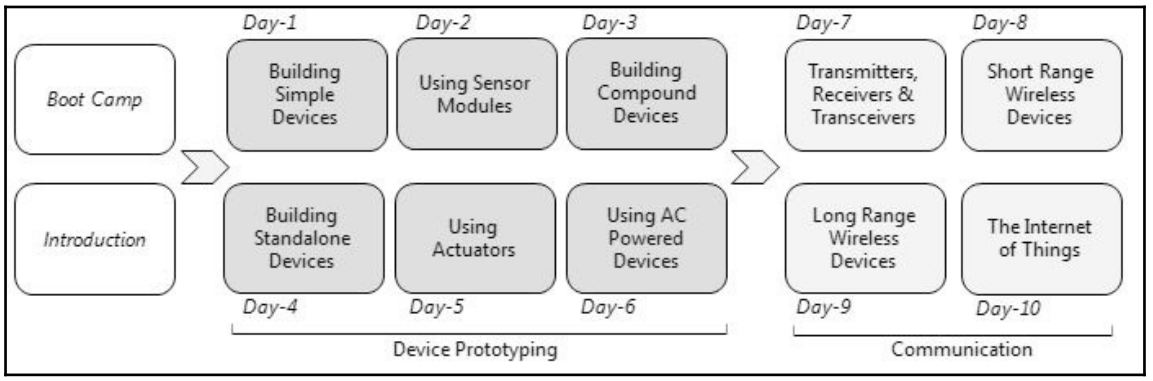
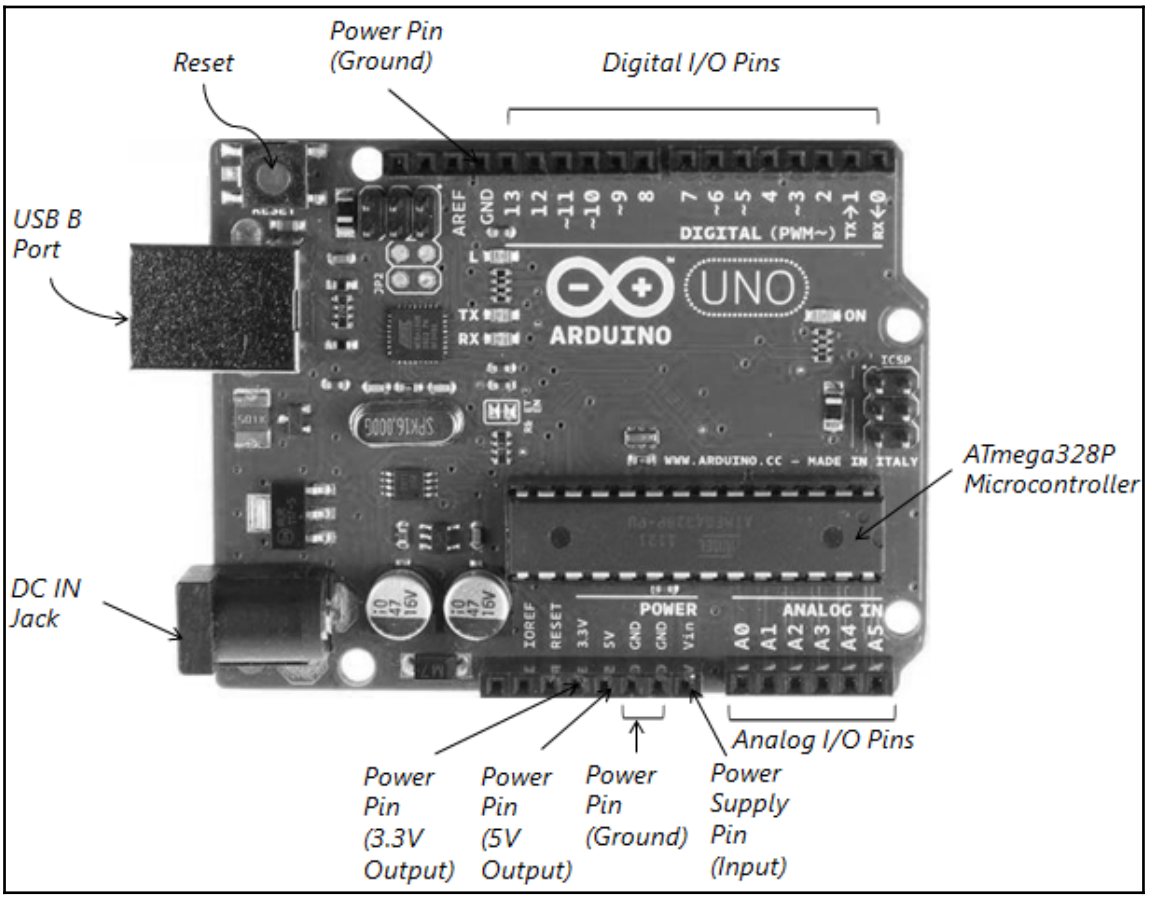
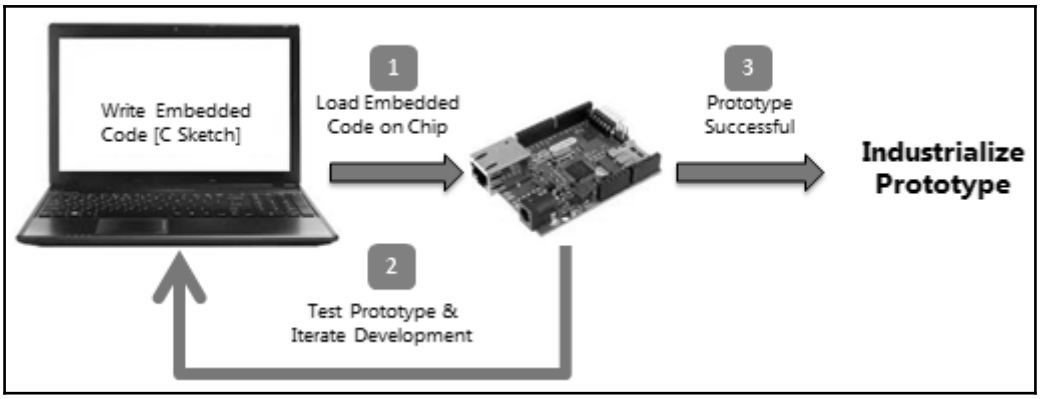
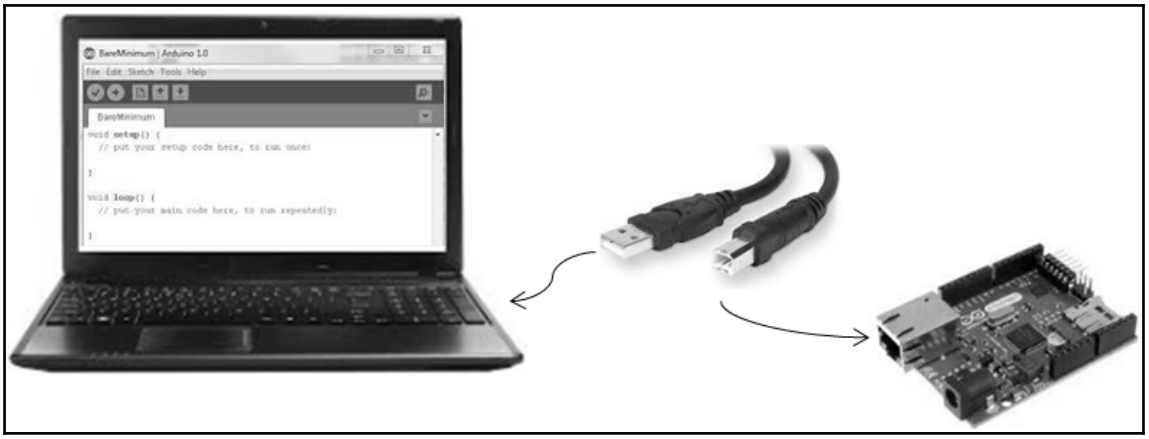
Chapter 1: Boot Camp

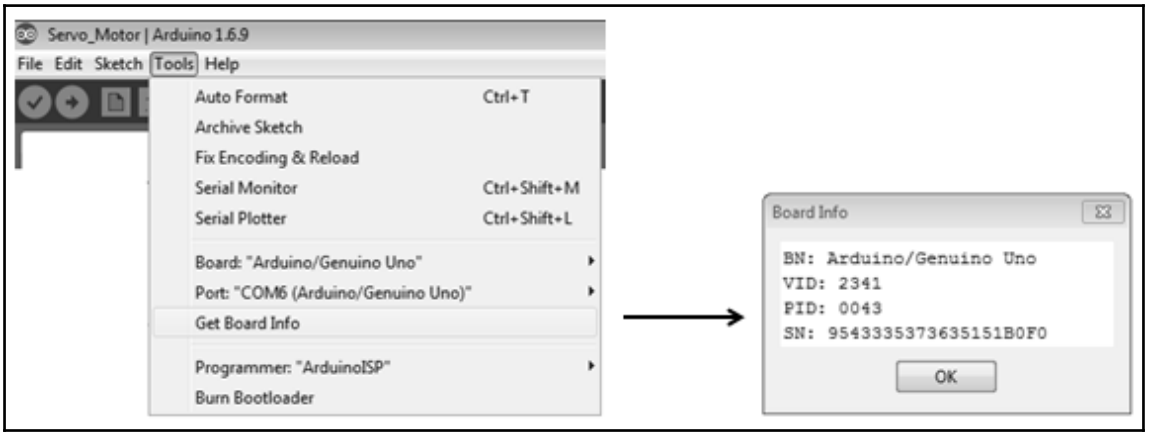


Chapter 2: The Arduino Platform




Write Embedded Code [C Sketch]
1
Load Embedded Code on Chip
3
Prototype Successful
Industrialize Prototype
2
Test Prototype & Iterate Development




Servo_Motor | Arduino 1.6.9
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
Board: "Arduino/Genuino Uno"
Port: "COM6 (Arduino/Genuino Uno)"
Get Board Info
Programmer: "ArduinoISP"
Burn Bootloader
Board Info
BN: Arduino/Genuino Uno
VID: 2341
PID: 0043
SN: 954333537363515 1B0F0
OK

LiquidLevel_Contactless_Ultrasonic | Arduino 1.6.9

File Edit Sketch Tools Help

LiquidLevel_Contactless_Ultrasonic §

```
int trig = 12;
int echo = 11;
```

Step-1: Define variables

```
void setup()
{
   Serial.begin(9600);
   pinMode(trig, OUTPUT);
   pinMode(echo, INPUT);
}
```

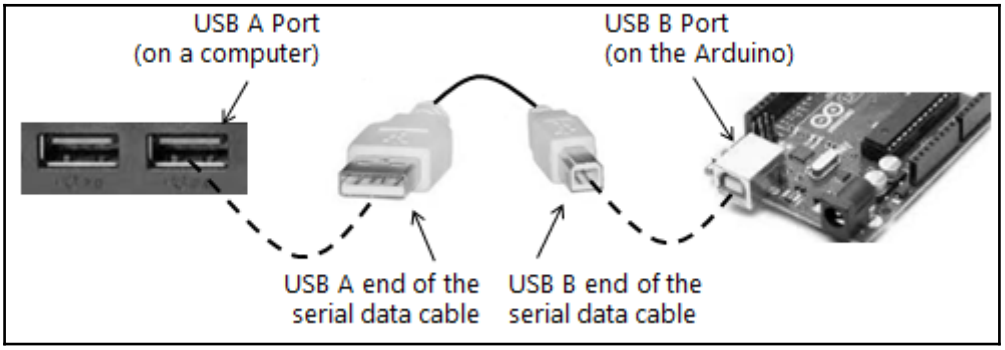
Step-2: Initialize parameters & I/O
The "setup()" function runs only once upon powering up the Arduino board.

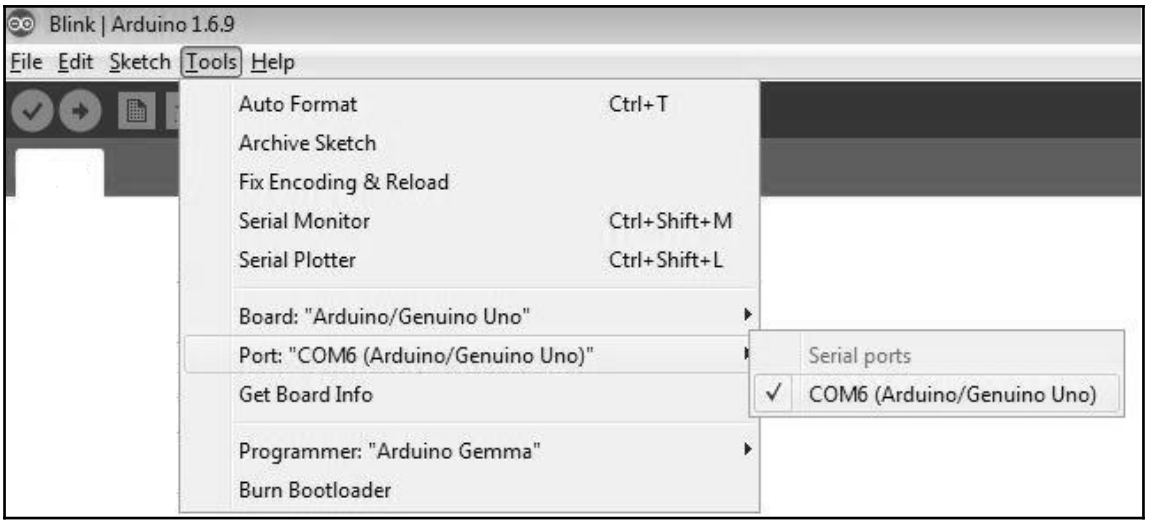
```
void loop()
{
   long t = 0, h = 0, hp = 0;

   //transmit signal
   digitalWrite(trig, LOW);
   delayMicroseconds(2);
   digitalWrite(trig, HIGH);
   delayMicroseconds(10);
   digitalWrite(trig, LOW);

   //wait until echo is received
   t = pulseIn(echo, HIGH);

   //now find height
   h = (duration/2) / 29.1;
}
```

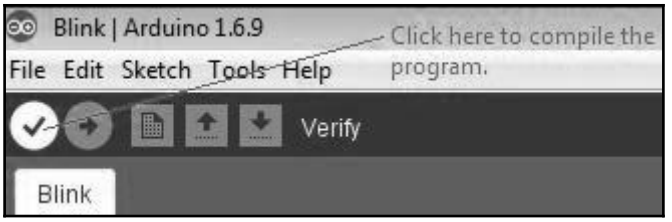
Step-3: The main program
The "loop()" function keeps running infinitely.

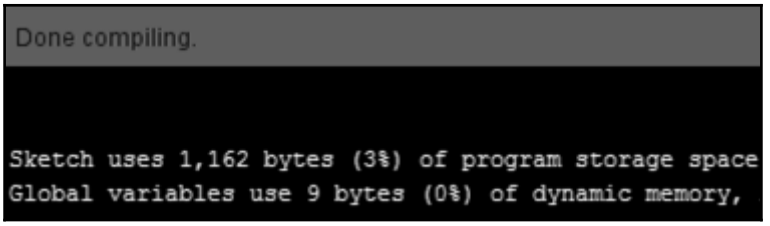
27

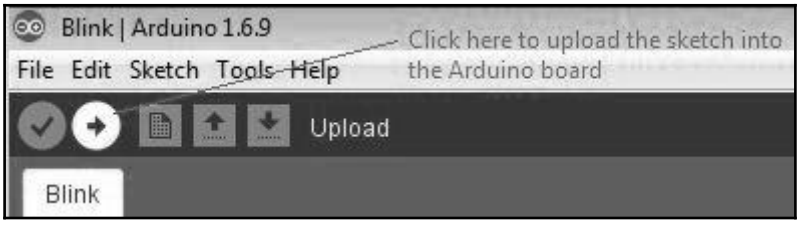
Arduino/Genuino Uno on COM6



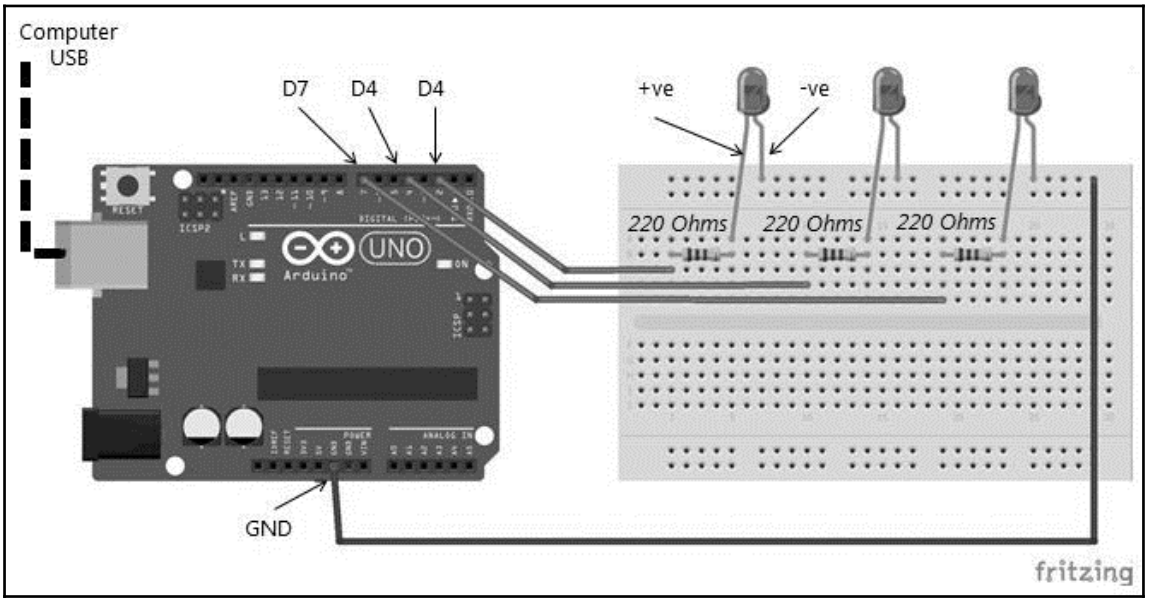

Blink | Arduino 1.6.9
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
Board: "Arduino/Genuino Uno"
Port: "COM6 (Arduino/Genuino Uno)"
Get Board Info
Programmer: "Arduino Gemma"
Burn Bootloader
Serial ports
COM6 (Arduino/Genuino Uno)

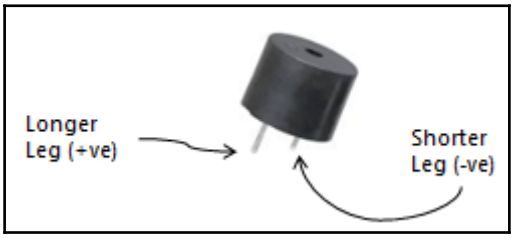

Blink | Arduino 1.6.9
File Edit Sketch Tools Help
Click here to compile the program.
Verify
Blink

