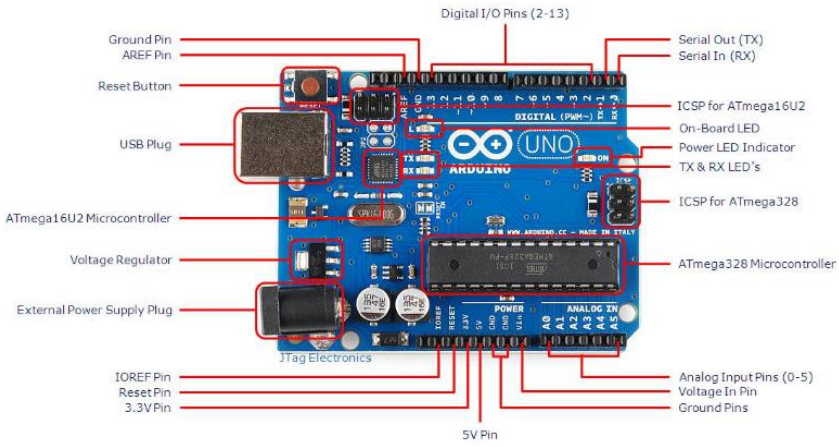
Instrumentation & Control

In this lab we will introduce the idea of using a microcontroller as a tool for interfacing with sensor and carrying out conditioning on the data. The decision on the state of the system is based on the digital or analog input to the microcontroller device and based on the codes that we can write and compile into the microcontroller. We will use Arduino Uno R3 as an 8-bit and simple microcontroller. The Arduino kits can be used both in the lab and at home to perform experiments and build projects. The Arduino kit also includes a breadboard for fast and easy circuit assembly.



LAB

Create a digital lab book document detail each task you are doing. Submit this via an email to the instructor at the end of the lab.

Task 1 – What is Arduino

Read the introduction to Arduino from their official website. This website is a great resource for all things related to Arduino.

https://www.arduino.cc/en/guide/introduction

Task 2 – Arduino development environment

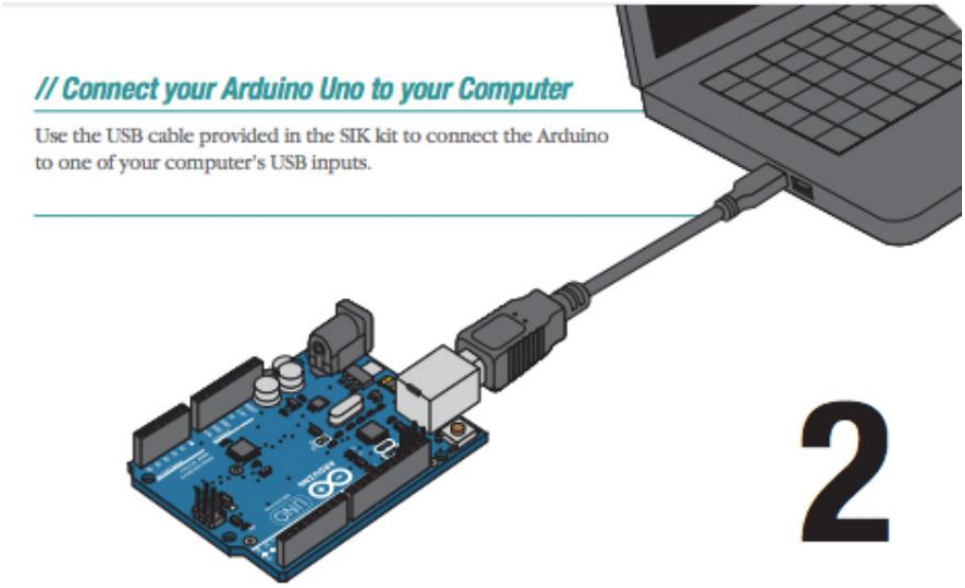
Installing the Integrated development environment (IDE) if is not already installed locally.

Go to the website and download the IDE.

