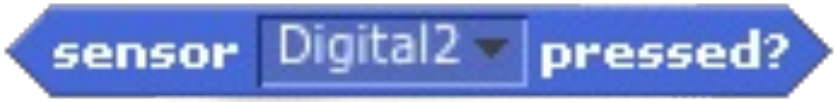
Each pin has a **number** which you talk to on S4A.

You also have pins to power components.



Press a Button

You can get the LEDS to flash, now extend it and get it to only happen when you **press a button**.



Chassis

Now, you will be handed a chassis.

Become familiar with the kit.

Unplug the LED circuit, put the arduino on the Shield.

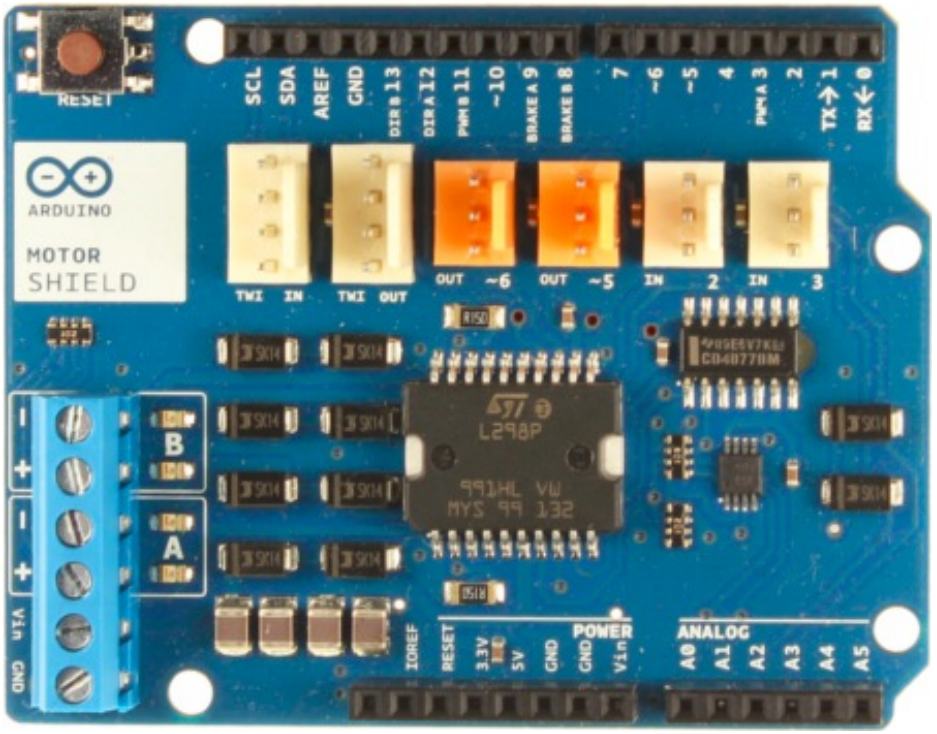
Have a look at the components on the chassis. What components can you recognise?

Motor Controller

This is the **motor controller.**

We use this to make our motors move.

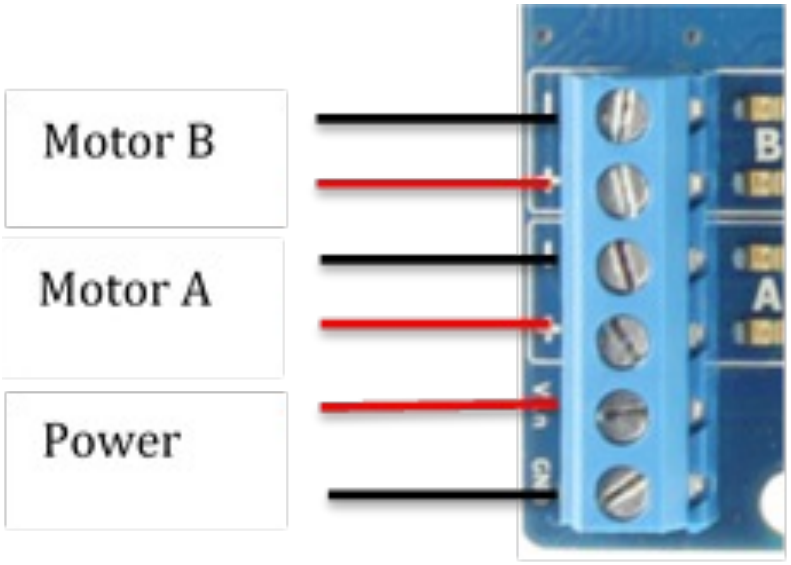
To do this. . ...



Motor Controller

The blue connections go to each motor, A and B.

And the bottom connection go to a power supply.



Motor Controller

DIRA – Direction of A (Pin 12)
DIRB – Direction of B (Pin 13)
PWMA – Power of A (Pin 3)
PWMB – Power of B (Pin 11)

So interact with these pins and try to move **forward**.

Moving!

When you press Up…

Set the **direction** of each motor

Set the **speed** of each motor

Try to get your robot moving **Up**, **Down**, **Left**, **Right** and **Stop**.

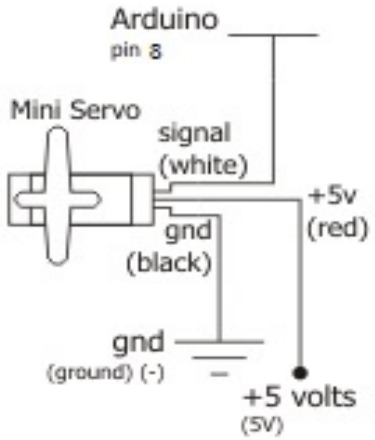
Ask if you need any help

Pen Movement

To move the pen we are going to use a **Servo.**

A servo allows us to have precise movement of a motor, so we can place the pen up and down. We do this using **angles!**

See if you can get your pen to move up and down when you press a button, but first you need to wire it into your arduino.



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Post-Day Questionnaire

Don’t forget to save your work!

All of our software is OPEN-SOURCE
(Free and available to download)

It can all be found on our Technocamps website:
www.technocamps.com