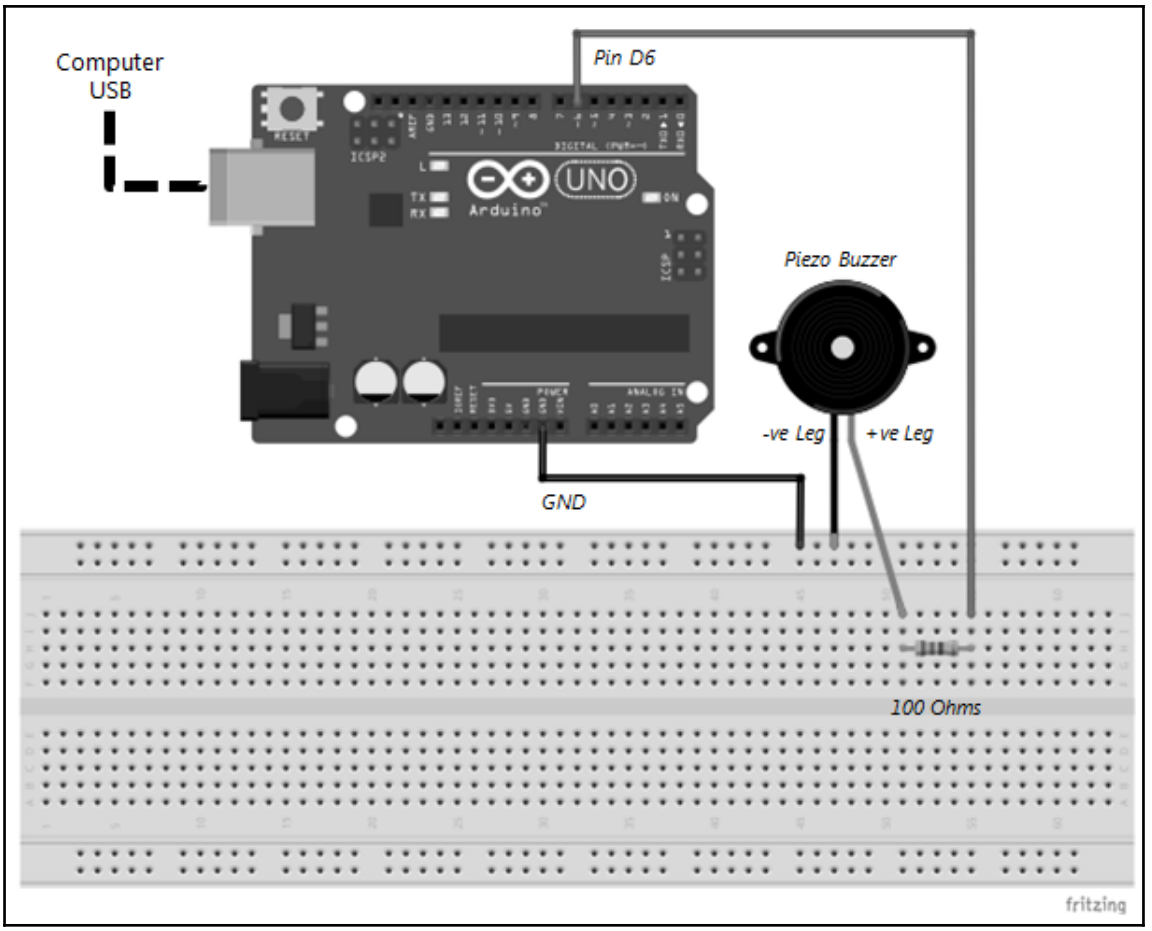

Done compiling.
Sketch uses 1,162 bytes (3%) of program storage space
Global variables use 9 bytes (0%) of dynamic memory,

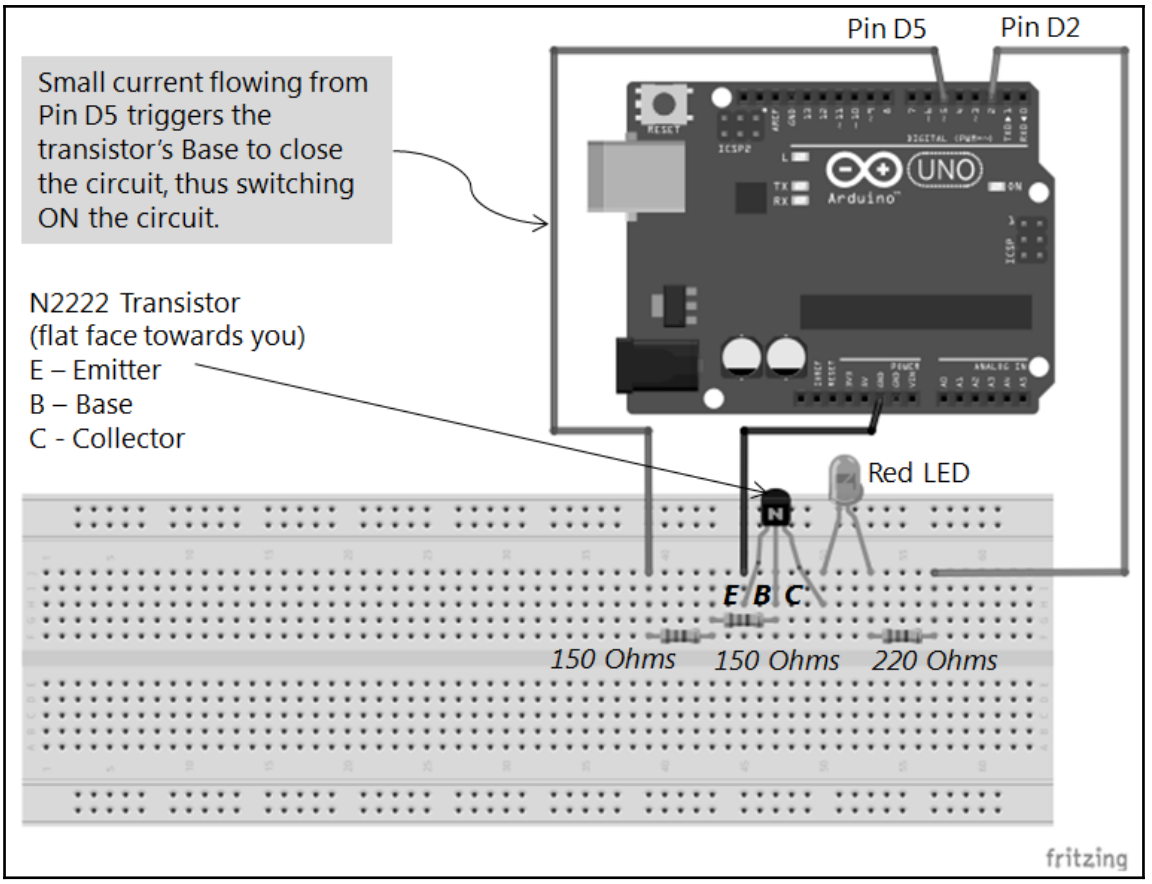

Blink | Arduino 1.6.9
File Edit Sketch Tools Help
Click here to upload the sketch into the Arduino board
Upload
Blink

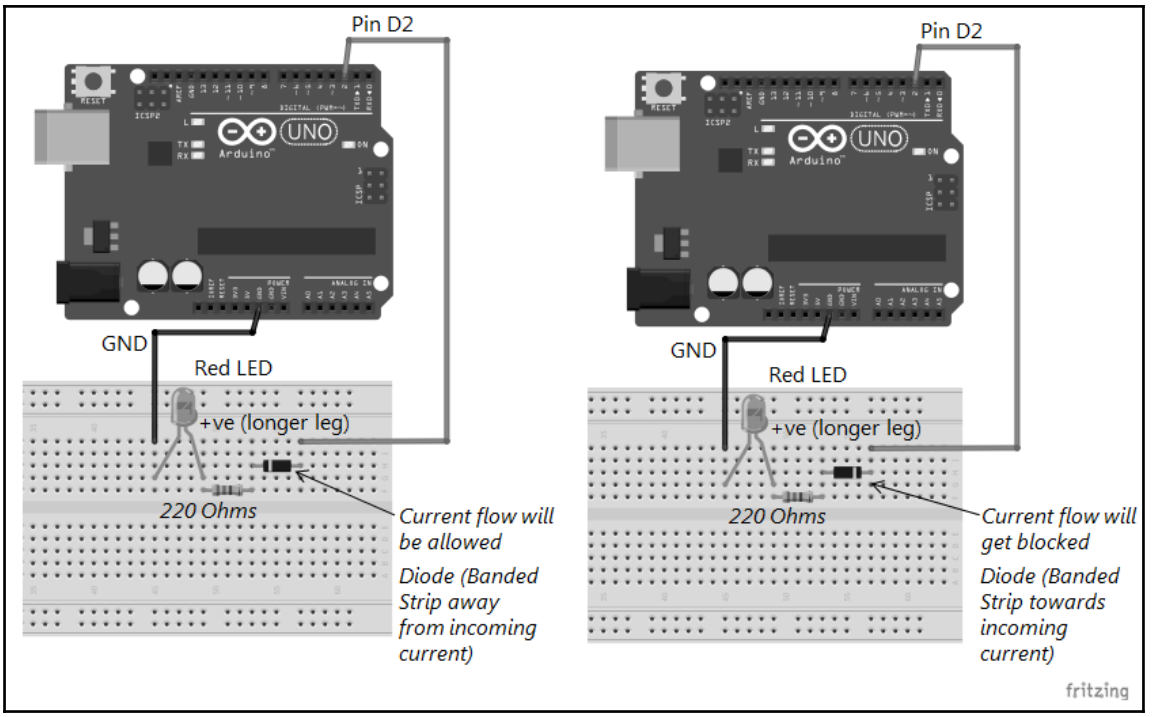
Chapter 3: Day 1 - Building a Simple Prototype

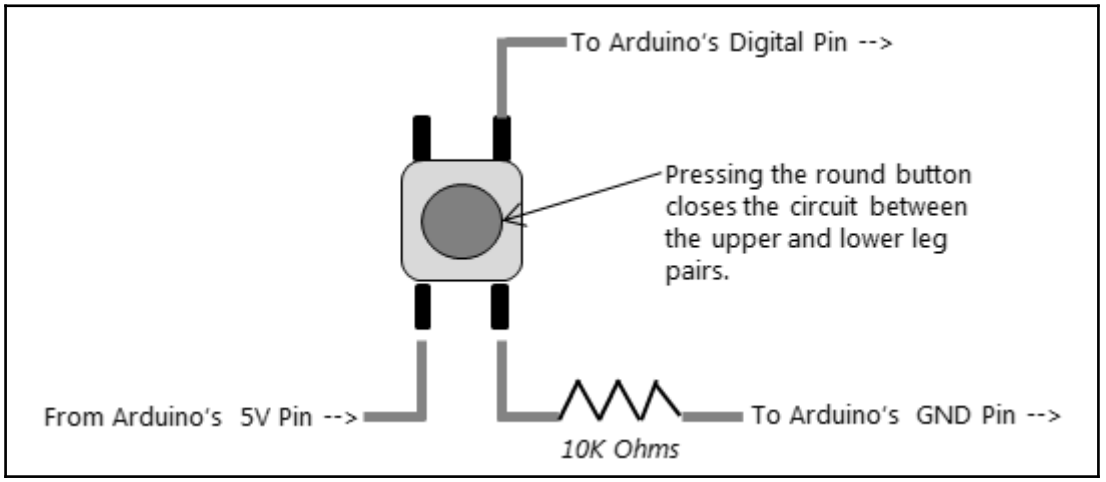


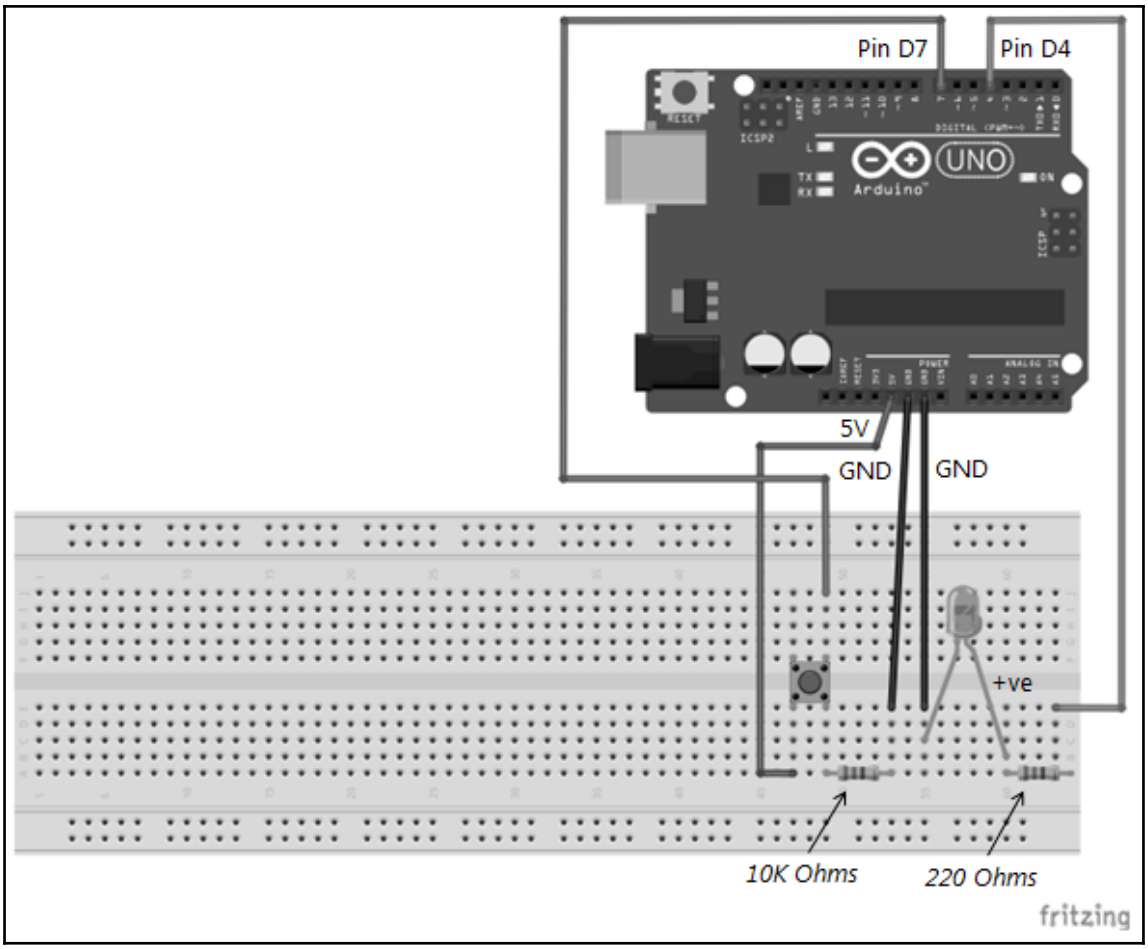



Computer
USB
Pin D6
Piezo Buzzer
-ve Leg
+ve Leg
GND
100 Ohms
fritzing

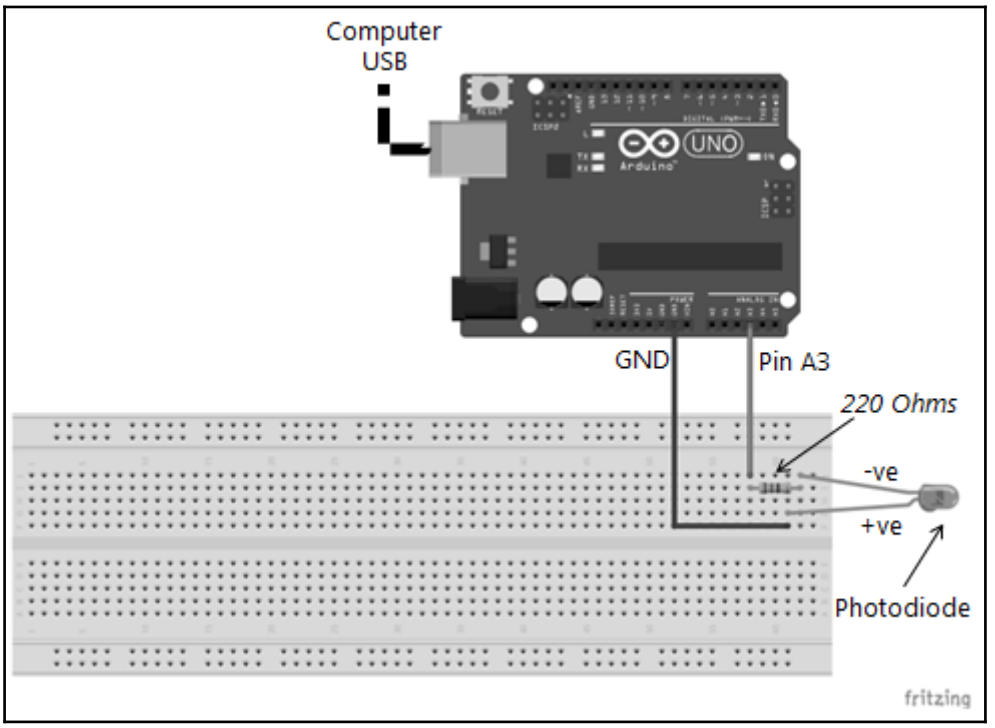

Pin D5
Pin D2
Small current flowing from Pin D5 triggers the transistor's Base to close the circuit, thus switching ON the circuit.
N2222 Transistor
(flat face towards you)
E – Emitter
B – Base
C - Collector
Red LED
E B C
150 Ohms
150 Ohms
220 Ohms
fritzing

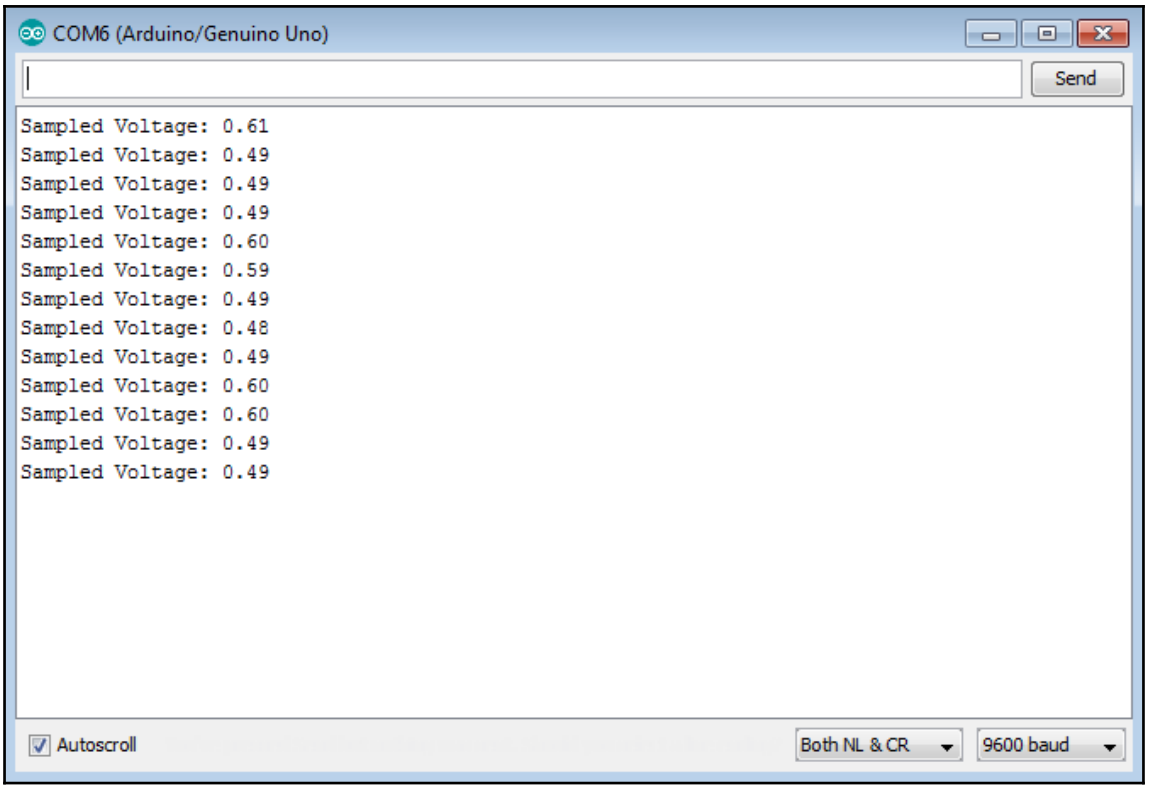

Pin D2
GND
Red LED
+ve (longer leg)
220 Ohms
Current flow will be allowed
Diode (Banded Strip away from incoming current)
Pin D2
GND
Red LED
+ve (longer leg)
220 Ohms
Current flow will get blocked
Diode (Banded Strip towards incoming current)
fritzing

