Glow Your Own

Worksheet for session 2

Coding is the language used by machines and computers, including everything from how a mobile phone works to controlling the colour sequence of traffic lights. Learning to code can open new areas of creativity, problem solving, collaboration and communication.

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

Glow Your Own aims to help people of all ages and groups to join in online: go from technology trepidation to creative coding confidence, using Arduino, Tinkercad computer programming and craft making.

Building and coding your circuit

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

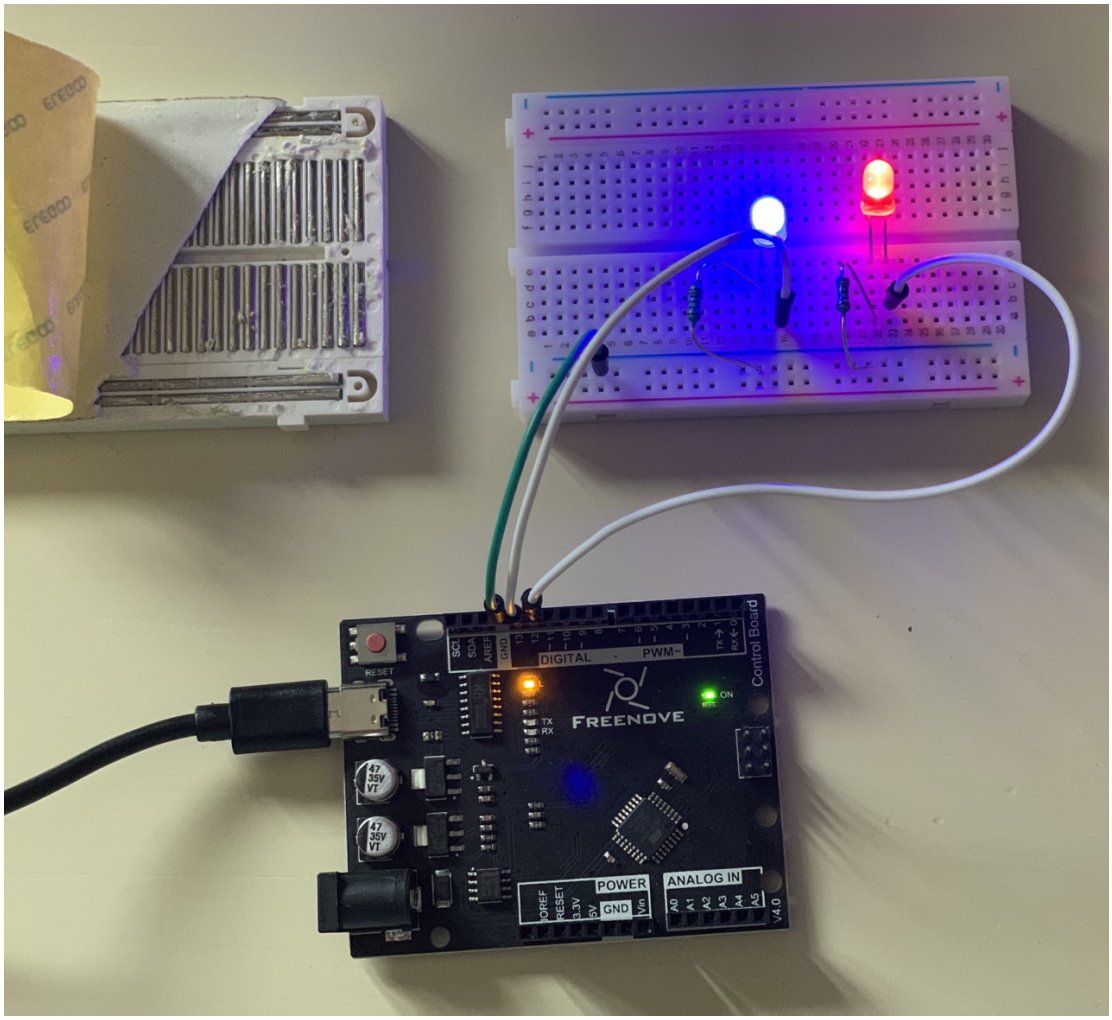
If you would like to join the Glow Your Own class on Tinkercad, please log on to https://www.tinkercad.com/joinclass/DF717MS2Y **(class code D F 7 1 7 M S 2 Y)** and enter your nickname – your nickname has the form **gyo###**, and everyone who signed up received a code with three unique numbers. If you need a new nickname, please email visitral@stfc.ac.uk

