uOttawa and Carleton 2015

ONWiE — ONTARIO NETWORK OF WOMEN IN ENGINEERING

Setting up the Arduino to work with the Pi's

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01. Update your pi
Always make sure your Raspberry Pi is up to date.

>sudo apt-get update
>sudo rpi-update

02. Install Arduino IDE
Next you'll need to install Arduino to the Pi, thankfully it's in the repos for Raspbian so all you'll need to open is a terminal and type:

>sudo apt-get install arduino

Setting up the Arduino to work with the Pi's

03. Using Ardunio
Now everything is ready! You can open up the Arduino IDE. It can be found under the Electronics section of the programs menu. It will create a new sketchbook folder in the home menu where all your projects will live.

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Activity 1: The Hello World of Arduinos -Blink

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Things to remember in this tutorial:

Text in green is code

//text after the two slashes are comments, they are to explain the
//code

Please don't be shy! Ask a volunteer if you are unsure at any point!

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Activity 1: The Hello World of Arduinos -Blink

Step 1: Make sure you have 1 Arduino, 1 USB adapter and 1 LED

Step 2: To set up the circuit, connect the long leg of the LED to Arduino pin 13 and the short leg of the LED to the Arduino GND, shown in the schematic below.
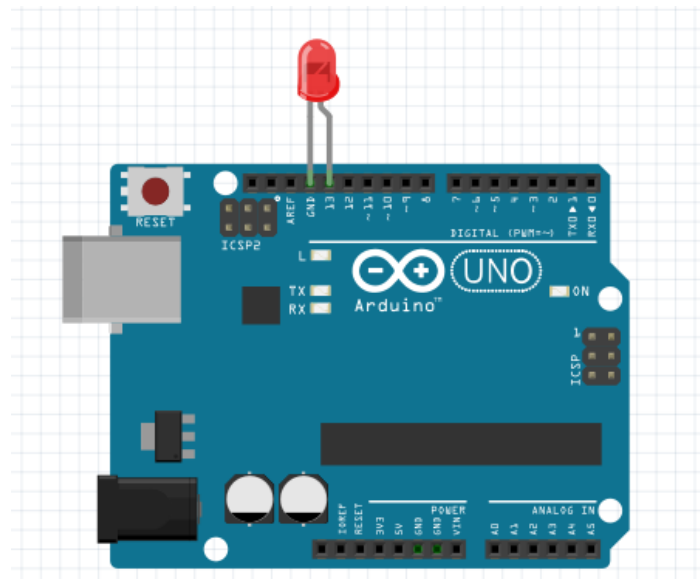
Activity 1: The Hello World of Arduinos -Blink

Step 3: Plug in the Arduino to the Computer using the USB adapter, you should see the LED turn on. (you might have to unplug a keyboard! Wait until the end if you have to!)

Time to get the LED to blink!

Step 4: Open up the Arduino Program

Activity 1: The Hello World of Arduinos -Blink

Step 5: Type in the following code, this is the Blink program.

```
// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin 13 as an output.
  pinMode(13, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(13, HIGH);   // turn the LED on (HIGH is the voltage
level)
  delay(1000);              // wait for a second
  digitalWrite(13, LOW);    // turn the LED off by making the voltage
LOW
  delay(1000);              // wait for a second
}
```

Activity 1: The Hello World of Arduinos -Blink

Step 6: Verify the sketch (click the checkmark).

Step 7: Once you get the ok from the Ardunio IDE (your sketch is well written, there are no errors), you can upload the Sketch onto the Arduino using the Upload button (click the right arrow)

Step 8: Debug time! Is it working? Is the light blinking? Did the Sketch properly upload onto the Ardunio?

Common problems: The board isn't selected properly, the serial port is wrong (COM8/COM9). Make sure the LED is placed in the right direction. (Shorter leg in the GND). Is it properly plugged in? Is everything written properly?

Activity 2: Spin off of Blink

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Activity 2: Spin off of Blink

Challenge 1: Change the amount of time the LED is off to 1 second.

Challenge 2: Change the pin to which the LED is connected from pin 13 to pin 12. Note: You must change both the circuit AND the Ardunio Sketch.

Challenge 3: Using the provided breadboard, attach 5 LEDs to pins 2 through 6, with provided 220k resistors and wires. Modify the code to turn on each one in order and then turn them off in order.

Challenge 4: Create a light show, add extra LEDs if desired and create different light patterns with the Arduino.