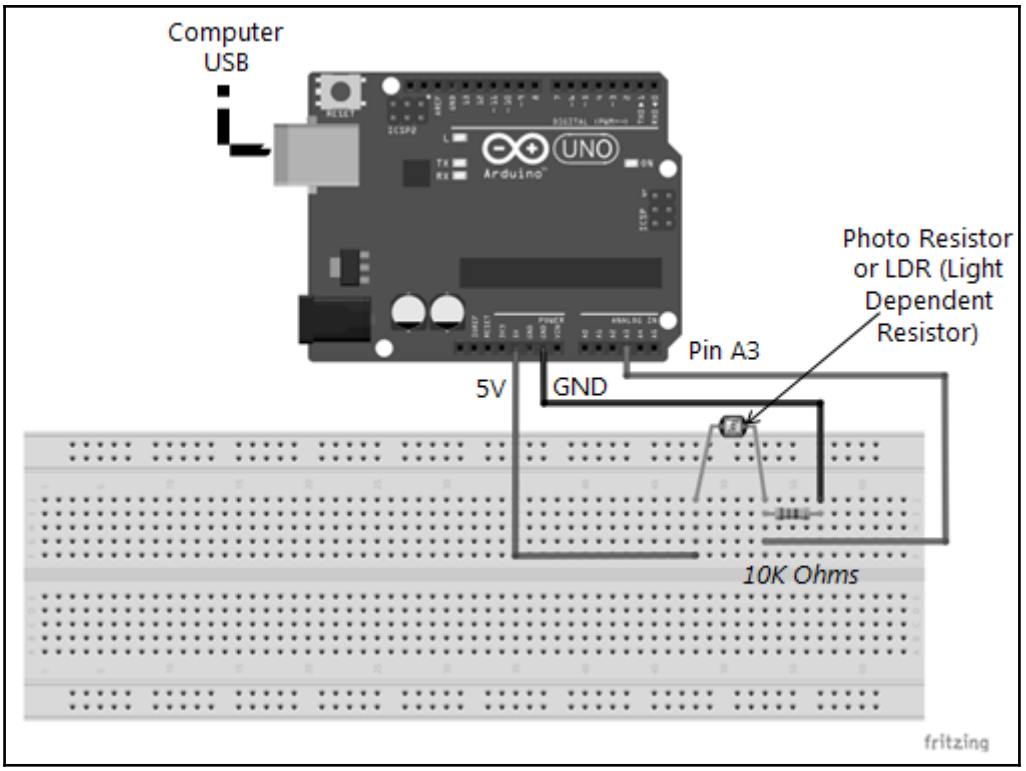

To Arduino's Digital Pin -->
Pressing the round button closes the circuit between the upper and lower leg pairs.
From Arduino's 5V Pin -->
10K Ohms
To Arduino's GND Pin -->

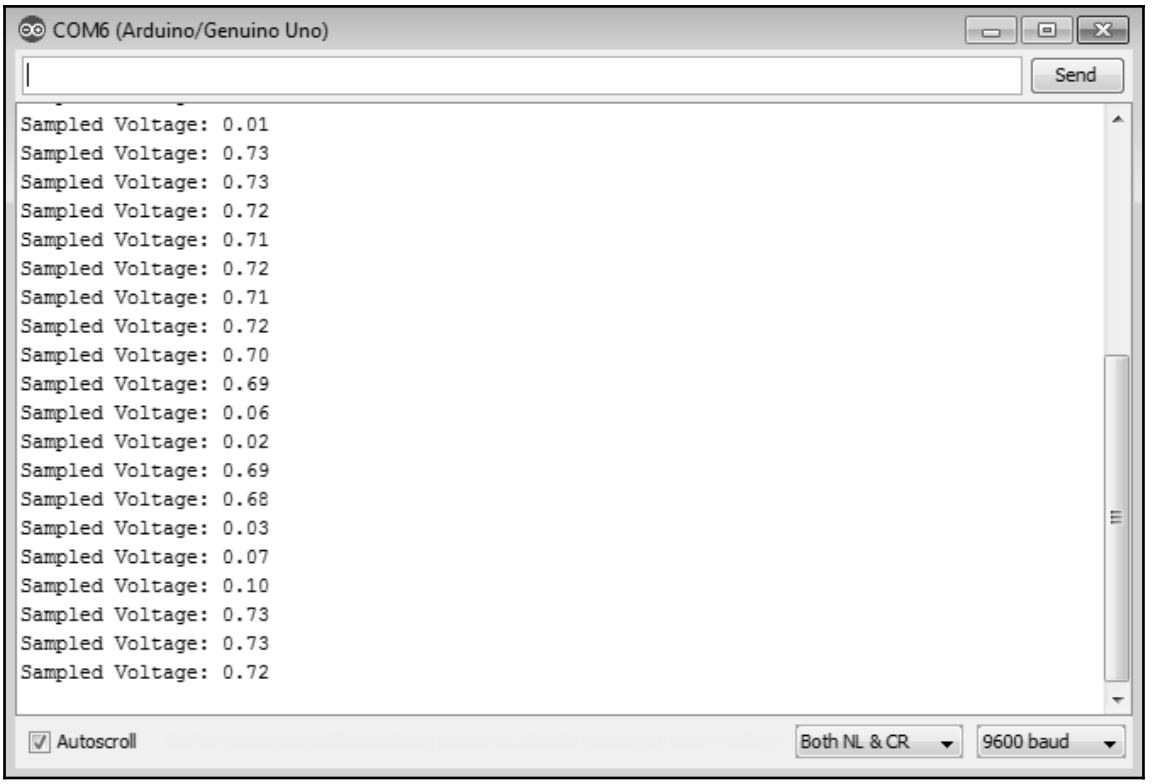

Pin D7
Pin D4
5V
GND
GND
+ve
10K Ohms
220 Ohms
fritzing

Chapter 4: Day 2 - Interfacing with Sensors




COM6 (Arduino/Genuino Uno)
Send
Sampled Voltage: 0.61
Sampled Voltage: 0.49
Sampled Voltage: 0.49
Sampled Voltage: 0.49
Sampled Voltage: 0.60
Sampled Voltage: 0.59
Sampled Voltage: 0.49
Sampled Voltage: 0.48
Sampled Voltage: 0.49
Sampled Voltage: 0.60
Sampled Voltage: 0.60
Sampled Voltage: 0.49
Sampled Voltage: 0.49
Autoscroll
Both NL & CR
9600 baud


Computer
USB
Photo Resistor
or LDR (Light
Dependent
Resistor)
Pin A3
5V
GND
10K Ohms
fritzing


COM6 (Arduino/Genuino Uno)
Send
Sampled Voltage: 0.01
Sampled Voltage: 0.73
Sampled Voltage: 0.73
Sampled Voltage: 0.72
Sampled Voltage: 0.71
Sampled Voltage: 0.72
Sampled Voltage: 0.71
Sampled Voltage: 0.72
Sampled Voltage: 0.70
Sampled Voltage: 0.69
Sampled Voltage: 0.06
Sampled Voltage: 0.02
Sampled Voltage: 0.69
Sampled Voltage: 0.68
Sampled Voltage: 0.03
Sampled Voltage: 0.07
Sampled Voltage: 0.10
Sampled Voltage: 0.73
Sampled Voltage: 0.73
Sampled Voltage: 0.72
Autoscroll
Both NL & CR
9600 baud

dht11.pdf - Adobe Reader

File Edit View Window Help

5 / 9 100% Comment

3. Typical Application (Figure 1)

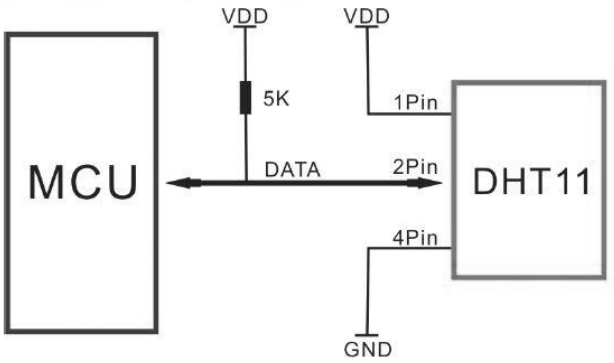
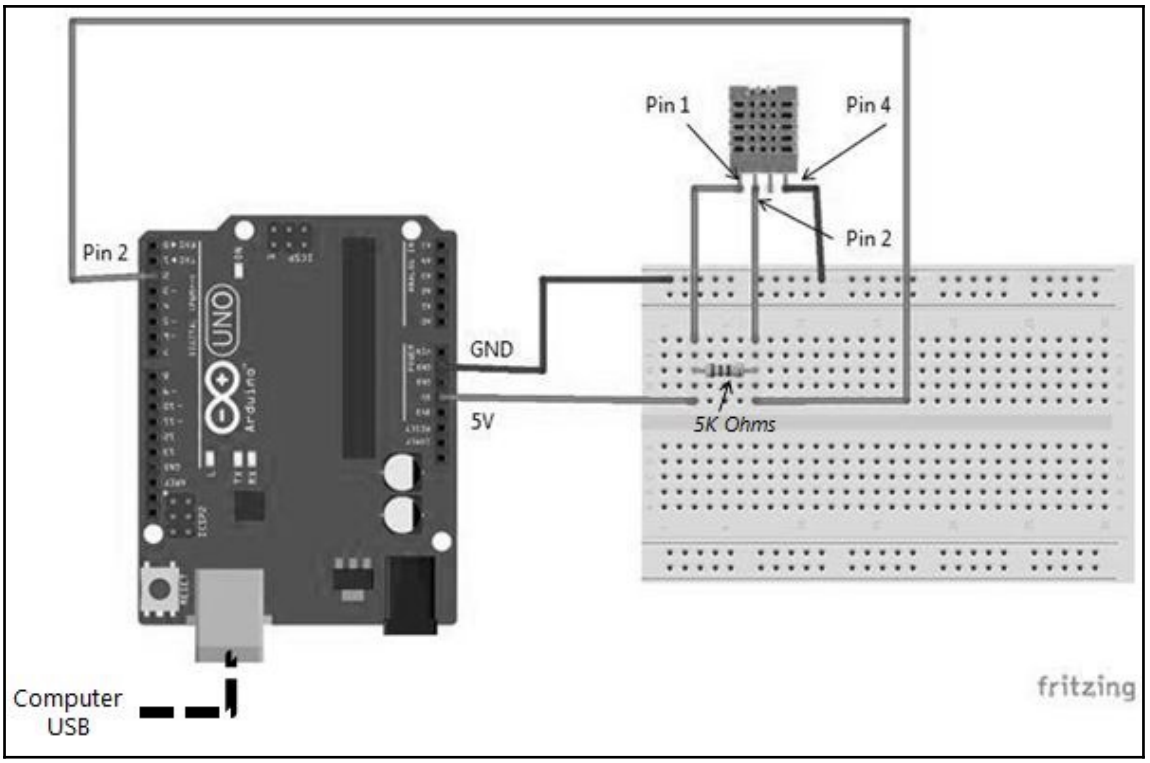
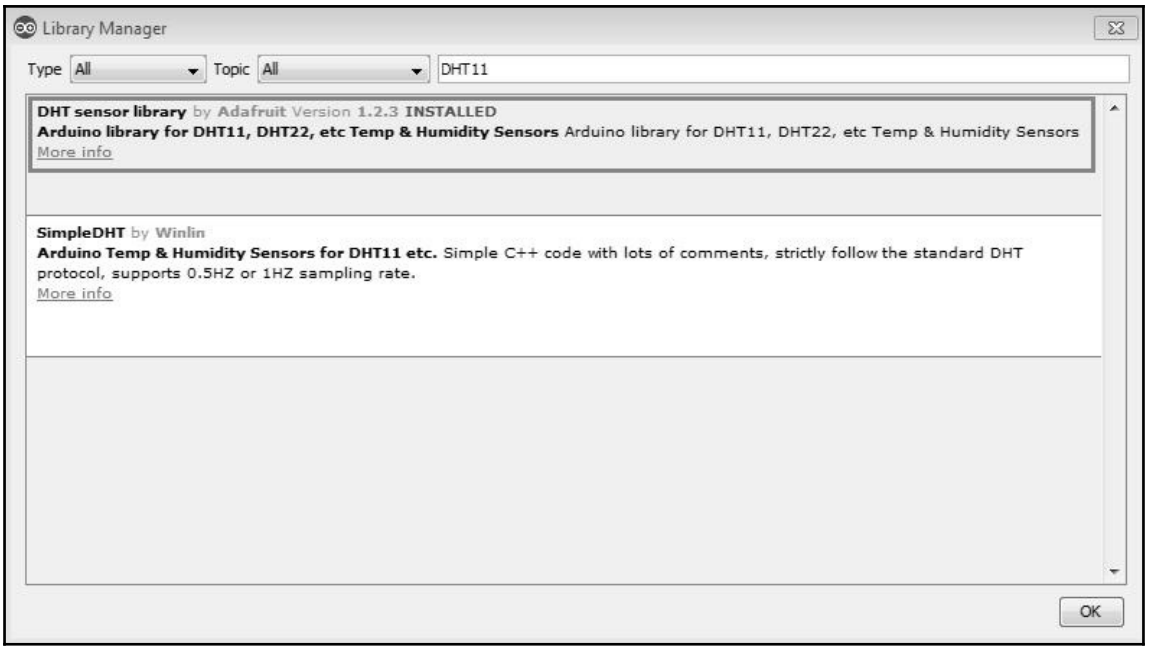


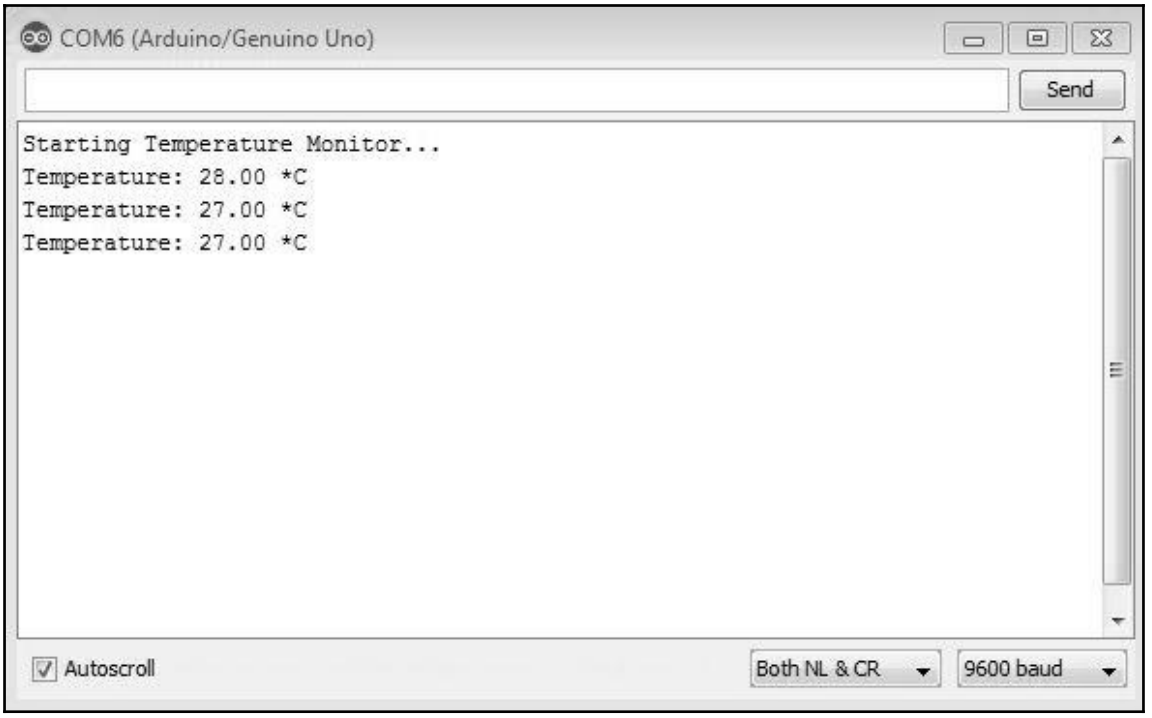
Figure 1 Typical Application

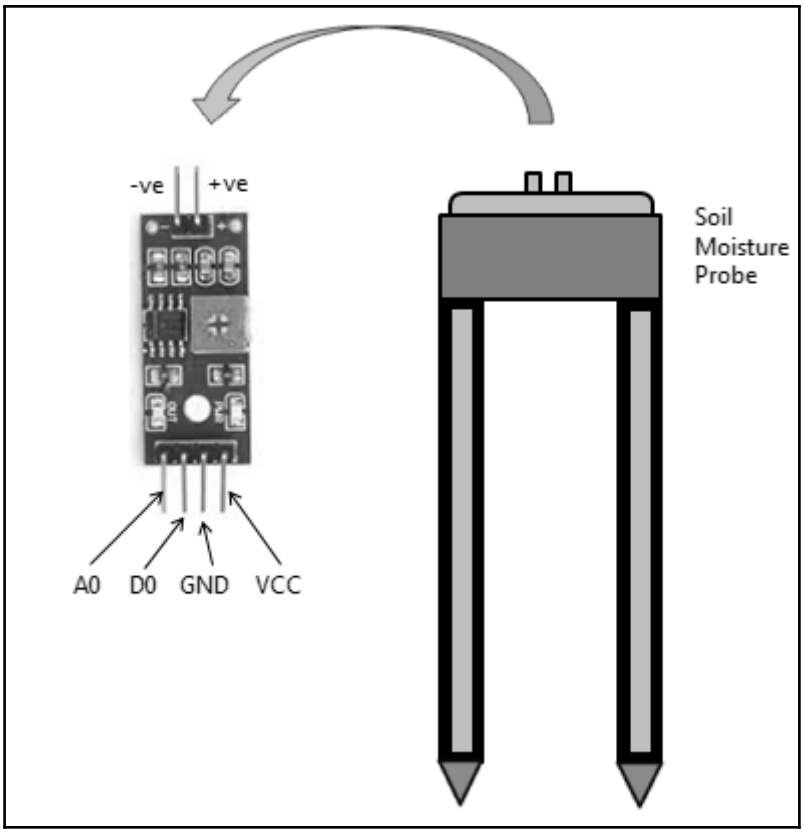
Note: 3Pin – Null; MCU = Micro-computer Unite or single chip Computer