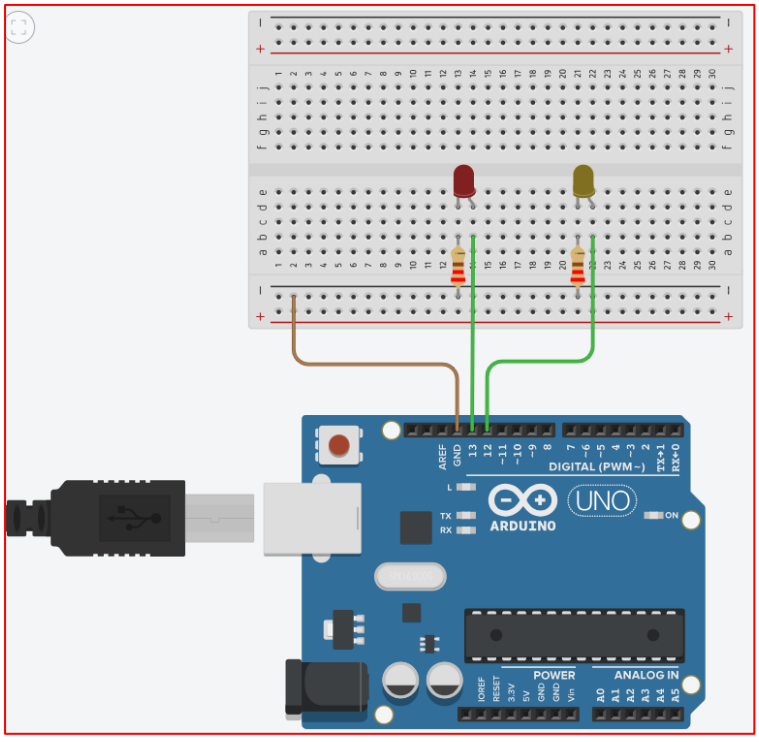
For a reminder of how to access Tinkercad and get started, see the 'How To' sheet for Session 1. There are instructions for how to upload your code in the 'Duino' How To sheet.

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





Notice how the sockets (holes) are connected within the breadboard: if you connect the components vertically and horizontally correctly, it doesn't matter which exact holes you use.

Do not dismantle your own breadboard because exposed metal carrying electricity is dangerous!!

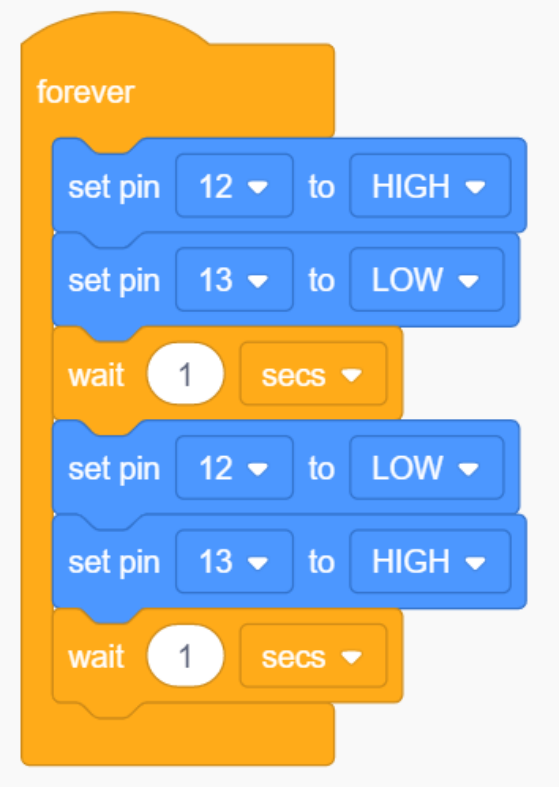
Flashing, alternating lights

We can create our own flashing lights using two LEDs and 220 Ω resistors:

Components needed:

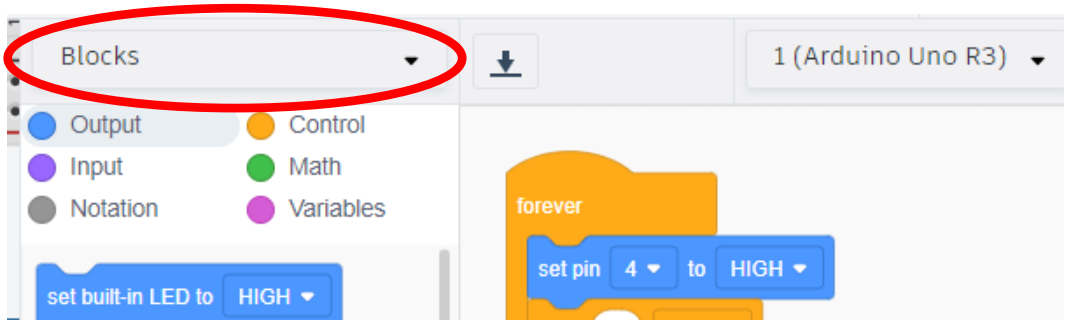
- Arduino + USB Cable
- Breadboard
- 2 x LEDs
- 3 x wires
- 2 x 220 Ω resistors

We can code the LEDs to flash on and off alternately using the same blocks we used in Session 1.



