Arduino Use and Applications

An introduction to the Arduino Platform

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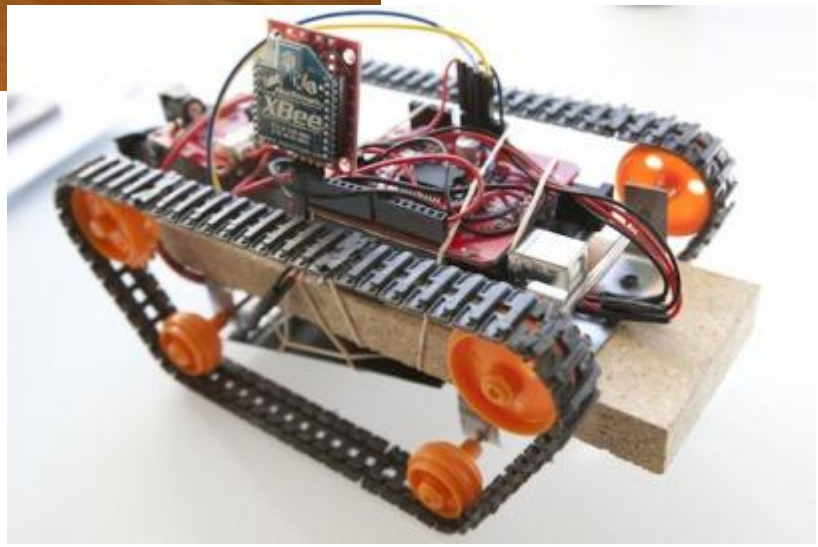
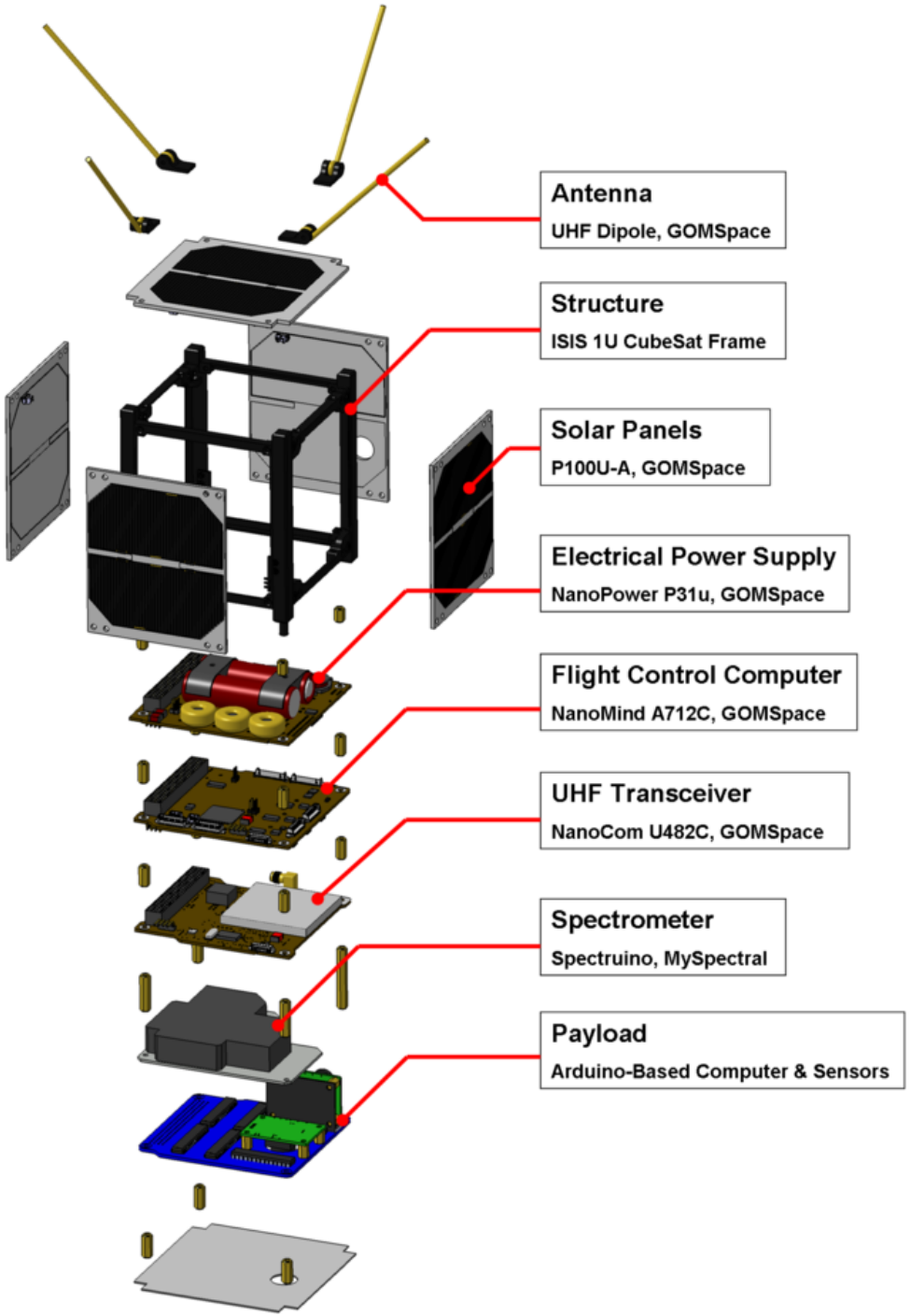
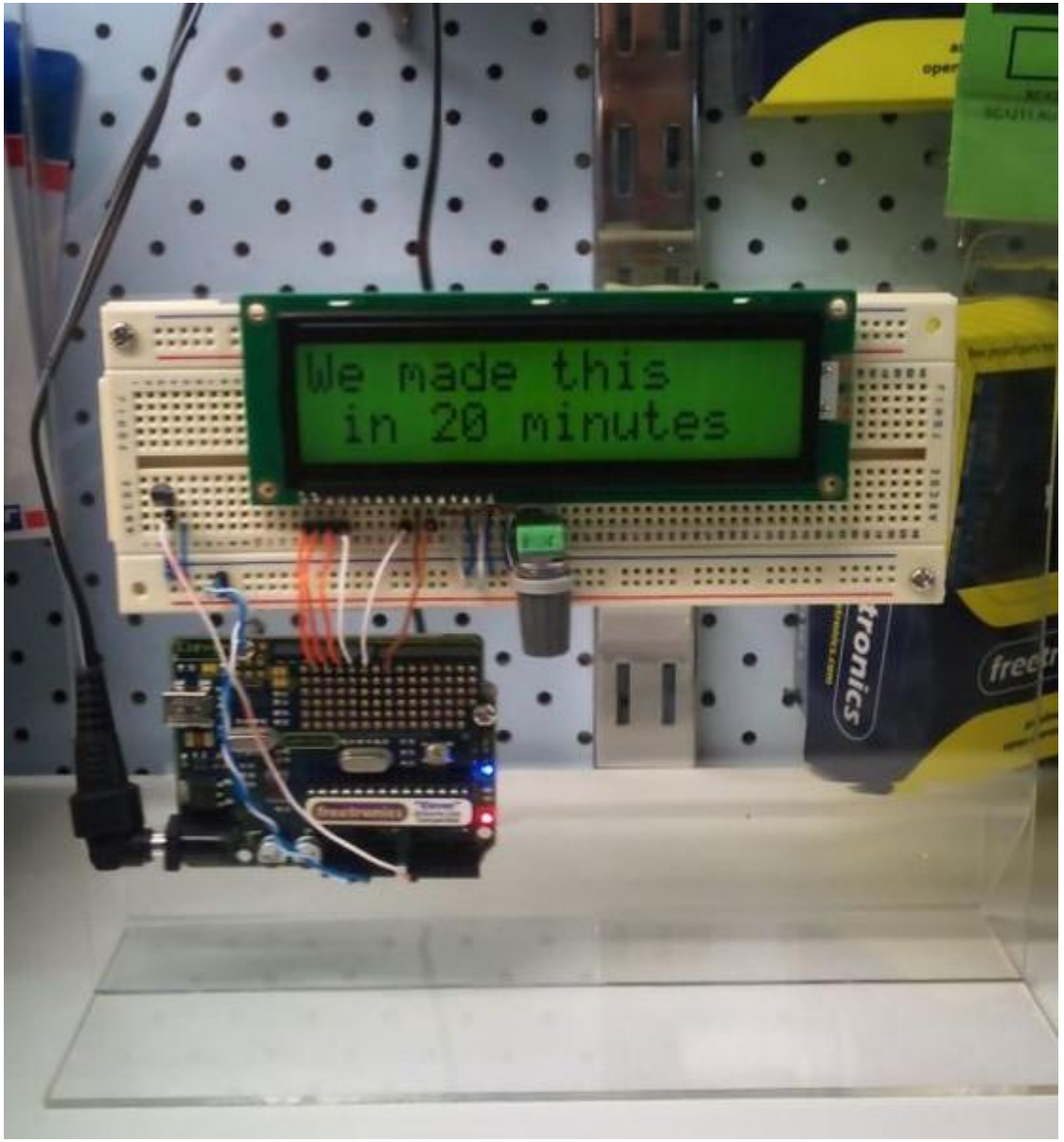
PREDATOR