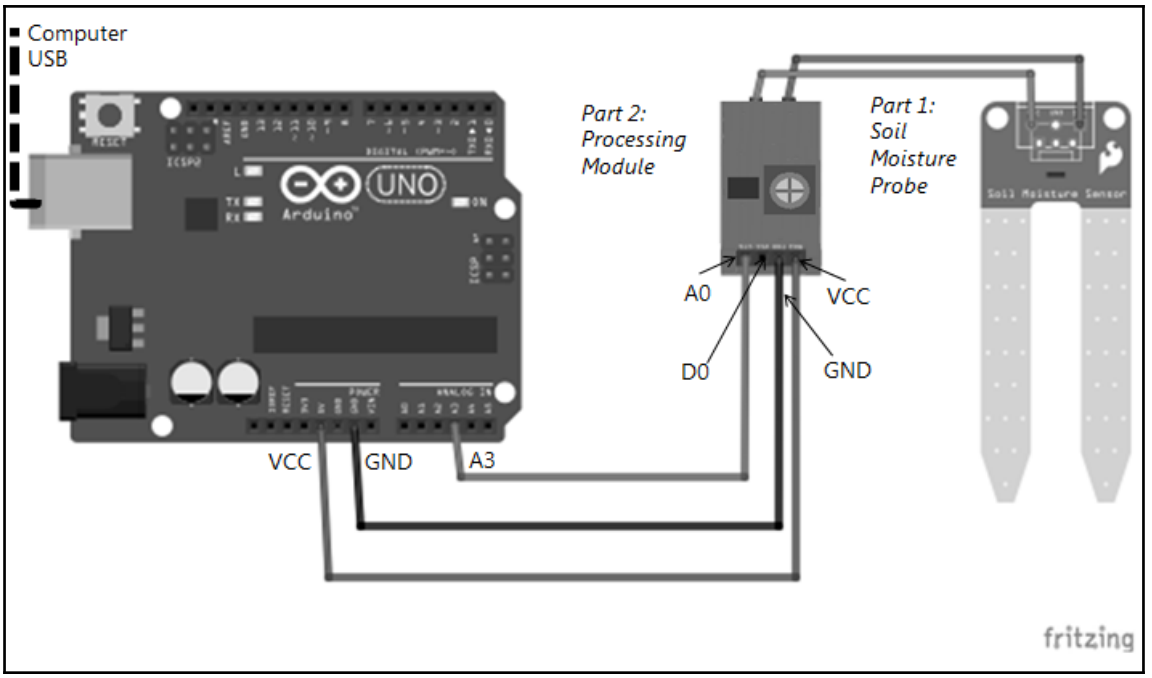
When the connecting cable is shorter than 20 metres, a 5K pull-up resistor is recommended; when the connecting cable is longer than 20 metres, choose a appropriate pull-up resistor as needed.

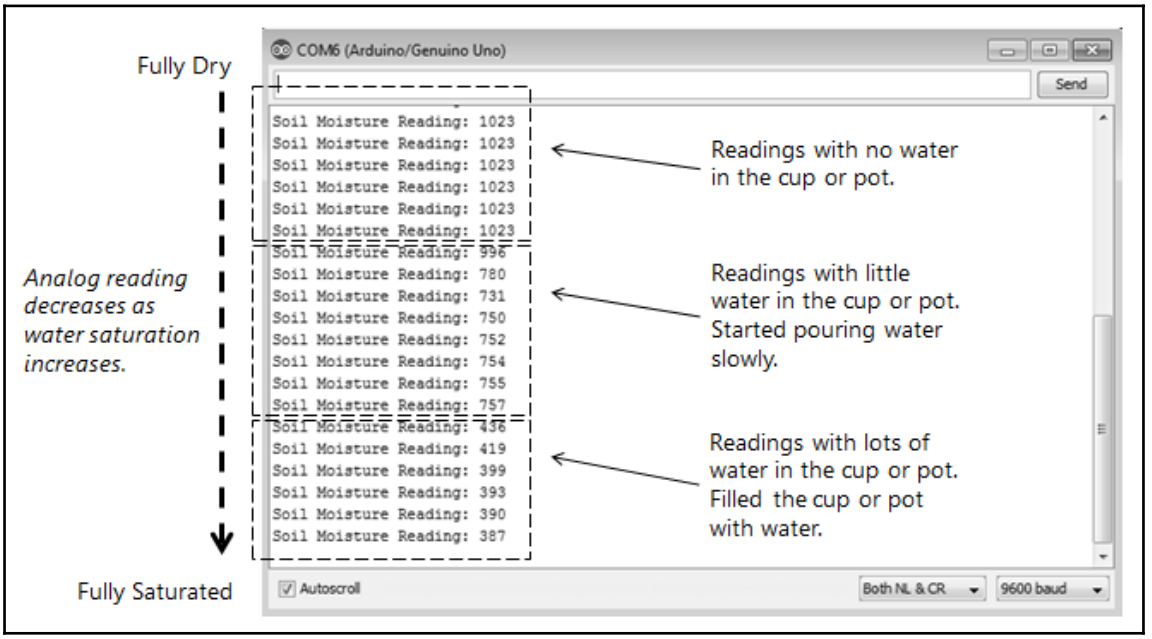

Pin 1
Pin 4
Pin 2
Pin 2
GND
5V
5K Ohms
Computer
USB
fritzing

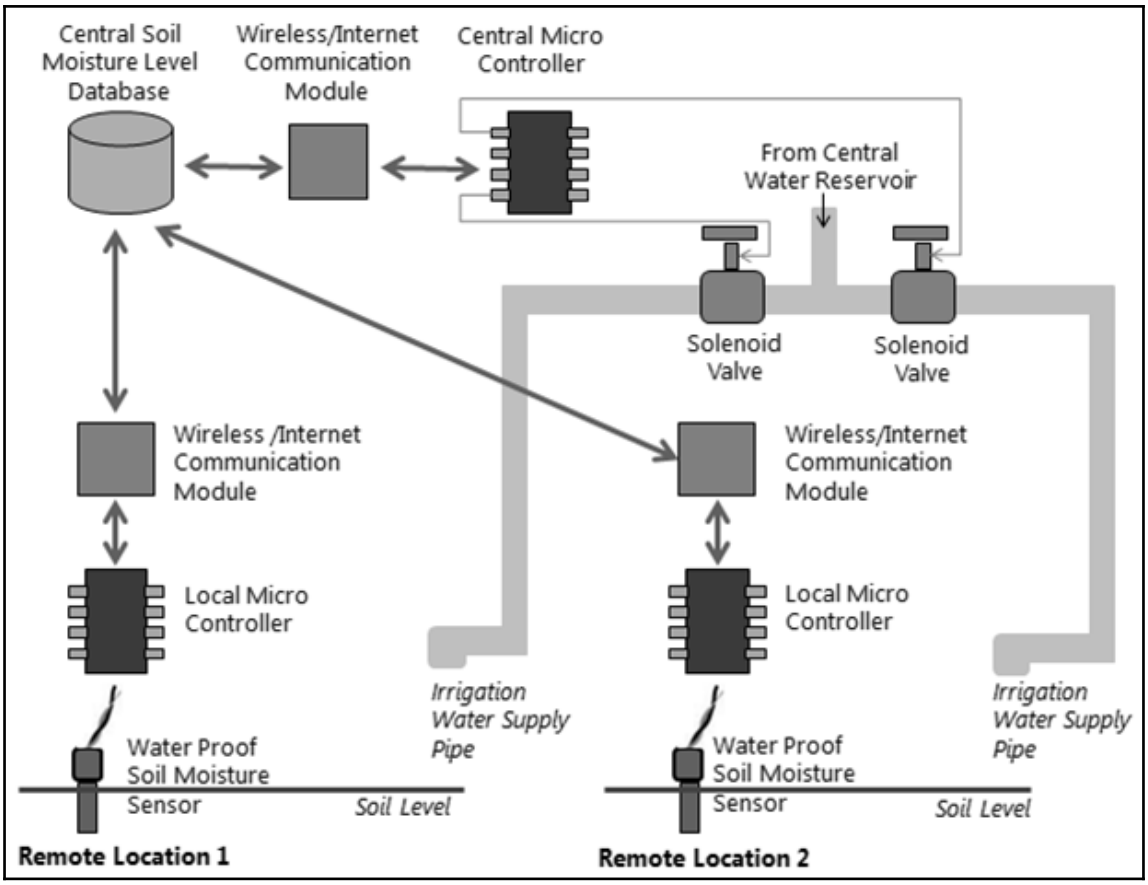

Library Manager
Type All
Topic All
DHT11
DHT sensor library by Adafruit Version 1.2.3 INSTALLED
Arduino library for DHT11, DHT22, etc Temp & Humidity Sensors Arduino library for DHT11, DHT22, etc Temp & Humidity Sensors
More info
SimpleDHT by Winlin
Arduino Temp & Humidity Sensors for DHT11 etc. Simple C++ code with lots of comments, strictly follow the standard DHT protocol, supports 0.5HZ or 1HZ sampling rate.
More info
OK


COM6 (Arduino/Genuino Uno)
Send
Starting Temperature Monitor...
Temperature: 28.00 *C
Temperature: 27.00 *C
Temperature: 27.00 *C
Autoscroll
Both NL & CR
9600 baud

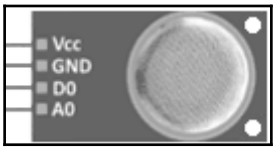

-ve
+ve
A0
D0
GND
VCC
Soil
Moisture
Probe

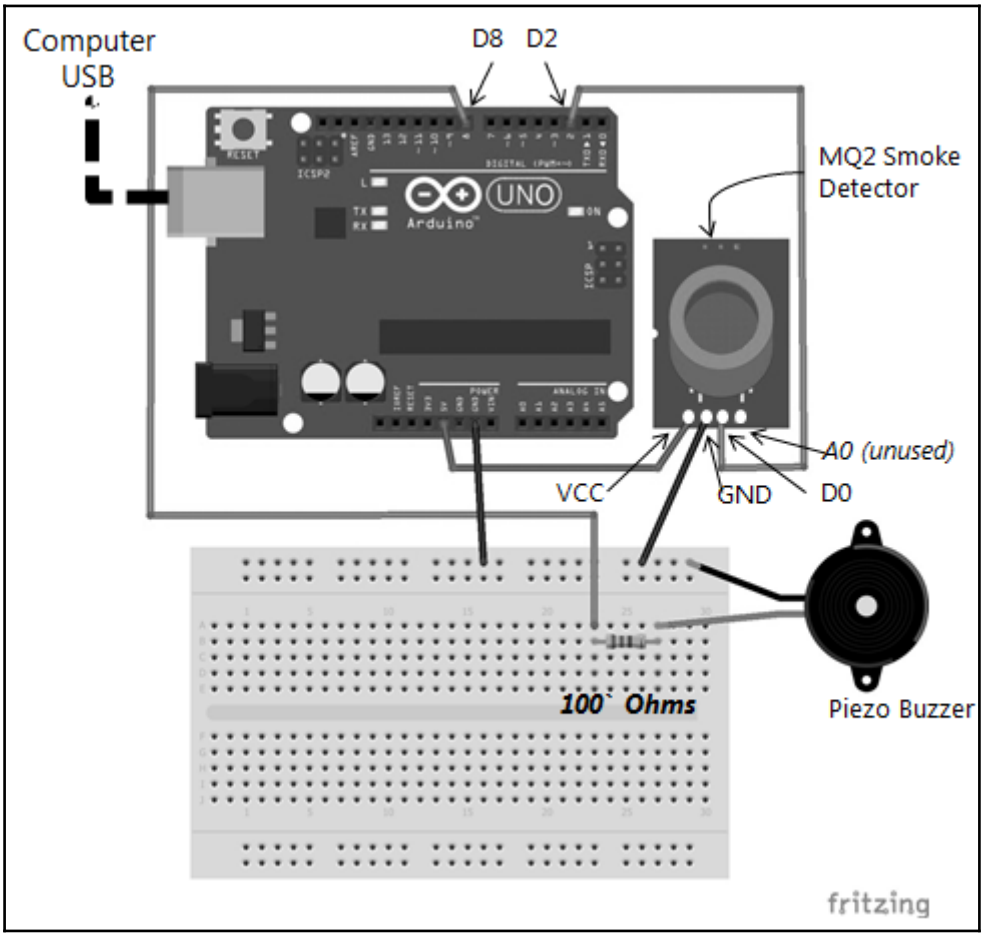

Computer
USB
Part 2:
Processing
Module
Part 1:
Soil
Moisture
Probe
A0
VCC
D0
GND
VCC
GND
A3
fritzing

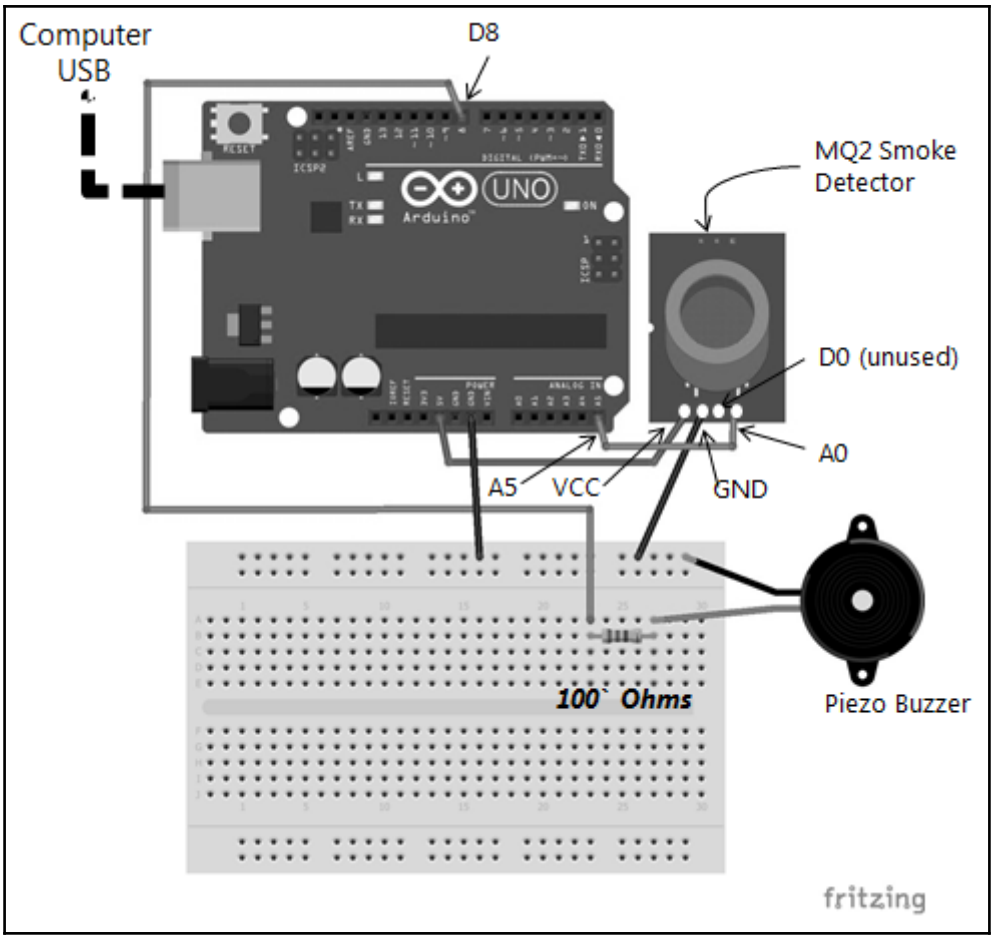

Fully Dry
COM6 (Arduino/Genuino Uno)
Send
Soil Moisture Reading: 1023
Soil Moisture Reading: 1023
Soil Moisture Reading: 1023
Soil Moisture Reading: 1023
Soil Moisture Reading: 1023
Soil Moisture Reading: 1023
Soil Moisture Reading: 996
Soil Moisture Reading: 780
Soil Moisture Reading: 731
Soil Moisture Reading: 750
Soil Moisture Reading: 752
Soil Moisture Reading: 754
Soil Moisture Reading: 755
Soil Moisture Reading: 757
Soil Moisture Reading: 436
Soil Moisture Reading: 419
Soil Moisture Reading: 399
Soil Moisture Reading: 393
Soil Moisture Reading: 390
Soil Moisture Reading: 387
Readings with no water in the cup or pot.
Readings with little water in the cup or pot. Started pouring water slowly.
Readings with lots of water in the cup or pot. Filled the cup or pot with water.
Analog reading decreases as water saturation increases.
Fully Saturated
Autoscroll
Both NL & CR
9600 baud

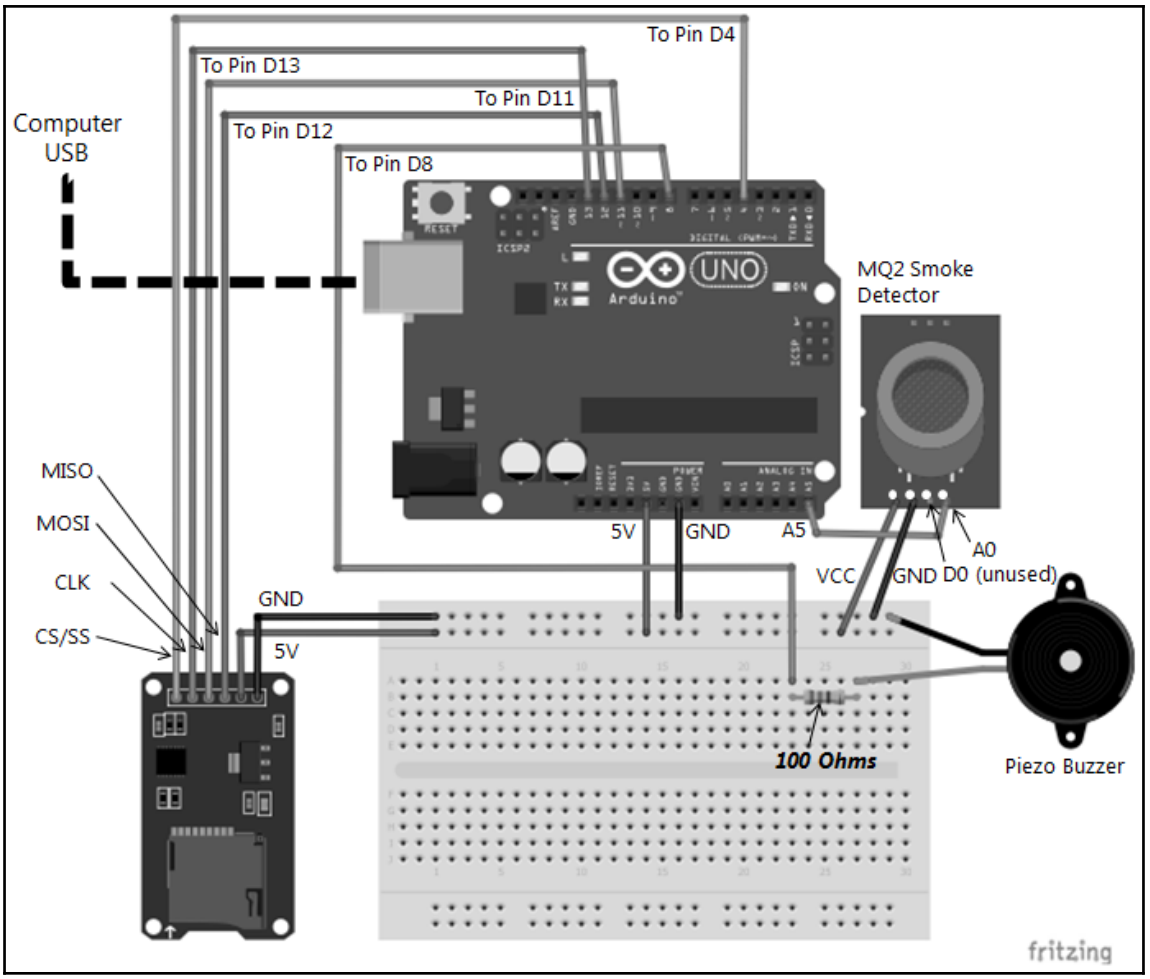

Central Soil Moisture Level Database
Wireless/Internet Communication Module
Central Micro Controller
From Central Water Reservoir
Solenoid Valve
Solenoid Valve
Wireless /Internet Communication Module
Wireless/Internet Communication Module
Local Micro Controller
Local Micro Controller
Irrigation Water Supply Pipe
Irrigation Water Supply Pipe
Water Proof Soil Moisture Sensor
Water Proof Soil Moisture Sensor
Soil Level
Soil Level
Remote Location 1
Remote Location 2

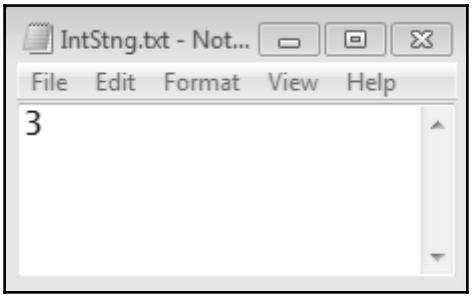
Chapter 5: Day 3 - Building a Compound Device

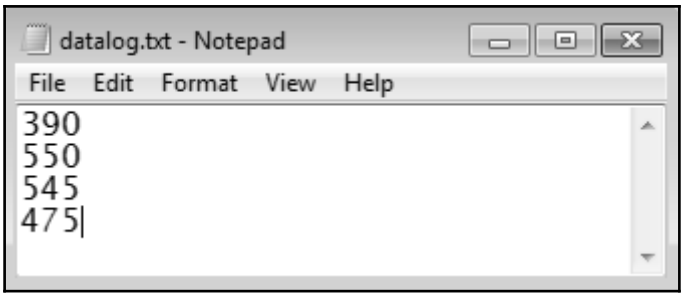




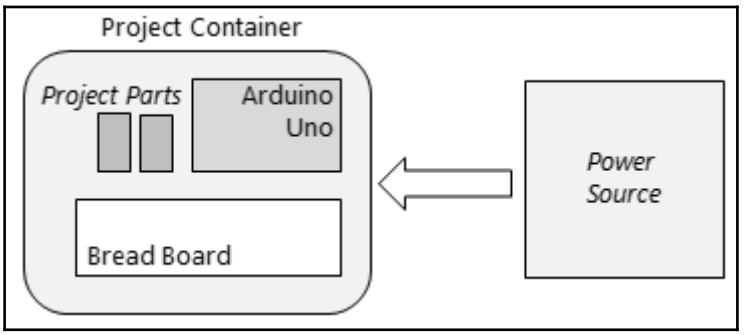

Computer
USB
D8
MQ2 Smoke
Detector
D0 (unused)
A0
A5
VCC
GND
100` Ohms
Piezo Buzzer
fritzing

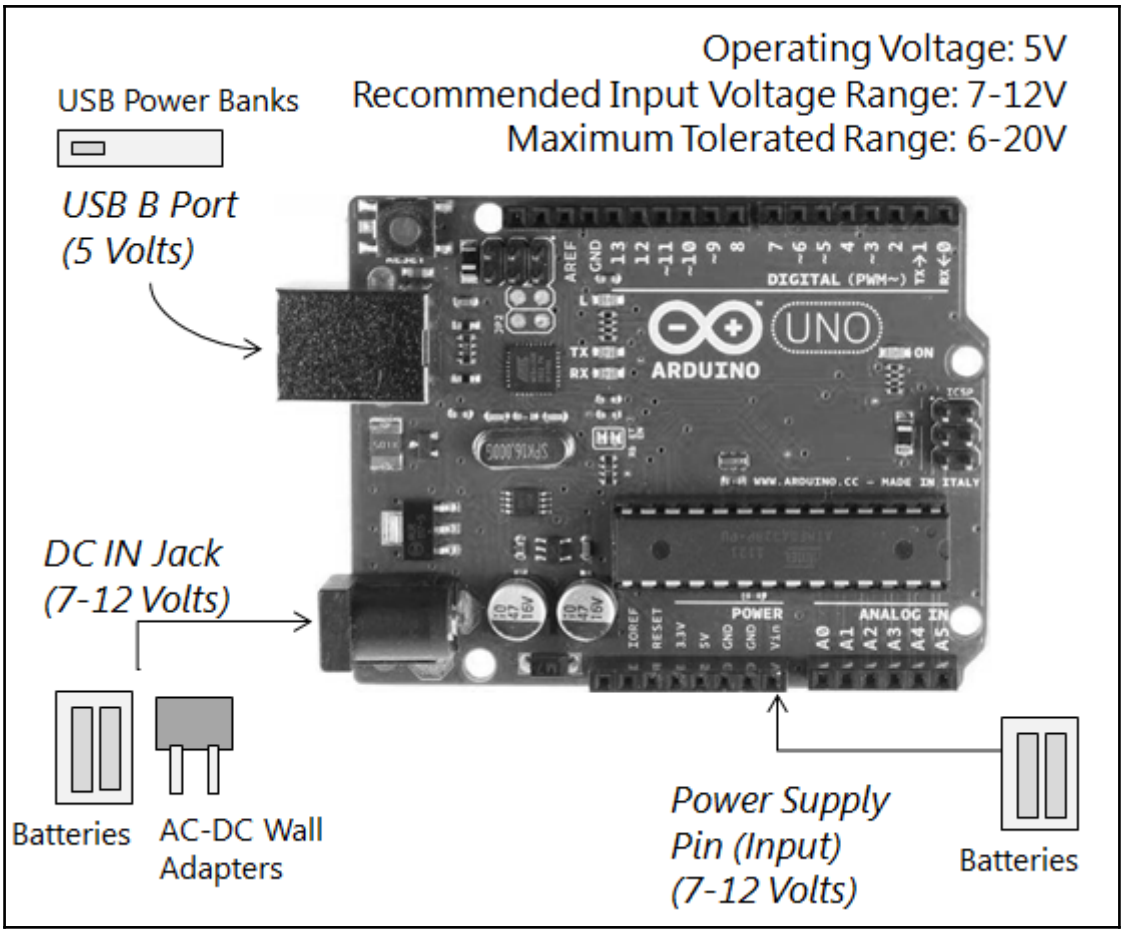

To Pin D4
To Pin D13
To Pin D11
To Pin D12
To Pin D8
Computer
USB
MQ2 Smoke
Detector
MISO
MOSI
CLK
CS/SS
GND
5V
5V
GND
A5
VCC
GND
D0 (unused)
A0
100 Ohms
Piezo Buzzer
fritzing

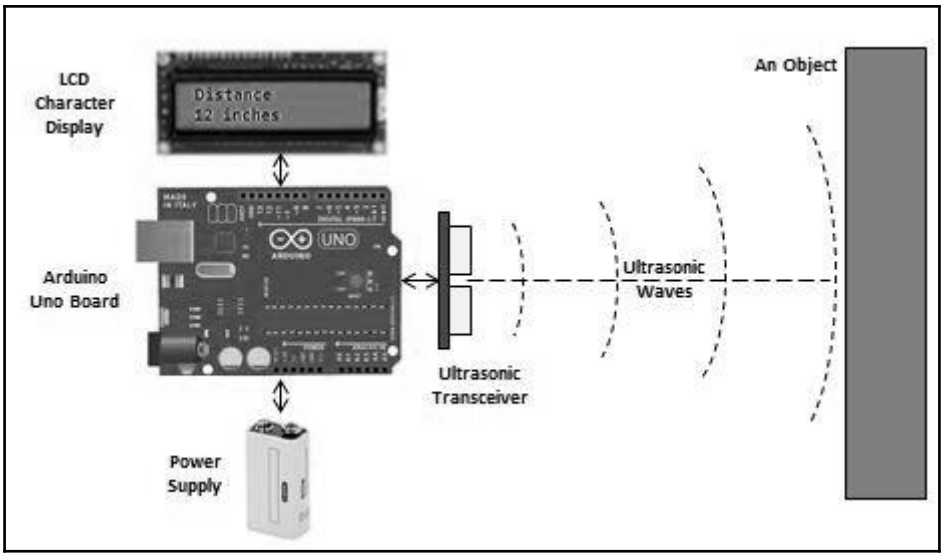

IntStng.txt - Not...
File Edit Format View Help
3

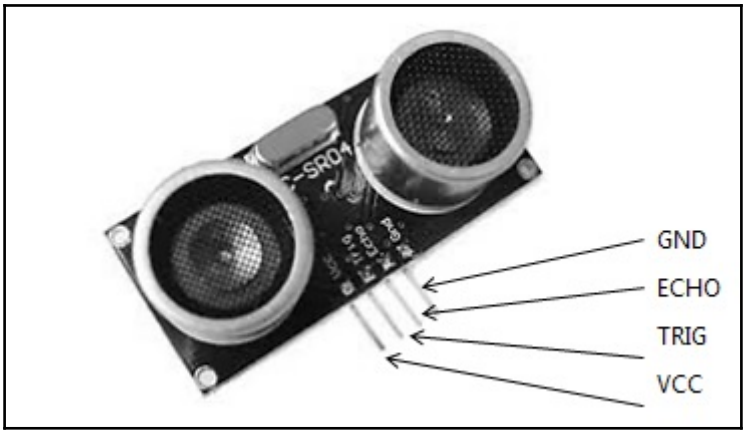

datalog.txt - Notepad
File Edit Format View Help
390
550
545
475

Chapter 6: Day 4 - Building a Standalone Device

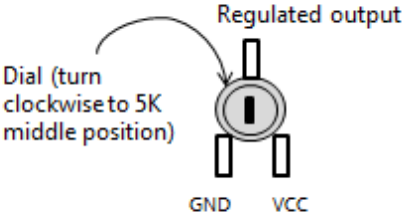


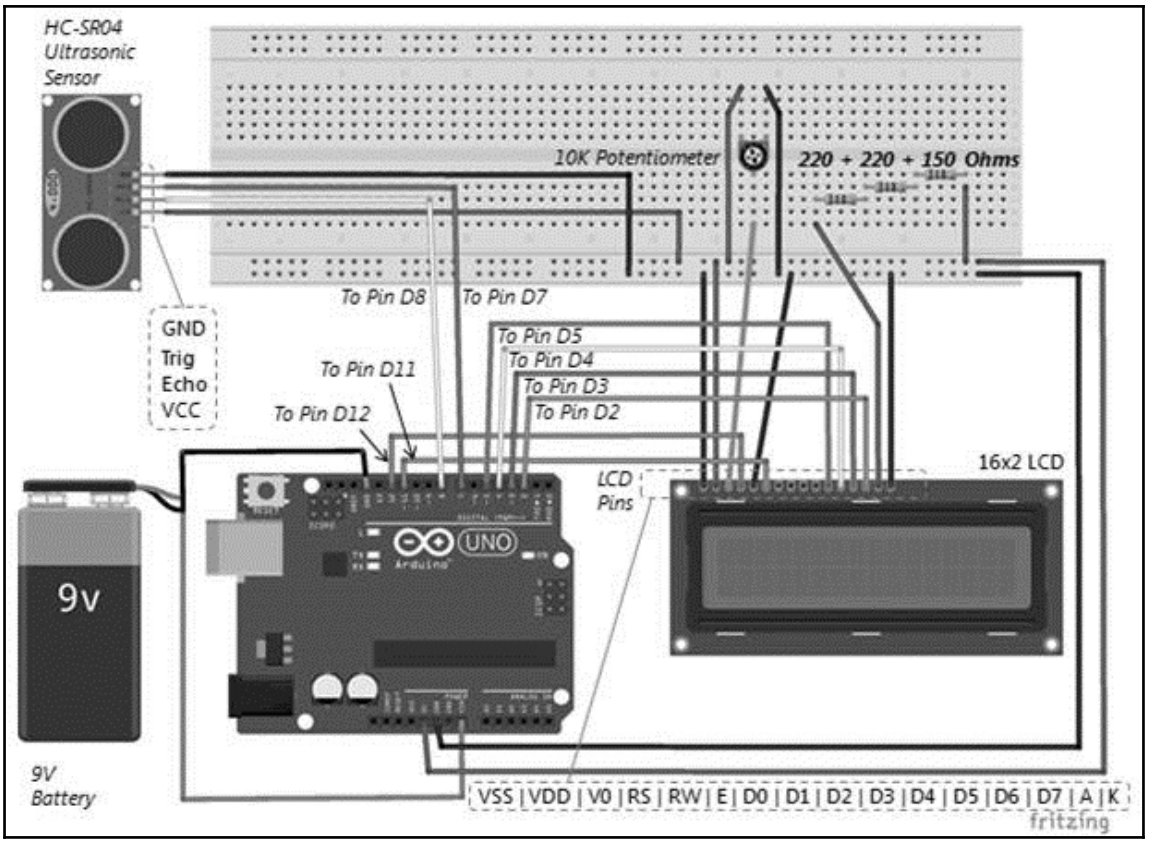

Operating Voltage: 5V
Recommended Input Voltage Range: 7-12V
Maximum Tolerated Range: 6-20V
USB Power Banks
USB B Port
(5 Volts)
DC IN Jack
(7-12 Volts)
Batteries
AC-DC Wall
Adapters
Power Supply
Pin (Input)
(7-12 Volts)
Batteries
UNO
ARDUINO
DIGITAL (PWM~)
POWER
ANALOG IN

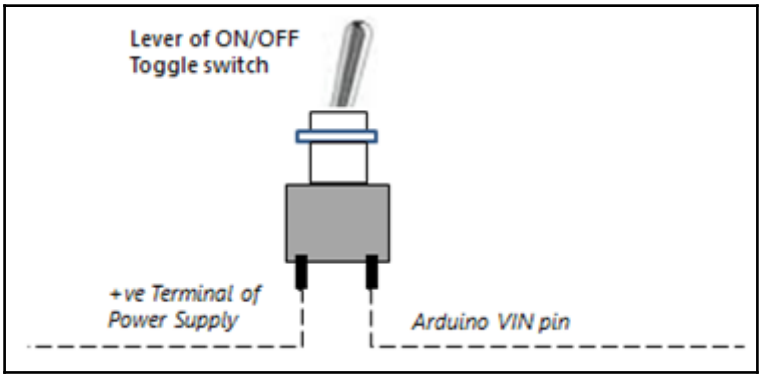


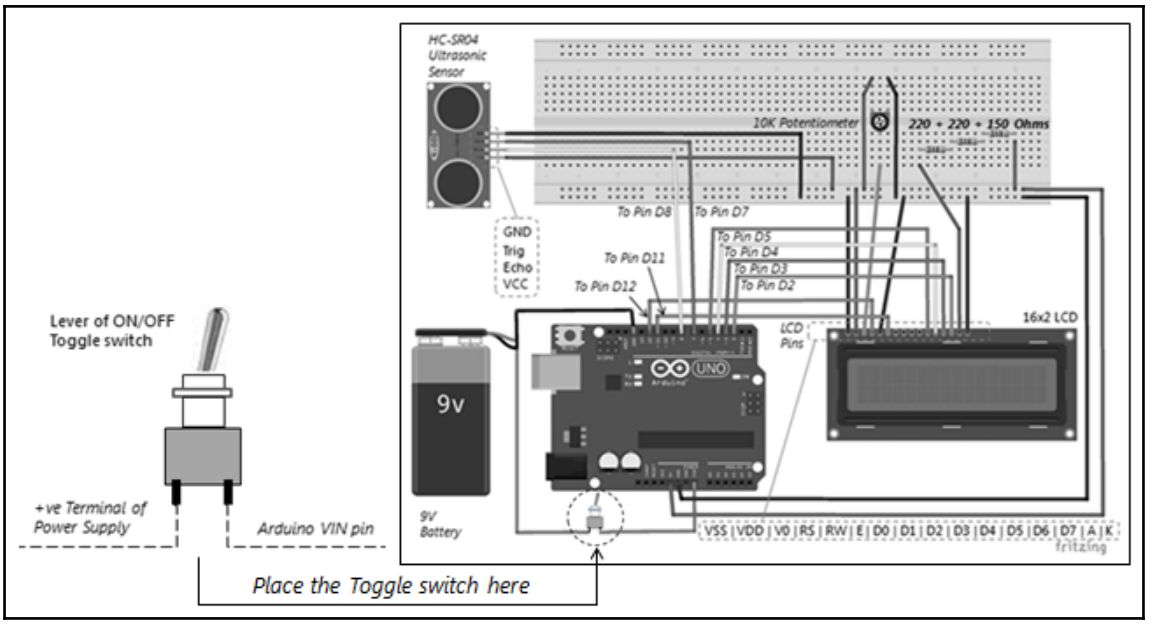


Some example of real life potentiometers



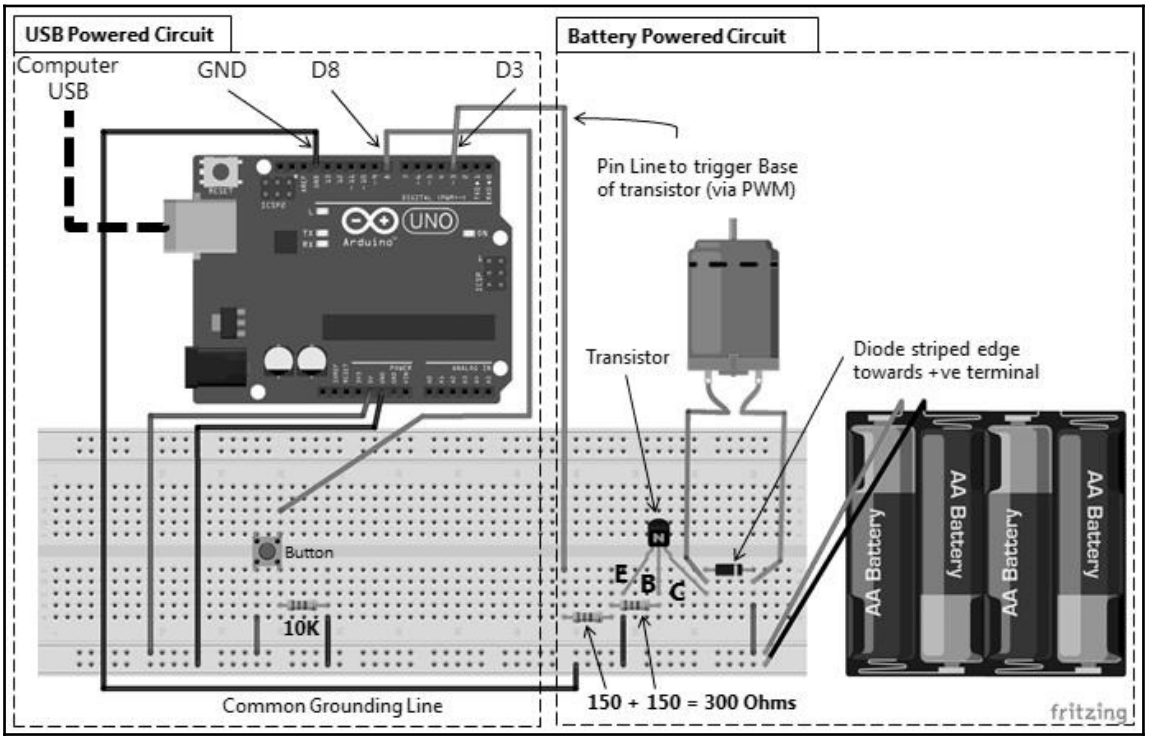

HC-SR04
Ultrasonic
Sensor
10K Potentiometer
220 + 220 + 150 Ohms
To Pin D8
To Pin D7
GND
Trig
Echo
VCC
To Pin D11
To Pin D12
To Pin D5
To Pin D4
To Pin D3
To Pin D2
LCD
Pins
16x2 LCD
9v
9V
Battery
VSS | VDD | V0 | RS | RW | E | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | A | K
fritzing

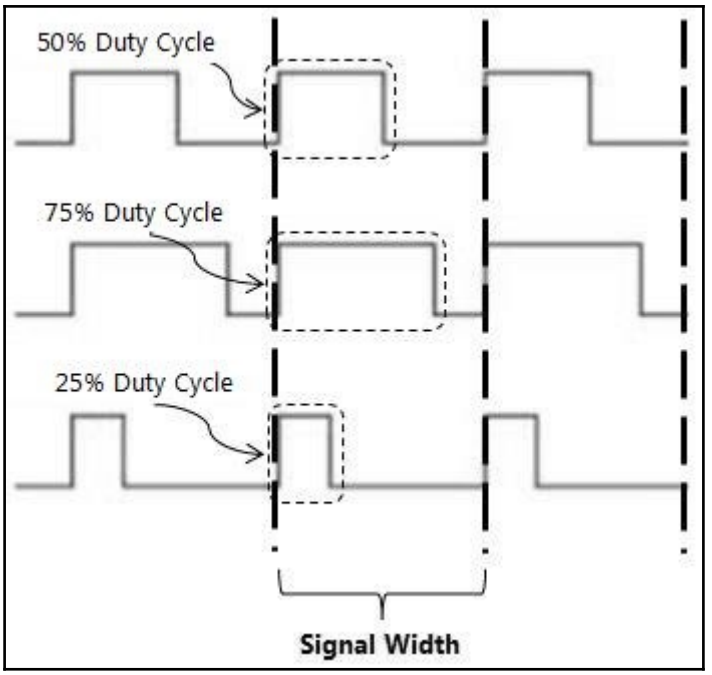

Lever of ON/OFF
Toggle switch
+ve Terminal of
Power Supply
Arduino VIN pin

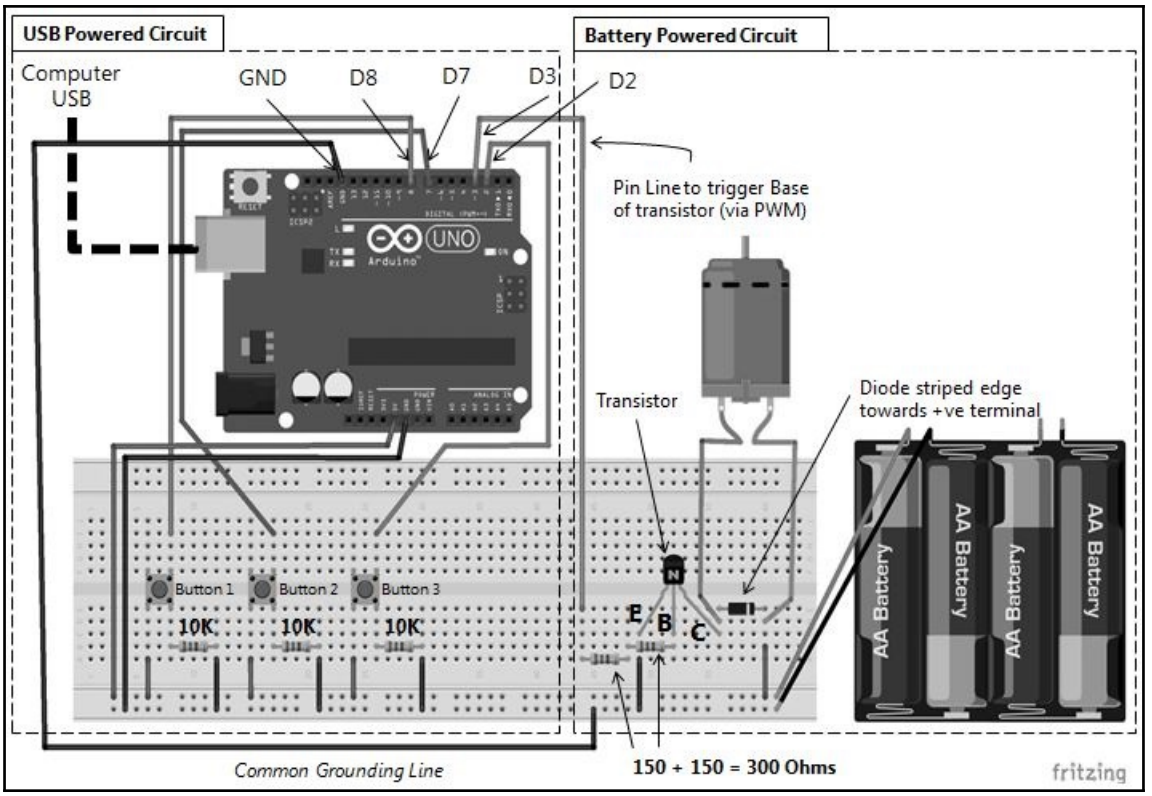

HC-SR04
Ultrasonic
Sensor
10K Potentiometer
220 + 220 + 150 Ohms
To Pin D8
To Pin D7
GND
Trig
Echo
VCC
To Pin D11
To Pin D12
To Pin D5
To Pin D4
To Pin D3
To Pin D2
16x2 LCD
LCD
Pins
9v
9V
Battery
UNO
VSS | VDD | V0 | RS | RW | E | D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | A | K
fritzing
Lever of ON/OFF
Toggle switch
+ve Terminal of
Power Supply
Arduino VIN pin
Place the Toggle switch here

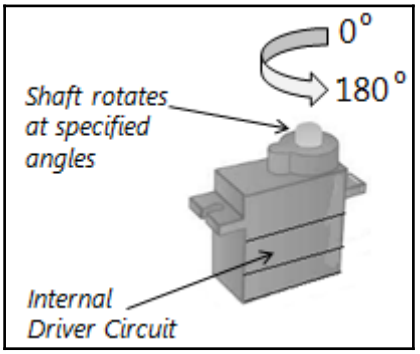
LCD pin	Arduino Uno pin	LCD pin description
VSS	GND (via breadboard)	Ground connection.
VDD/VCC	5V (via breadboard)	5V Power input.
V0/VEE	Potentiometer output	LCD contrast control receives output from potentiometer.
RS	Digital I/O Pin 12	Register select pin.
RW	GND (via breadboard)	Read/Write pin.
E	Digital I/O Pin 11	Enable pin.
D0	Not Used	These pins represent a 8-bit data. These pins are used to exchange data between the LCD and the Arduino board.
D1	Not Used	
D2	Not Used	
D3	Not Used	
D4	Digital I/O Pin 5	
D5	Digital I/O Pin 4	
D6	Digital I/O Pin 3	
D7	Digital I/O Pin 2	
A/LED+	5V (via breadboard and 590 Ohms resistors)	5V Power input
K/LED-	GND (via breadboard)	Ground connection

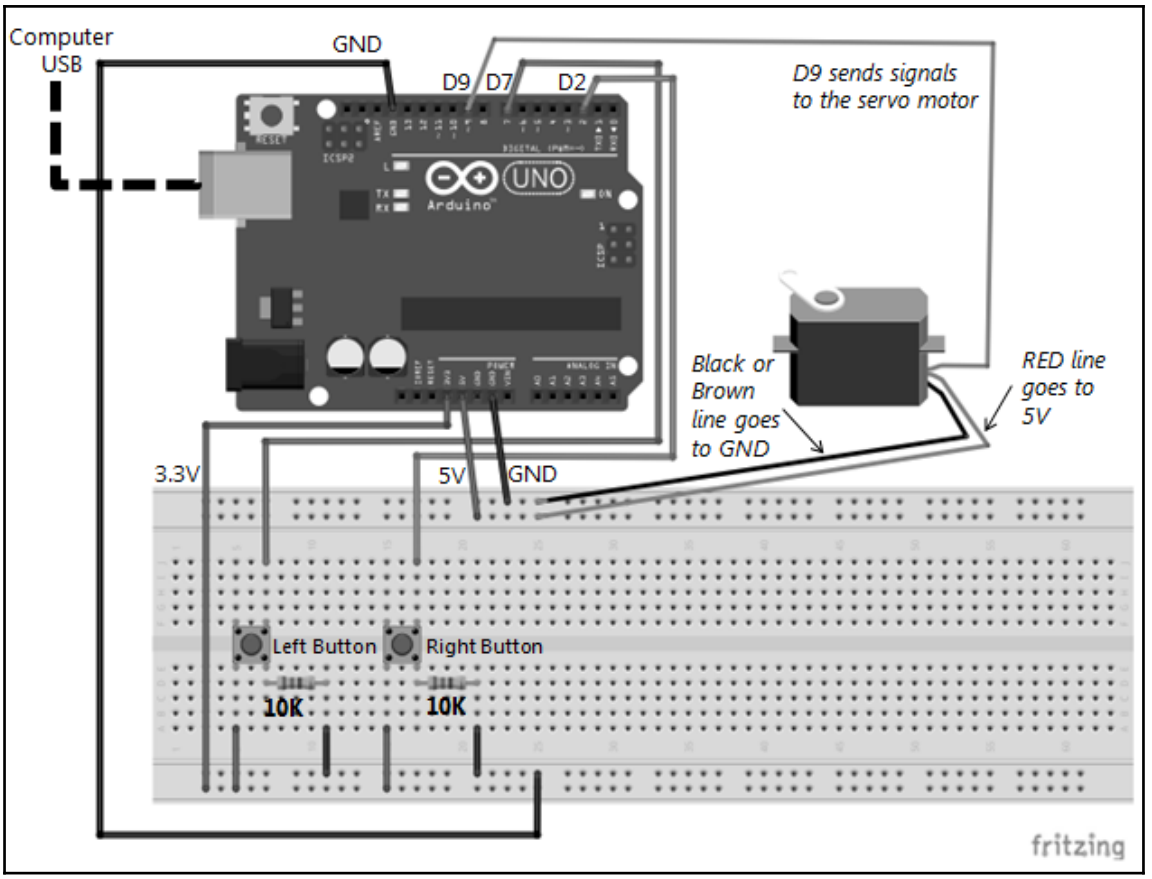
Chapter 7: Day 5 - Using Actuators

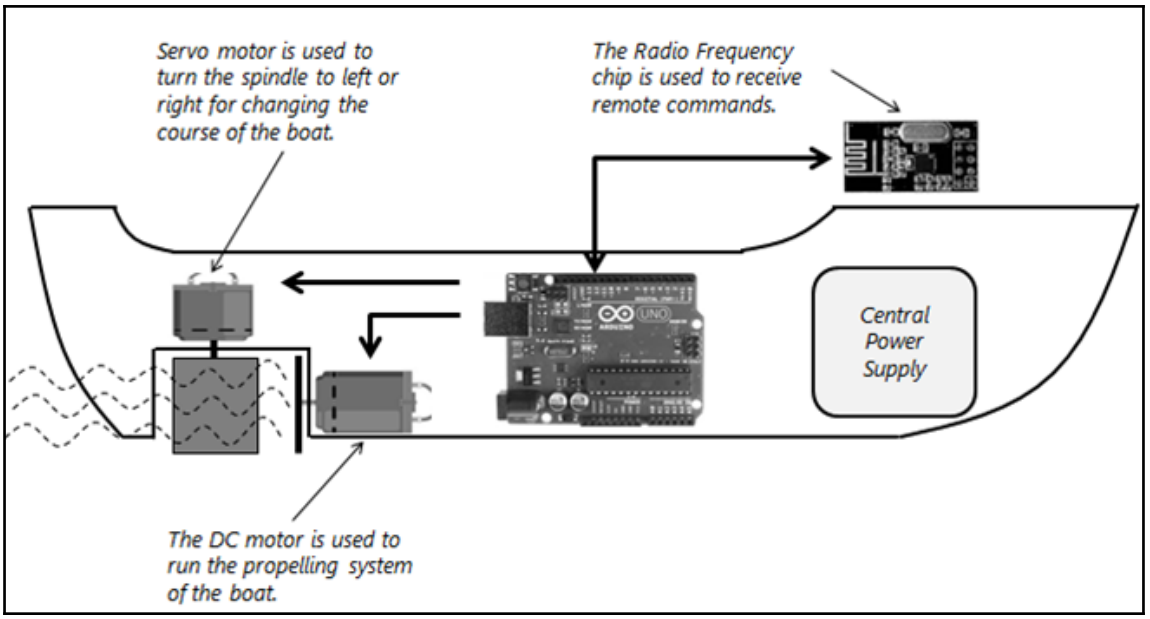



50% Duty Cycle
75% Duty Cycle
25% Duty Cycle
Signal Width

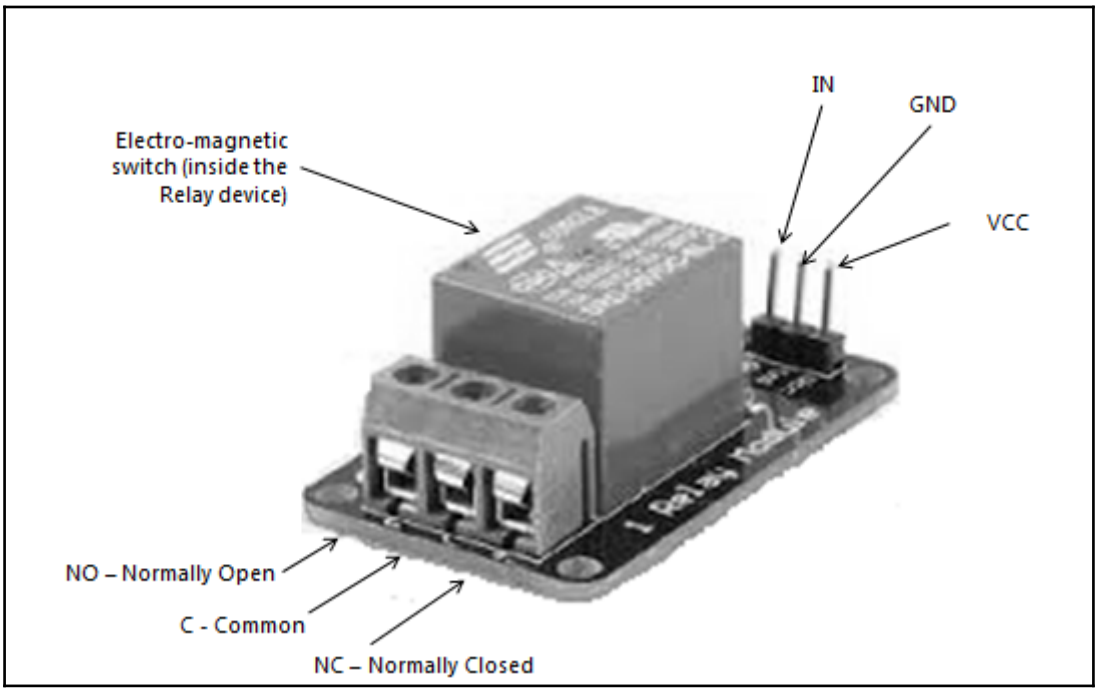

USB Powered Circuit
Battery Powered Circuit
Computer USB
GND
D8
D7
D3
D2
Pin Line to trigger Base of transistor (via PWM)
Transistor
Diode striped edge towards +ve terminal
Button 1
Button 2
Button 3
10K
10K
10K
E
B
C
AA Battery
AA Battery
AA Battery
AA Battery
Common Grounding Line
150 + 150 = 300 Ohms
fritzing

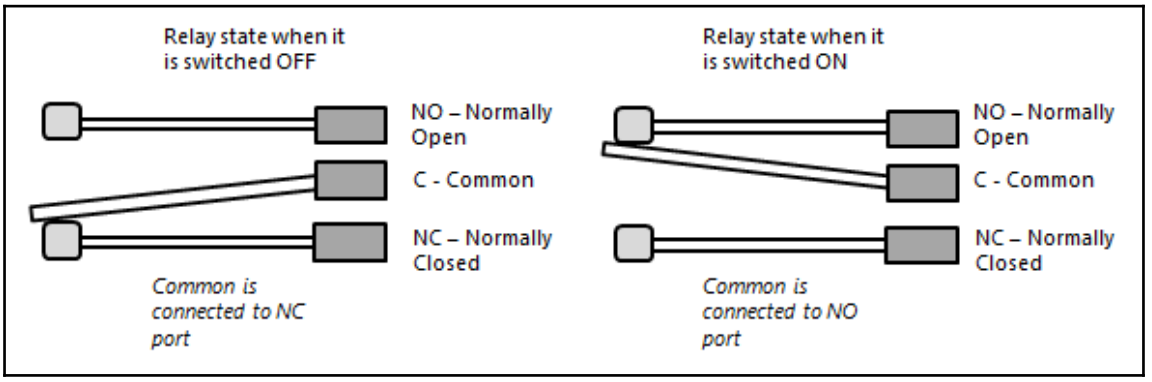

0°
180°
Shaft rotates at specified angles
Internal Driver Circuit

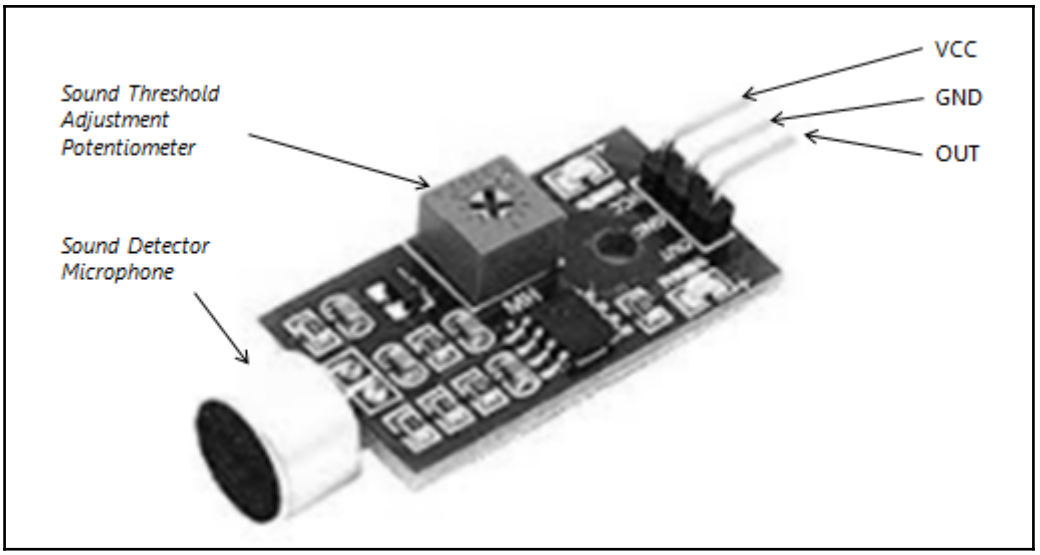

Computer
USB
GND
D9
D7
D2
D9 sends signals
to the servo motor
Black or
Brown
line goes
to GND
RED line
goes to
5V
3.3V
5V
GND
Left Button
Right Button
10K
10K
fritzing