Activity 2: Spin off of Blink

Solution to Challenge 1: Change the first delay(1000) from 1000 to delay(500).

**Solution to Challenge 2:** Circuit: make sure the LED is in the proper pins. One leg in GND(shorter) one leg in pin 12. Software: Make sure in setup, you've changed: pinMode(12, OUTPUT)

Solution to Challenge 3: Using the provided breadboard, attach 5 LEDs to pins 2 through 6, with provided 220k resistors and wires. (See picture on next page). Code to change: In setup(), make sure to add in all pinMode(x, OUTPUT), where x = 2-6. in loop() you'll have all the code with digitalWrite(x, HIGH) or digitalWrite(x, LOW).

Activity 2: Spin off of Blink

Solution to Challenge 3: Make sure that there is a wire that goes from the Ardunio from GND to the last pins on the breadboard. This is how you complete the circuit. Ask a volunteer if you are unsure at any point!
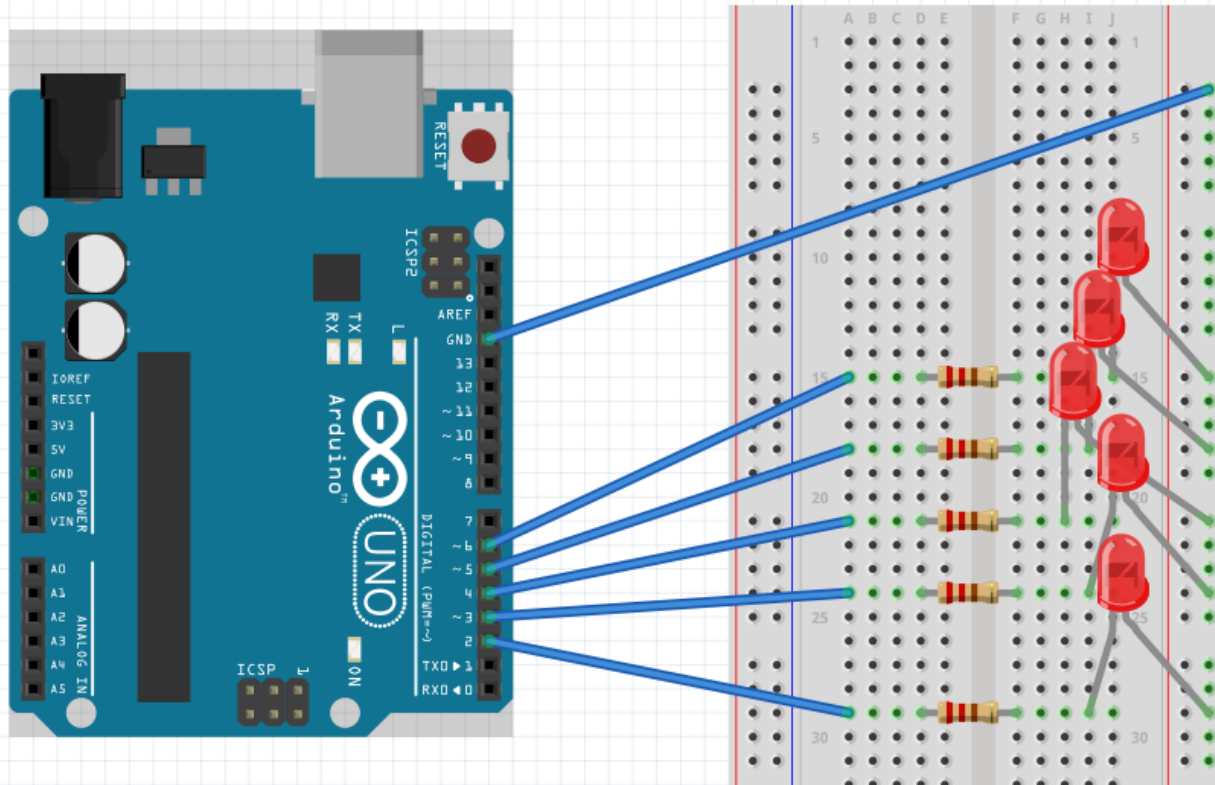
Activity 2: Spin off of Blink

Challenge 4: Create a light show, add extra LEDs if desired and create different light patterns with the Arduino.

This can be done by altering the code for Challenge 3 and making changes to the **timing** of the digitalWrite() HIGH and LOWS, as well as the **delays**.

There is no correct or single answer for this challenge.

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Thank You!

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