

Arduino circuits

Arduinos

- This week, we'll be using the Arduino to build and program some circuits

BRONZE Challenge:

- Step 1:
 - Build a circuit using
 - an Arduino
 - a breadboard
 - a resistor and
 - an LED
 - Connect the +ve on the breadboard to 5V on the Arduino
 - Have the LED always on when the simulation is running

BRONZE Challenge:

- Step 2:
 - Using the breadboard, connect another LED with resistor to pin 2 on the Arduino
 - In the program:
 - Delete the existing code in the forever loop
 - Add the code to make the new LED turn on and off every second (wait 500 ms)

SILVER Challenge:

- Step 1:
 - Add two more LEDs (and resistors) to your breadboard
 - Connect the LEDs to pins 4 and 7 on the Arduino so you can program them

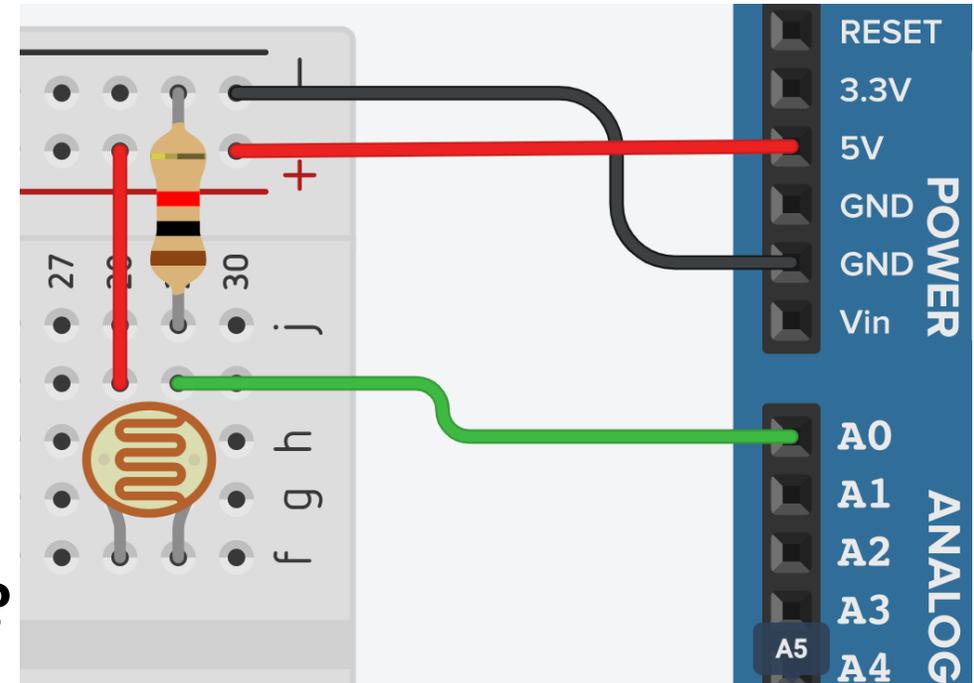
SILVER Challenge:

- Step 2:
 - In your program, create a **variable** called "myNum"
 - Inside your forever loop, set the variable to use the **Math** command to pick a random number between 0 and 3
 - Using the **Output** command, print the myNum variable to the serial monitor
 - Using the if-then-else blocks from the **Control** menu, turn on the number of LEDs to match the random number generated
 - Note, you will need to "nest" these in the else-blocks (or switch to text-only mode)
 - Remember to add a wait block to slow down the loop so you can see the LEDs changing

GOLD Challenge:

- In a new Circuit, step 1:
 - Add an LDR (photo resistor) and use a breadboard to connect it to an Arduino
 - Create a variable and set it to the analog reading from the LDR
 - Print out the values from the variable to the Serial monitor

What is the range of values generated by the LDR?



GOLD Challenge:

- Step 2:
 - Add an LED to your breadboard and connect it to your Arduino
 - Turn the LED on when the LDR reading is less than the middle of its range

Extension Challenge 1

- Create a new circuit that takes input from a temperature sensor
 - Measure the range of values for the temperature sensor
 - Add three LEDs so you have a blue, white and red LED
 - If the temp $< 0^{\circ}\text{C}$ turn on the Blue LED
 - else if the temp $< 35^{\circ}\text{C}$ turn on the White LED
 - else turn on the Red LED

Extension Challenge 2

- Modifying the circuit with the LDR
 - Change the LED to connect to a pin with a "~" in front of the number
 - Instead of simply turning the LED on / off, try setting the output to the pin to be a number between 0 and 255. Try different numbers to see what happens
 - 255 is equivalent to "HIGH", whilst 0 equates to "LOW". This is a different range of values to that from the LDR
 - Using the Math map function, try taking the LDR value and setting the brightness of the LED
 - Note, you will need to switch to Text-Only mode to set the correct range for the LDR