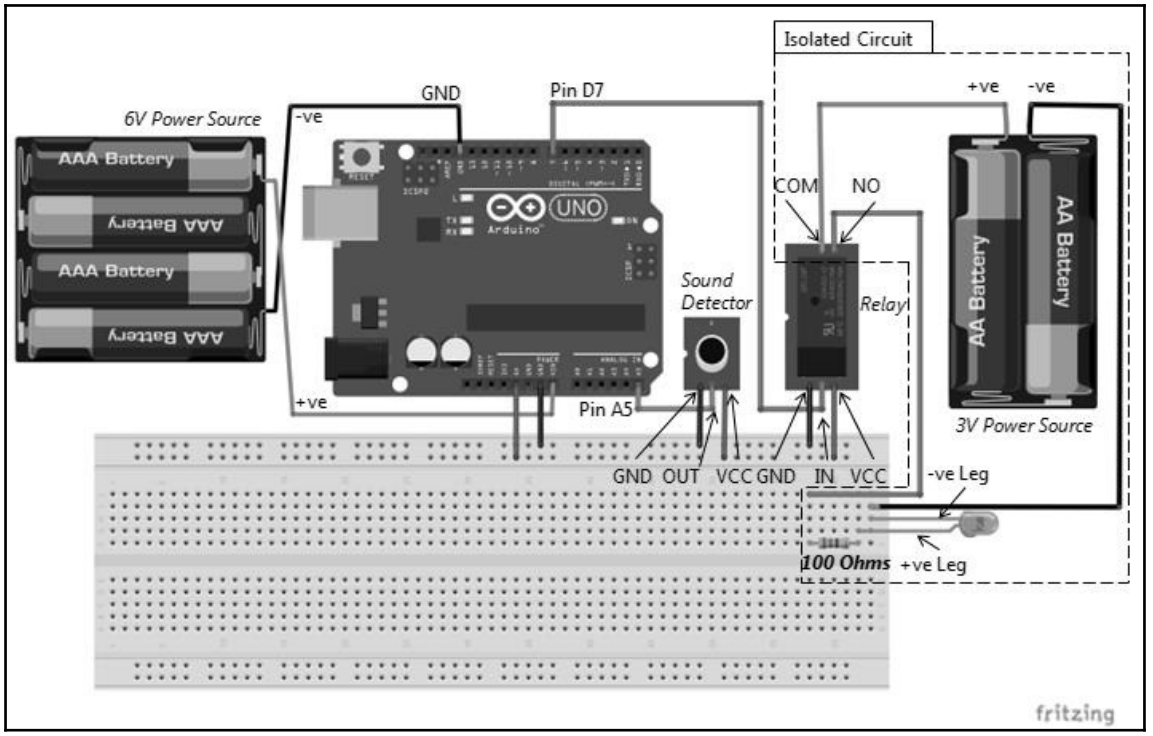

Servo motor is used to turn the spindle to left or right for changing the course of the boat.
The Radio Frequency chip is used to receive remote commands.
Central Power Supply
The DC motor is used to run the propelling system of the boat.

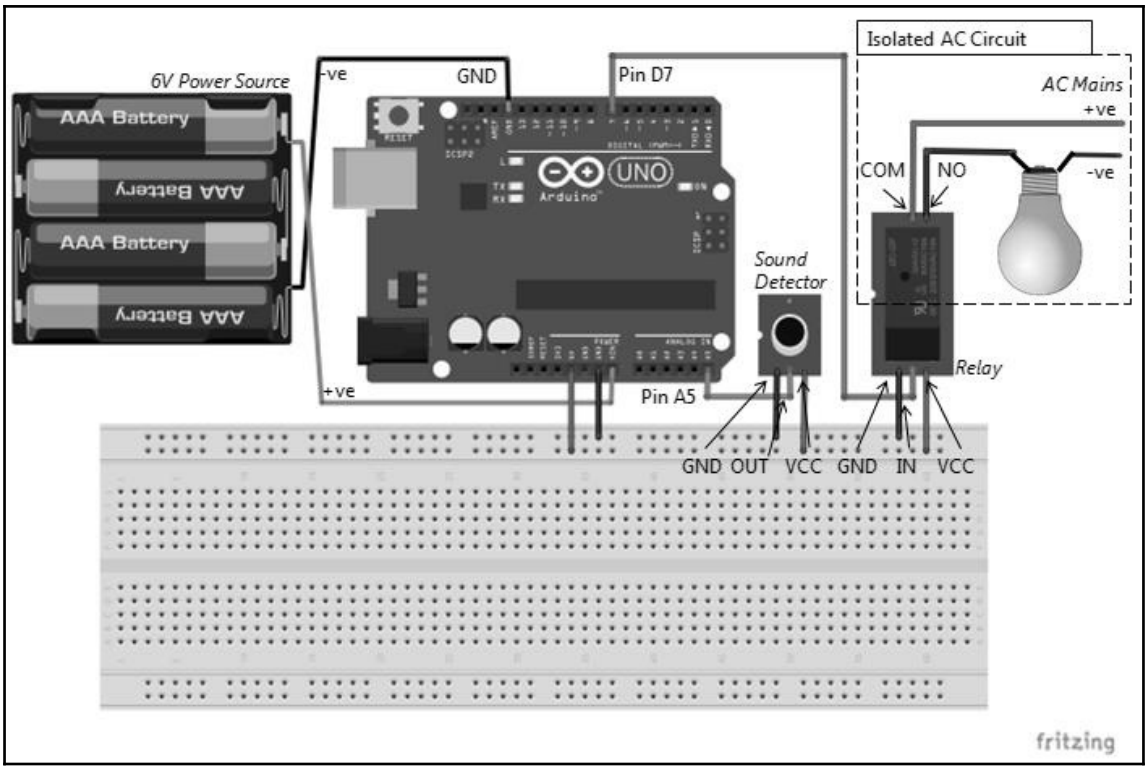
Chapter 8: Day 6 - Using AC Powered Components

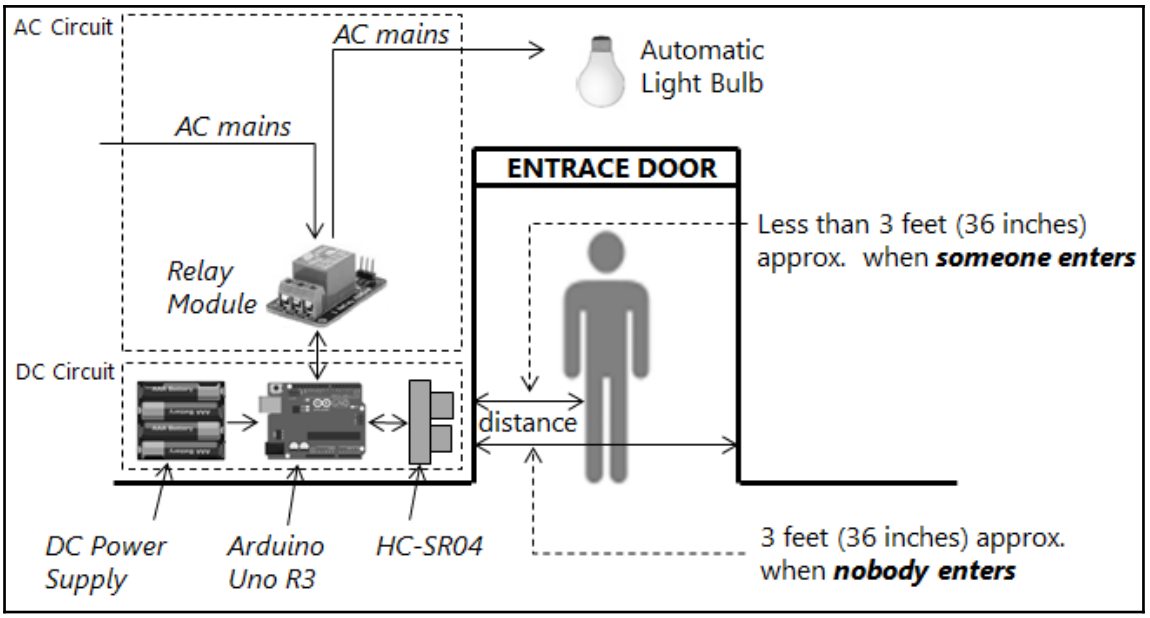




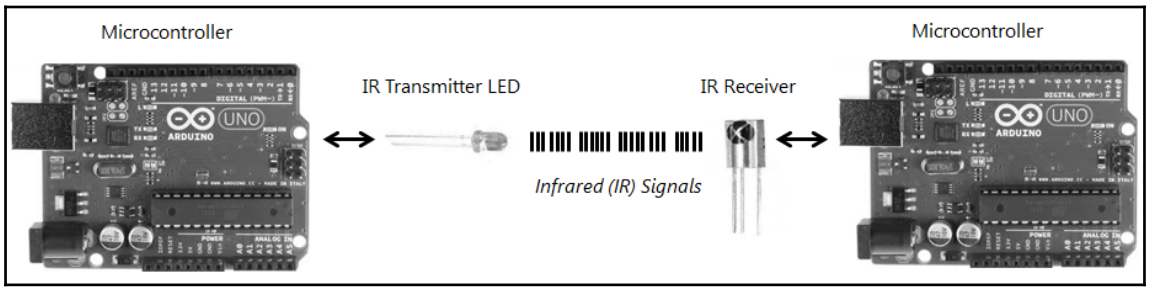

Sound Threshold Adjustment Potentiometer
Sound Detector Microphone
VCC
GND
OUT

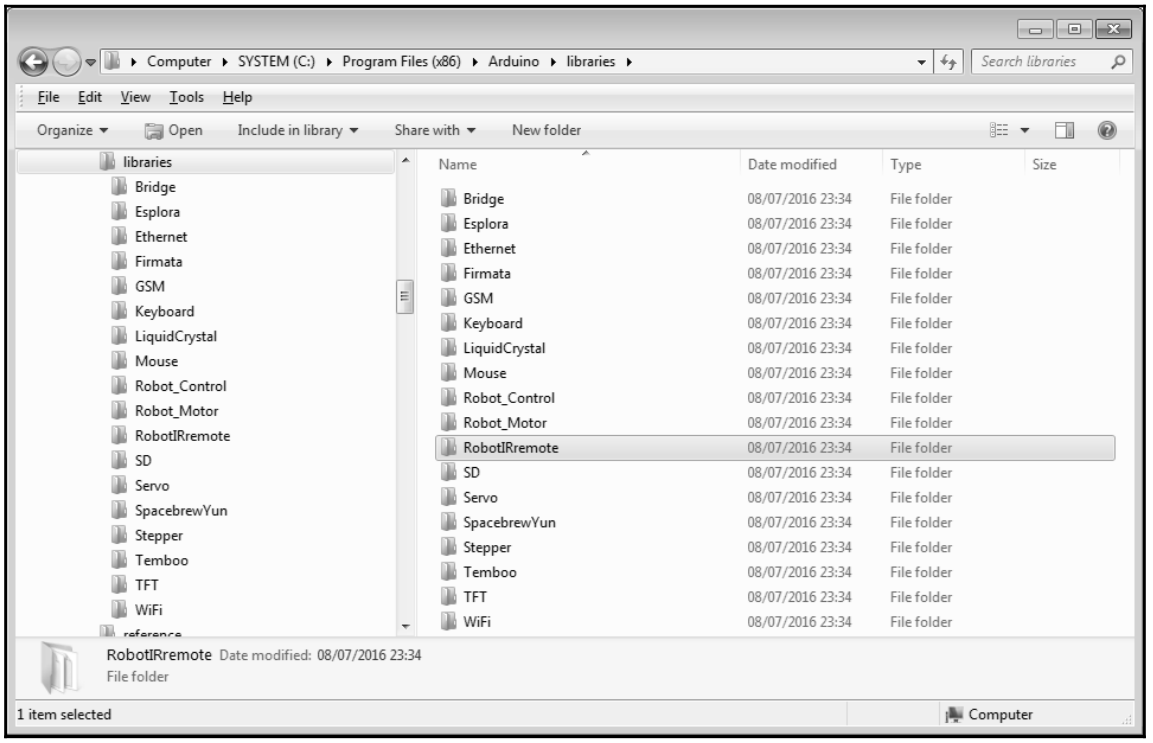

Isolated Circuit
6V Power Source
AAA Battery
AAA Battery
AAA Battery
AAA Battery
-ve
+ve
GND
Pin D7
Pin A5
UNO
Arduino
Sound Detector
GND OUT VCC
COM
NO
Relay
GND IN VCC
+ve -ve
AA Battery
AA Battery
3V Power Source
-ve Leg
100 Ohms
+ve Leg
fritzing

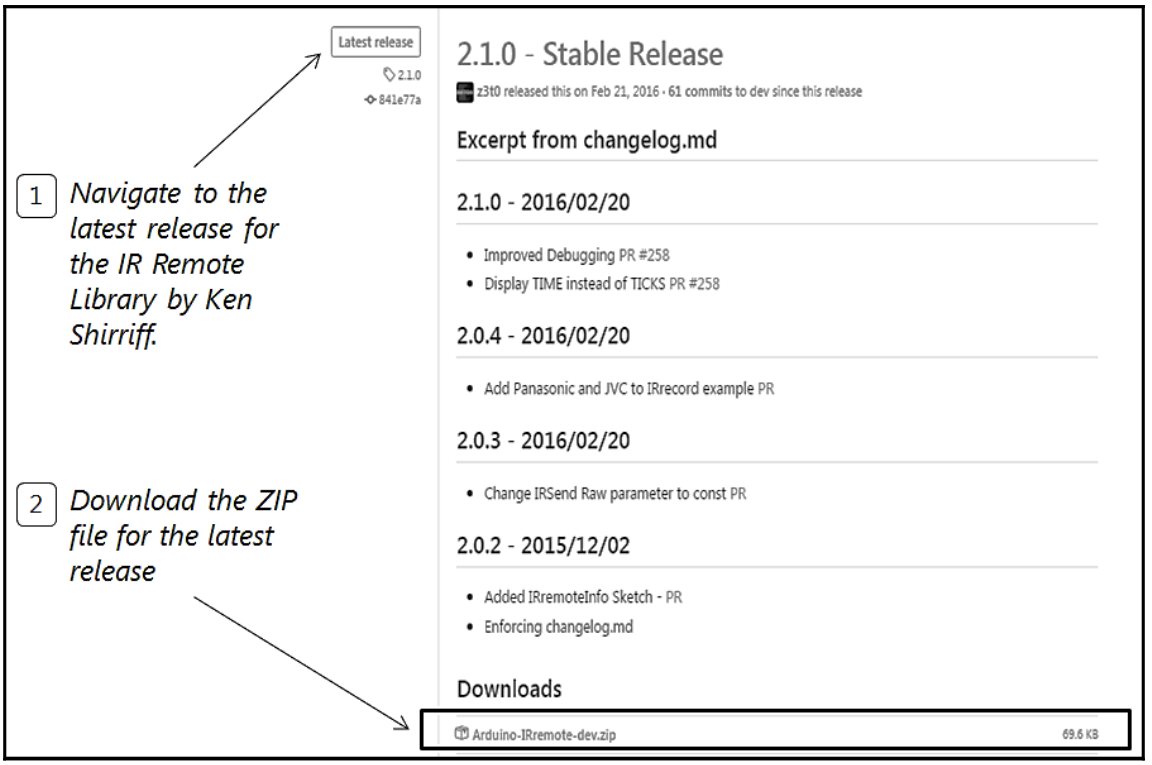

Isolated AC Circuit
AC Mains
+ve
COM
NO
-ve
6V Power Source
AAA Battery
AAA Battery
AAA Battery
AAA Battery
-ve
GND
Pin D7
UNO
Arduino
Sound
Detector
Relay
+ve
Pin A5
GND OUT VCC GND IN VCC
fritzing

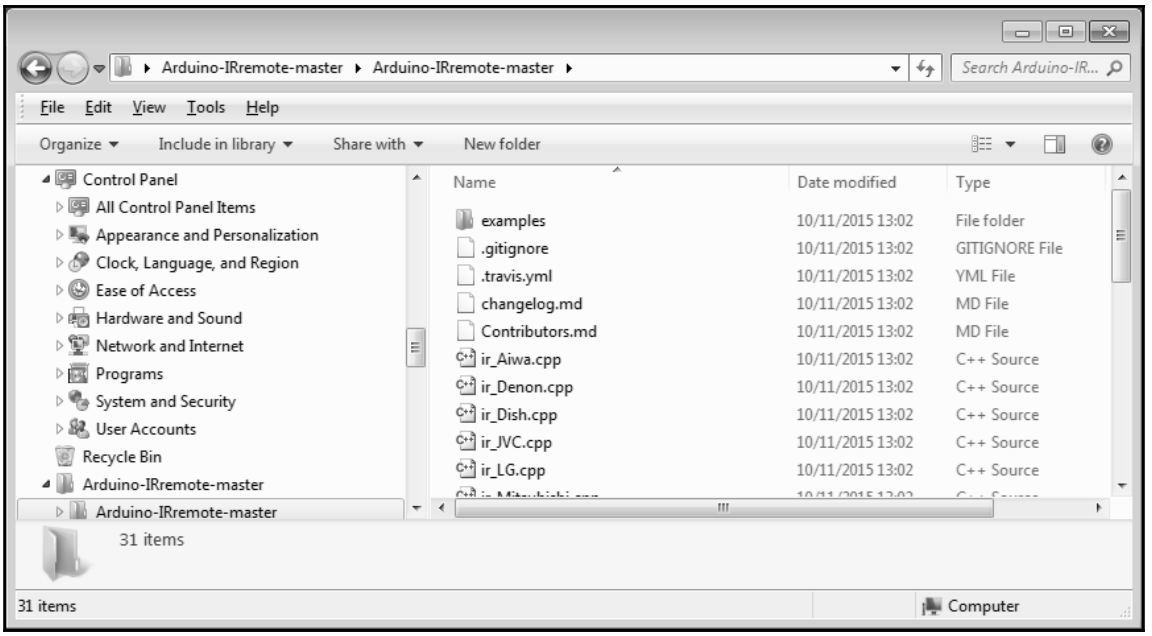

AC Circuit
AC mains
Automatic
Light Bulb
AC mains
ENTRACE DOOR
Relay
Module
Less than 3 feet (36 inches)
approx. when someone enters
DC Circuit
distance
DC Power
Supply
Arduino
Uno R3
HC-SR04
3 feet (36 inches) approx.
when nobody enters