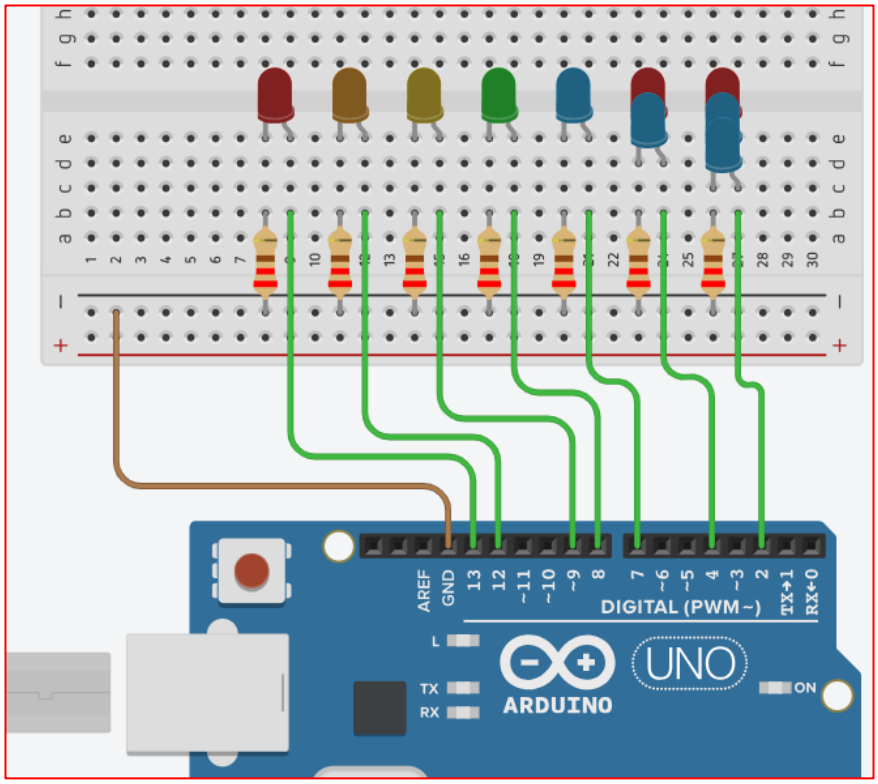
Remember to make sure that the pin numbers in the code match the pins in the Arduino! In the circuit above, the red LED (on the left) is connected to pin 13 and the yellow LED (on the right) is connected to pin 12.

If you are using a physical Arduino, once you've built your circuit, use the USB cable to connect your Arduino to your computer. If you need to change your electrical components, always remember to unplug your Arduino from your computer first! Then in Tinkercad, in the Code section, change "Blocks" to "Blocks + Text".



Making a rainbow

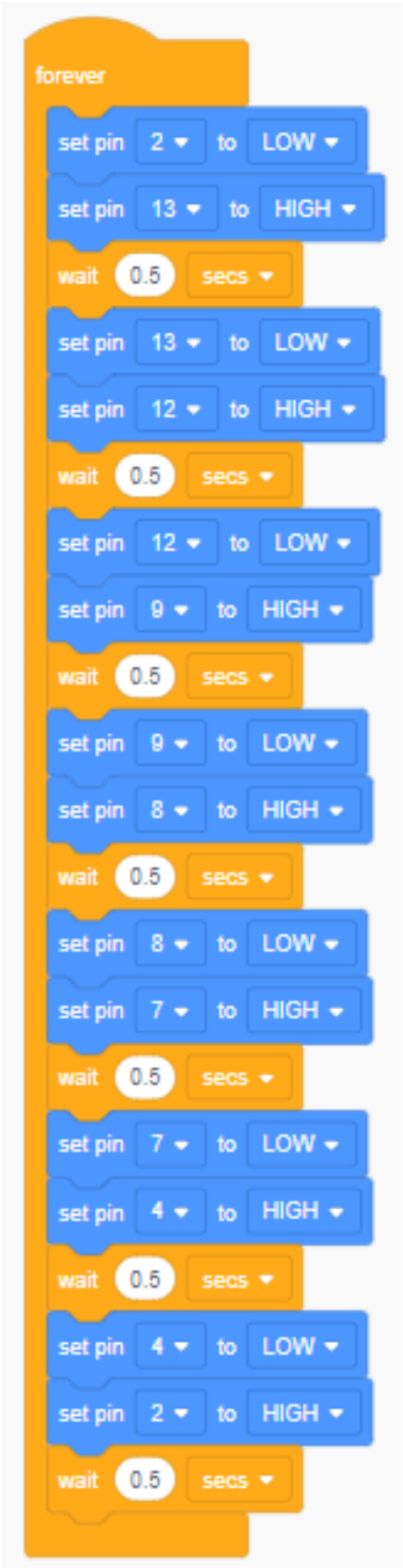
You can add to your first circuit to make a beautiful rainbow!



(Use resistors of 220 Ω or less with your LEDs.) Arduinos (and Tinkercad!) don't normally have LEDs of all the colours of the rainbow, so we have used multiple LEDs to approximate some of the colours.

Notice that you only need one Ground (GND) pin connected to the breadboard circuit to make either a single LED, or a whole rainbow of LEDs work from your Arduino.

Components needed:

- Arduino + USB Cable
- Breadboard
- 10 x LEDs (3 x red, 1 x orange, 1 x yellow, 1 x green, 3 x blue)
- 8 x wires
- 7 x 220 Ω resistors

To turn your LEDs on in a sequence, according to the colours of the rainbow, you can build on the first code we wrote, as shown below: