Glow Your Own – Session 3

Building and coding your circuit

Glow Your Own is a six-week project, bringing together science and arts organisations, connecting creative coding and artistic practice to help develop transferable skills during an enjoyable project. It started in 2020 and previous videos and how to worksheets are online:

https://if-oxford.com/GYO

Building and coding your circuit

You can build, test and code your circuits virtually on Tinkercad: www.tinkercad.com

If you would like to join the Glow Your Own class on Tinkercad, please log on to

https://www.tinkercad.com/joinclass/MUIZMQMRM **(class code: M U I Z M Q M R M)** and enter your login code– your login code has the form **gyo2026###** and everyone who signed up received a code with three unique numbers to use as the # keys.
If you need a new login code, please email visitral@stfc.ac.uk or ask in the Zoom chat during the session.

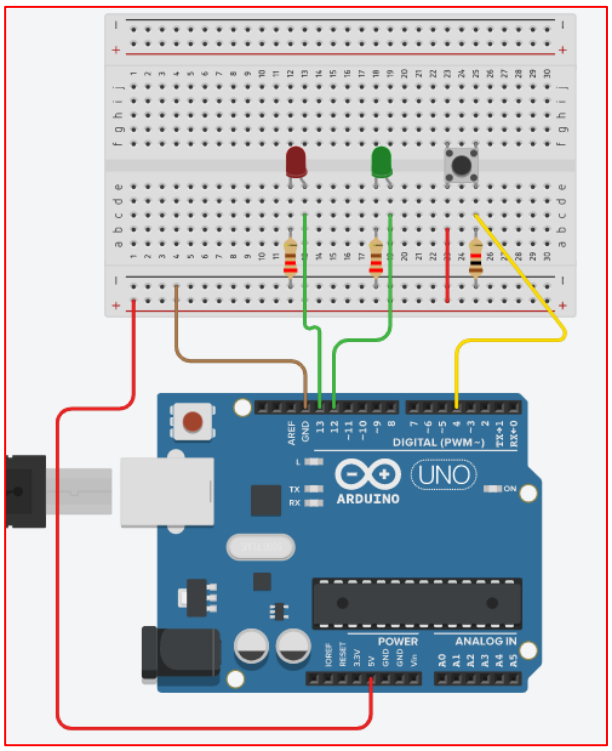
For a reminder of how to access Tinkercad and get started, see the 'How To' sheet for Session 1. There are instructions for how to upload your code in the 'Duino' How To sheet from session 2.

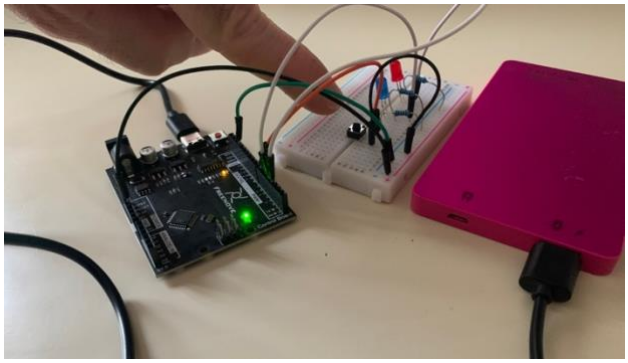
Remember, if you're building physical circuits with your real Arduino:

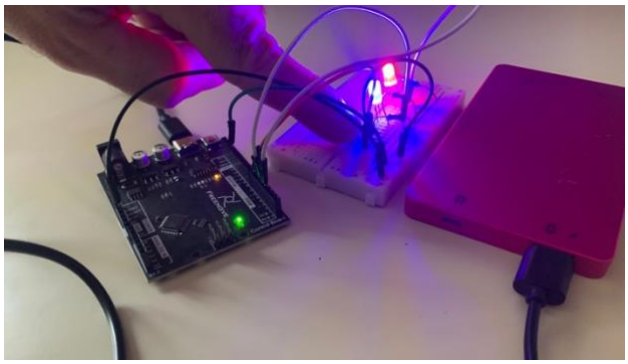
- Always remember to unplug your Arduino when you're changing components.
- Make sure all of the small components are kept out of reach of young children and pets.
- Make sure that all components are tidied up at the end of the session, and none are left on the floor or table.

Circuits to build and code: Turning an LED on with a button

Lights that are always on can be a bit annoying! You can control LEDs by clicking a button, using a circuit like this:

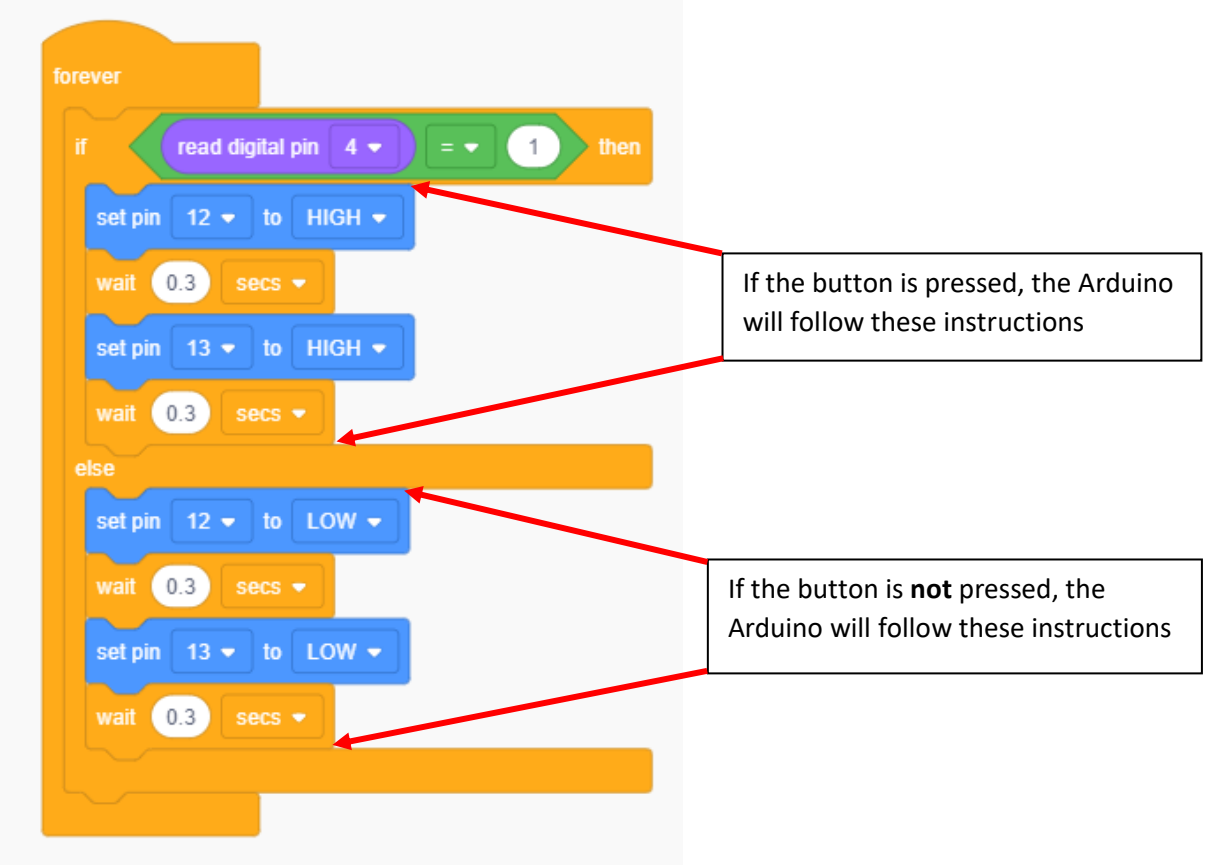






Don't forget the red wire on the left hand side of the diagram! This links the button to the 5V (power) pin on the Arduino – the button needs this power to work!

To code our new circuit, we need to use an "**if then else"** block: this block is used when we want to ask the computer a question. We ask whether the button has been pushed. If it has been pressed, we instruct the Arduino to turn the LEDs on (one after the other), if the button is not pressed, we instruct the Arduino to turn the LEDs off (one after another), using the code below.



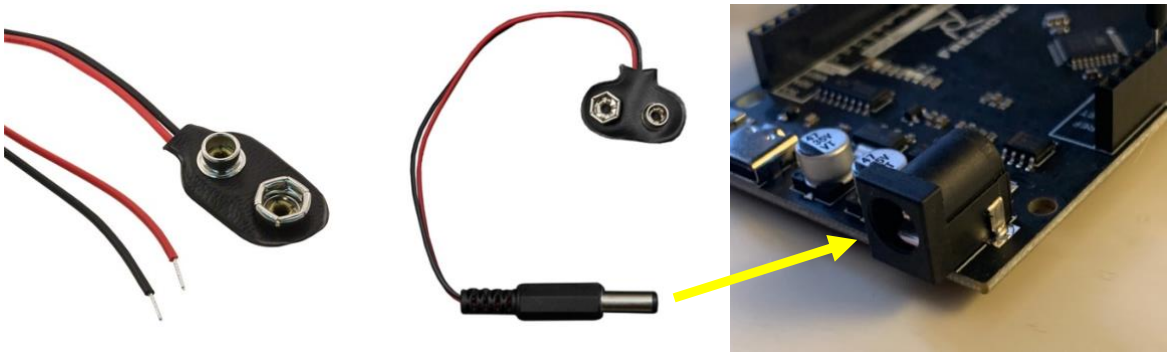
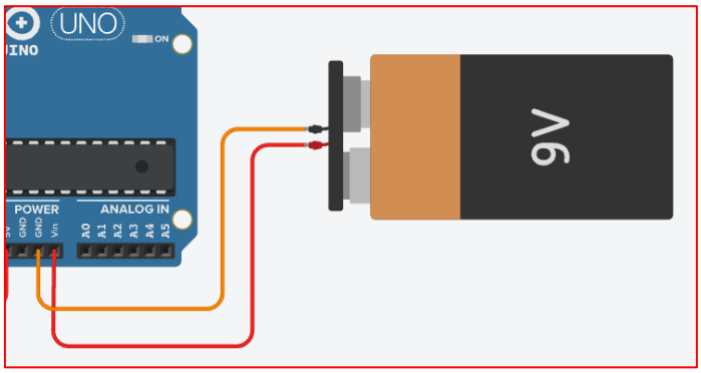
When you simulate your circuit on Tinkercad, in order to press the button just click-and-hold the button on your screen.

You can experiment with delays and extra LEDs to make your LEDs flash when the button is pressed.

Adding a power source

We don't always want our Arduino to be connected to a computer while it's working. We can add an alternative power source to our circuit, which means that it will continue working after being disconnected from the computer (so long as the code works!)

There are a few ways to power your Arduino from a battery, the easiest is to us a USB rechargeable battery or a standard USB plug adaptor. Connect your Arduino in the same way as you would to your computer, but now your microcontroller (the Arduino) is working alone!

An alternative is to use a 9-volt battery. Some Arduinos have a barrel connector which you can connect with a ‘snap 9v barrel connector’ or you can connect via the Arduino pins. To do this, simply connect your power source to “Vin” and “GND” pins on the Arduino, as in the circuit diagram below.

It is important to be careful when handling electrified wires! Only connect your battery at the last moment, when all other connections to your Arduino are securely in place.