Follow the https://www.arduino.cc/en/Guide

Task 3 – Plugin the board

https://www.tutorialspoint.com/arduino/arduino_installation.htm



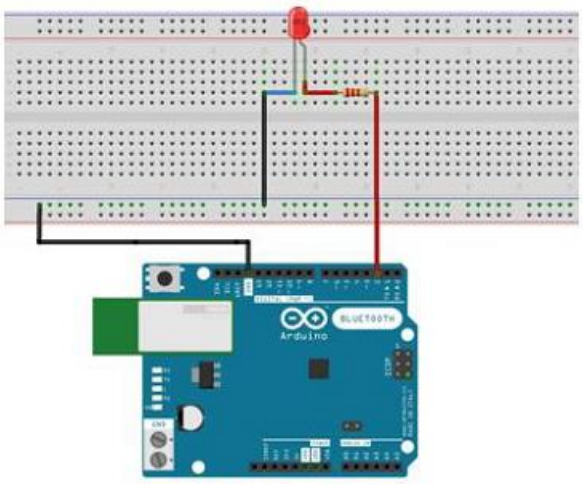
Task 4 – Build your first program

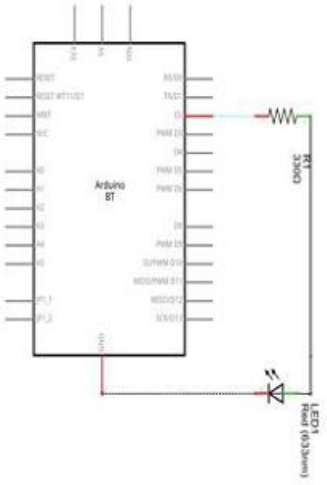
Build run the following example program and you will have a blinking LED on your board.

Task 5

After you have your board setup you are ready for you first embedded program that will light up your own LED.

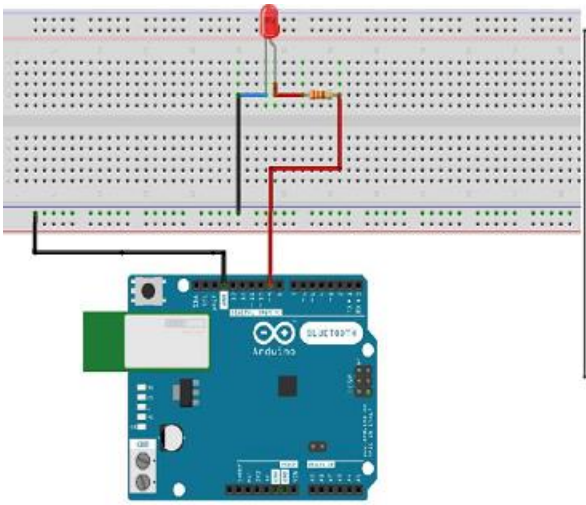
https://www.tutorialspoint.com/arduino/arduino_blinking_led.htm

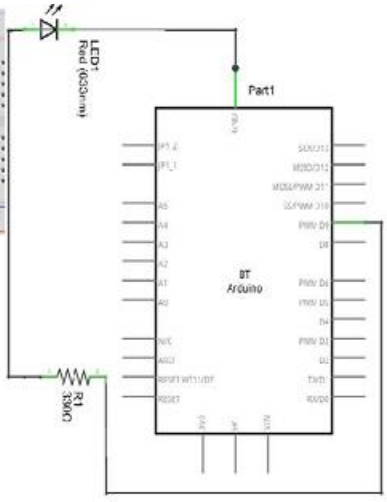




Task 6

https://www.tutorialspoint.com/arduino/arduino_fading_led.htm





Task 7

Expand on task 5,6 and two extra LEDs.

1. Show that you can

https://www.tutorialspoint.com/arduino/arduino_led_bar_graph.htm

Task 8

Add a pot to the board

2. Show that you can do

https://www.tutorialspoint.com/arduino/arduino_reading_analog_voltage.htm