XBee


Antenna
UHF Dipole, GOMSpace
Structure
ISIS 1U CubeSat Frame
Solar Panels
P100U-A, GOMSpace
Electrical Power Supply
NanoPower P31u, GOMSpace
Flight Control Computer
NanoMind A712C, GOMSpace
UHF Transceiver
NanoCom U482C, GOMSpace
Spectrometer
Spectruino, MySpectral
Payload
Arduino-Based Computer & Sensors


We made this
in 20 minutes

Arduino Use and Application

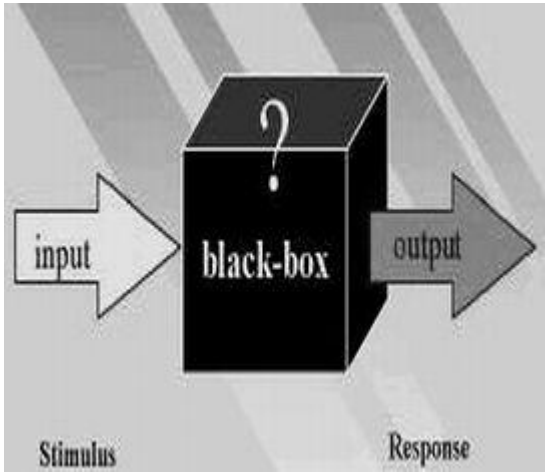
- Arduino hardware and software introduction
  - Basic hardware and electrical terms
  - Connecting the Arduino
  - Programming the Arduino
- Arduino shields and interaction
  - 'Talking' to the arduino
  - What is a shield and how to use it
  - 'reading' a sensor
  - Autonomous operation
  - Arduino wired and wireless networking

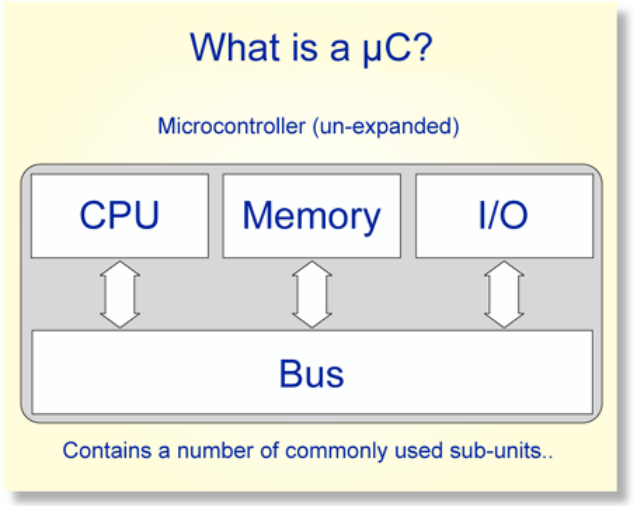
Arduino hardware and software introduction

What is an 'Arduino'

What does it do?

What do you do with it?

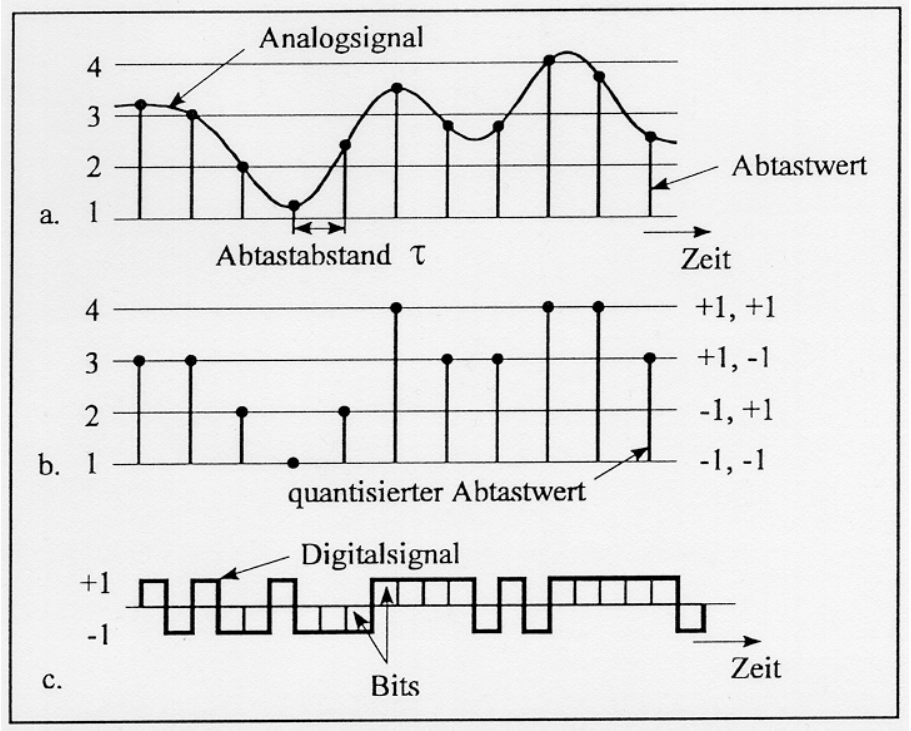




Arduino hardware and software introduction

Basic hardware and electrical terms

- what are volts?
- What is 'zero'
- What is the difference between analog and digital
- What is a 'port'

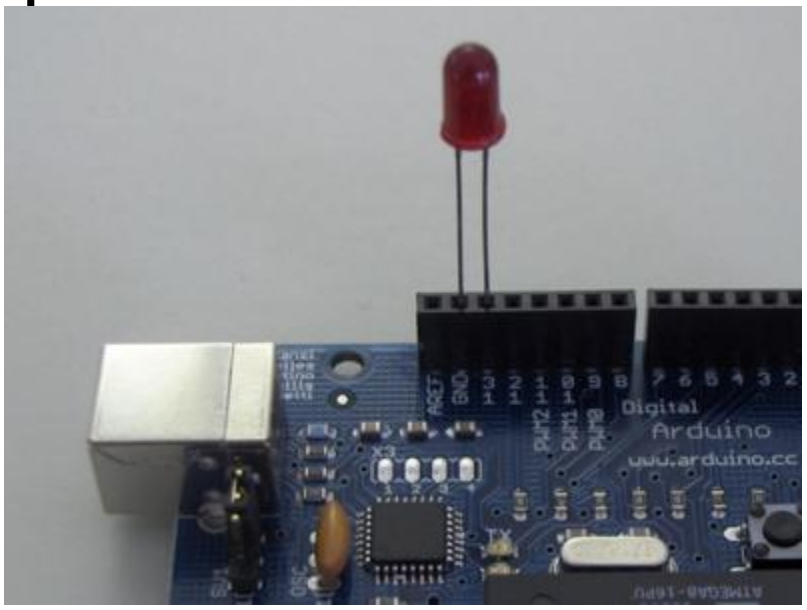


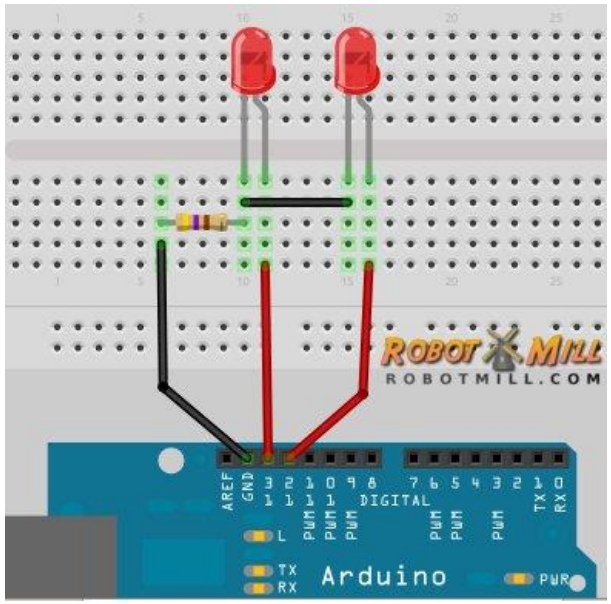
Arduino hardware and software introduction

Connecting the Arduino

- How to connect the programming cable

- How to connect to individual input and output pins





Arduino hardware and software introduction

Programming the Arduino

- Where do you get code?
- What 'language' is the code in?
- What happens when you hit 'go'

```
void setup() {
  // put your setup code here, to run once:

}

void loop() {
  // put your main code here, to run repeatedly:

}
```

```
void setup() {
  // initialize serial communication at 9600 bits per second:
  Serial.begin(9600);
}

// the loop routine runs over and over again forever:
void loop() {
  // read the input on analog pin 0:
  int sensorValue = analogRead(A0);
  // Convert the analog reading (which goes from 0 - 1023) to a voltage (0 - 5V):
  float voltage = sensorValue * (5.0 / 1023.0);
  // print out the value you read:
  Serial.println(voltage);
}
```

Session 1 Interactive period

Interactive Task!

Connect to an Arduino and blink a light

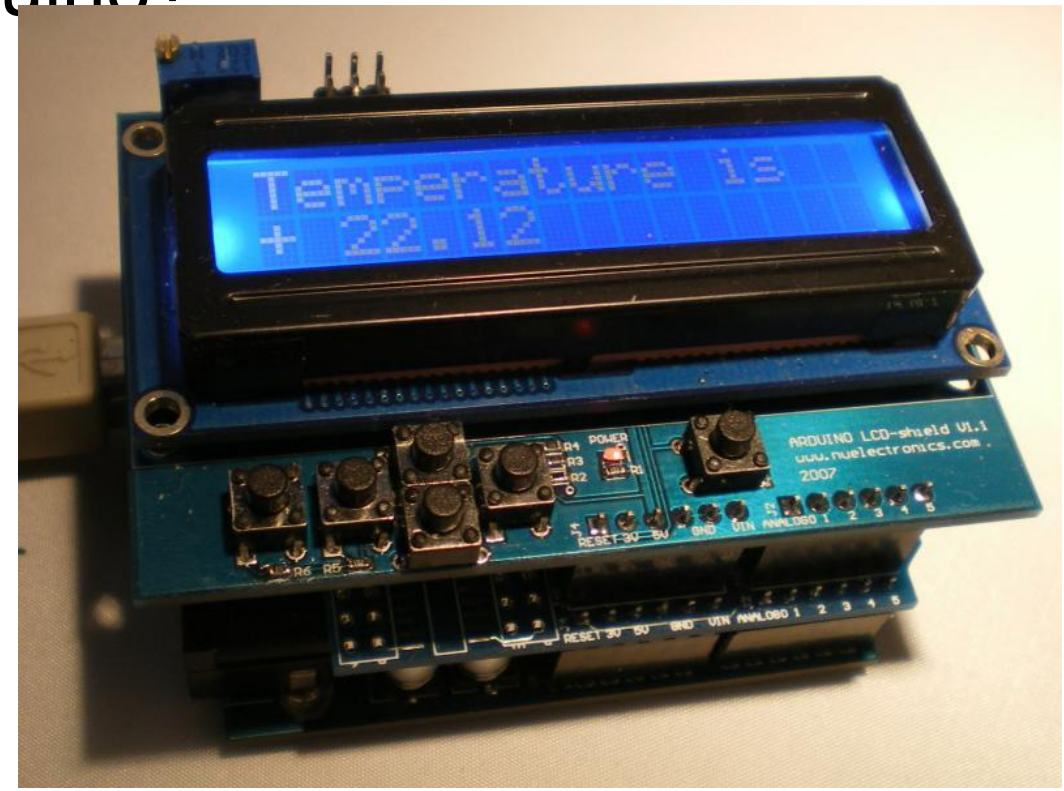
Extra Credit!

Connect a button (or pair of wires) to the arduino and use those to control the light!

Arduino shields and interaction

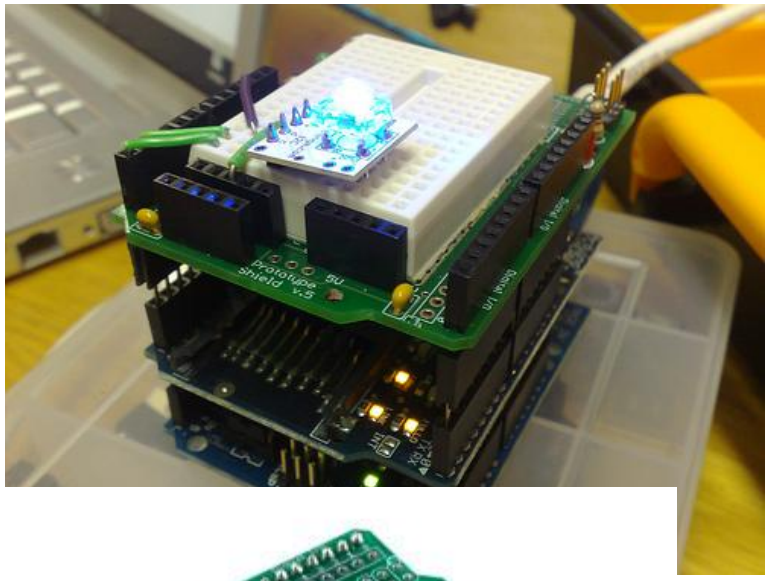
'Talking' to the arduino

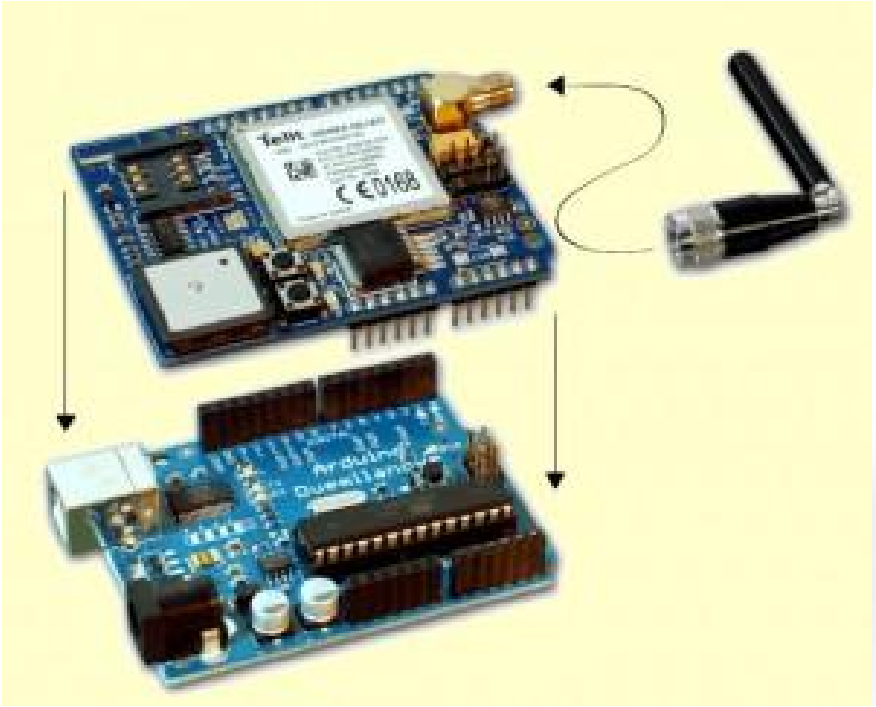
- How do other things communicate with a basic arduino?



Arduino shields and interaction

- What is a shield and how do you use it
- What kinds of shields are available?





Session 2 Interactive Period

Main Task:

Create or modify the Simple Serial code to customize controls, etc.!

Extra Credit!

'Read' the value from a sensor or shield and display the data in the terminal window

Advanced Arduino use

- Autonomous operation
- Arduino wired and wireless networking
- Low power operation
- Equipment Control