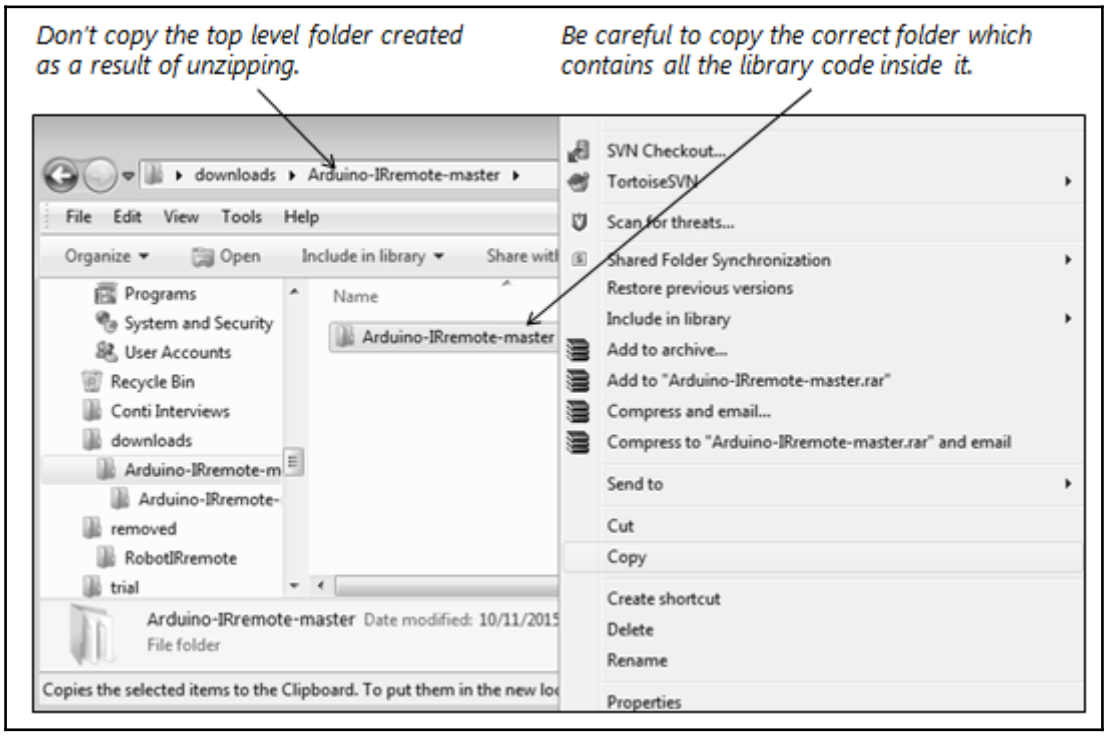
Chapter 9: Day 7 - The World of Transmitters, Receivers, and Transceivers

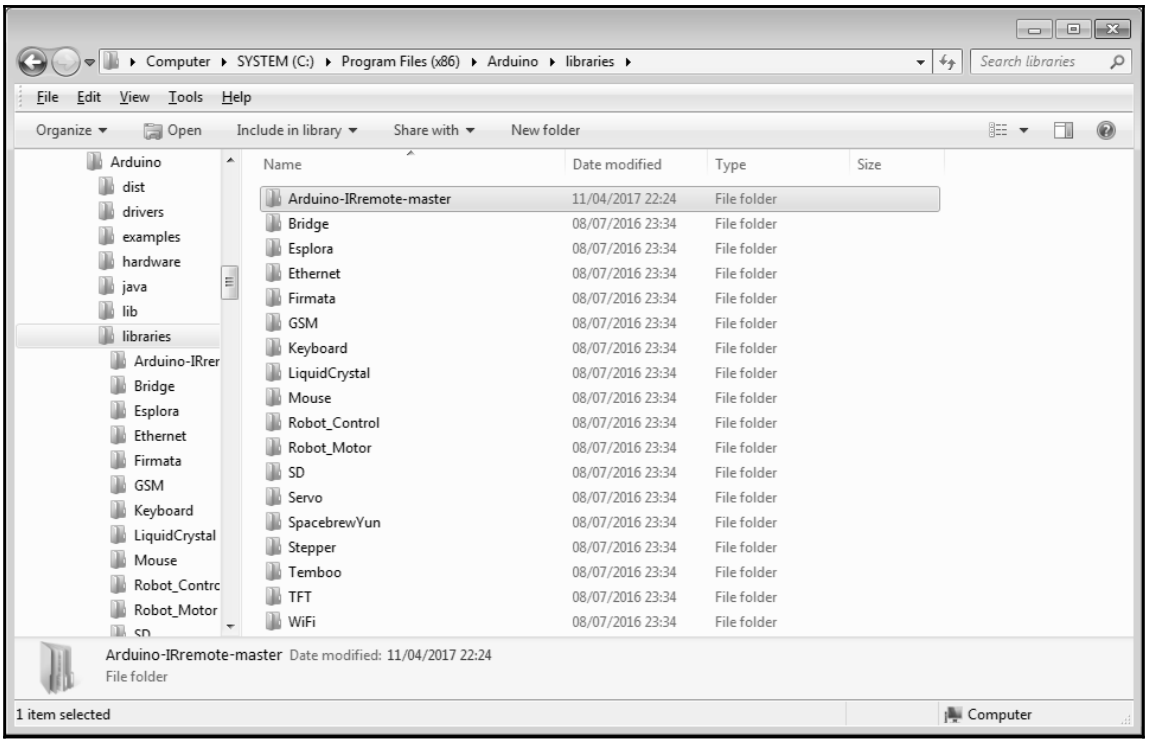


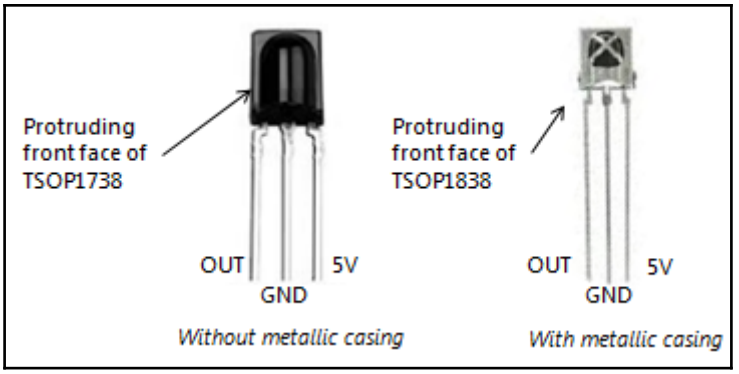


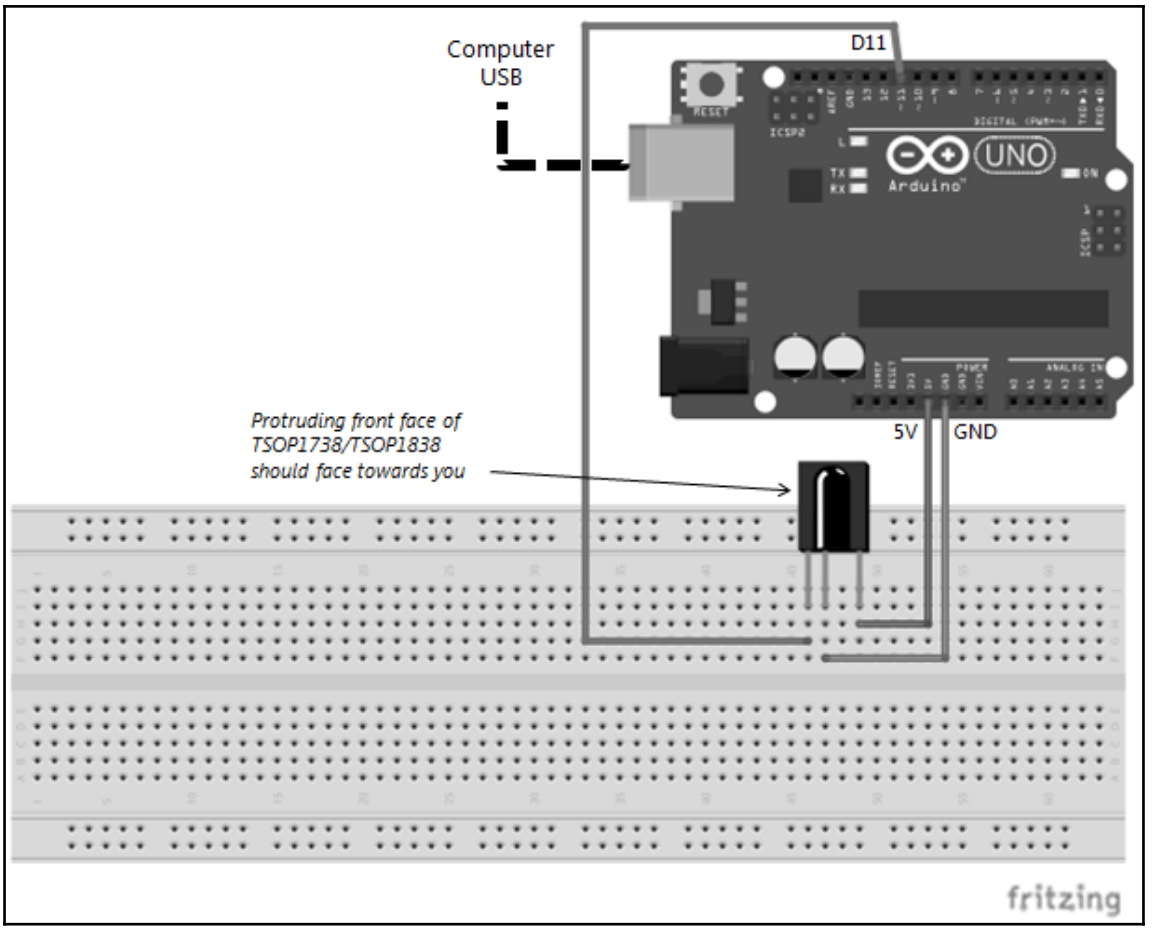

Latest release
2.1.0
841e77a
1
Navigate to the latest release for the IR Remote Library by Ken Shirriff.
2
Download the ZIP file for the latest release
2.1.0 - Stable Release
z3t0 released this on Feb 21, 2016 · 61 commits to dev since this release
Excerpt from changelog.md
2.1.0 - 2016/02/20
Improved Debugging PR #258
Display TIME instead of TICKS PR #258
2.0.4 - 2016/02/20
Add Panasonic and JVC to IRrecord example PR
2.0.3 - 2016/02/20
Change IRSend Raw parameter to const PR
2.0.2 - 2015/12/02
Added IRremoteInfo Sketch - PR
Enforcing changelog.md
Downloads
Arduino-IRremote-dev.zip
69.6 KB

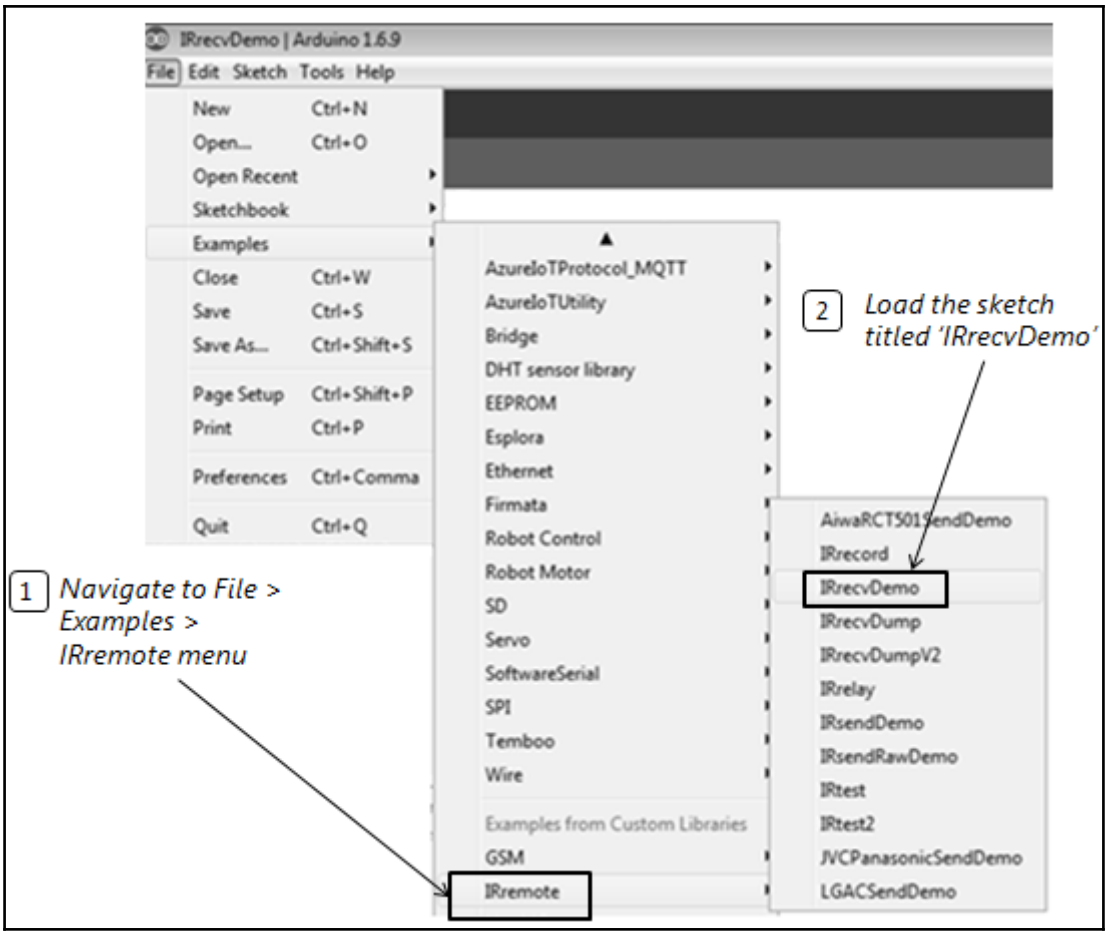

Arduino-IRremote-master ▸ Arduino-IRremote-master ▸
Search Arduino-IR...
File Edit View Tools Help
Organize Include in library Share with New folder
Control Panel
All Control Panel Items
Appearance and Personalization
Clock, Language, and Region
Ease of Access
Hardware and Sound
Network and Internet
Programs
System and Security
User Accounts
Recycle Bin
Arduino-IRremote-master
Arduino-IRremote-master
Name
Date modified
Type
examples 10/11/2015 13:02 File folder
.gitignore 10/11/2015 13:02 GITIGNORE File
.travis.yml 10/11/2015 13:02 YML File
changelog.md 10/11/2015 13:02 MD File
Contributors.md 10/11/2015 13:02 MD File
ir_Aiwa.cpp 10/11/2015 13:02 C++ Source
ir_Denon.cpp 10/11/2015 13:02 C++ Source
ir_Dish.cpp 10/11/2015 13:02 C++ Source
ir_JVC.cpp 10/11/2015 13:02 C++ Source
ir_LG.cpp 10/11/2015 13:02 C++ Source
31 items
31 items
Computer

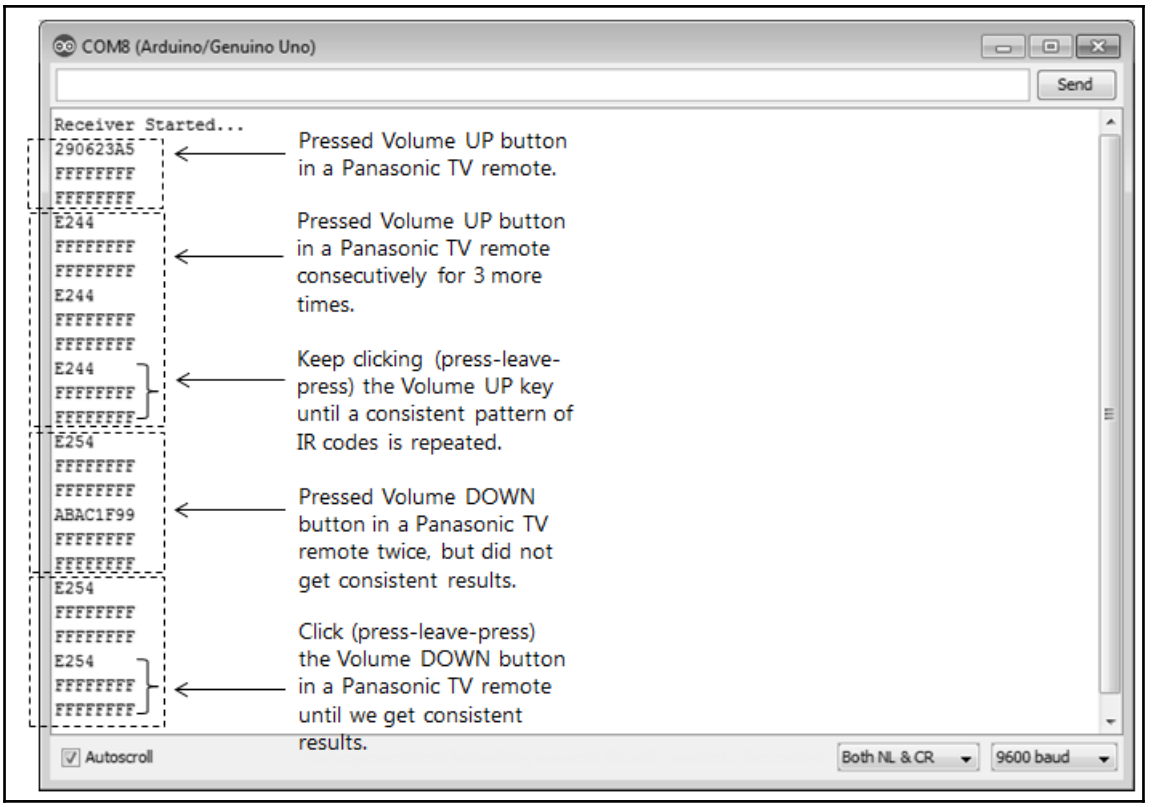

Don't copy the top level folder created as a result of unzipping.
Be careful to copy the correct folder which contains all the library code inside it.
downloads ▸ Arduino-IRremote-master ▸
File Edit View Tools Help
Organize Open Include in library
Programs
System and Security
User Accounts
Recycle Bin
Conti Interviews
downloads
Arduino-IRremote-m
Arduino-IRremote-
removed
RobotIRremote
trial
Name
Arduino-IRremote-master
Arduino-IRremote-master Date modified: 10/11/2015
File folder
Copies the selected items to the Clipboard. To put them in the new lo
SVN Checkout...
TortoiseSVN
Scan for threats...
Shared Folder Synchronization
Restore previous versions
Include in library
Add to archive...
Add to "Arduino-IRremote-master.rar"
Compress and email...
Compress to "Arduino-IRremote-master.rar" and email
Send to
Cut
Copy
Create shortcut
Delete
Rename
Properties

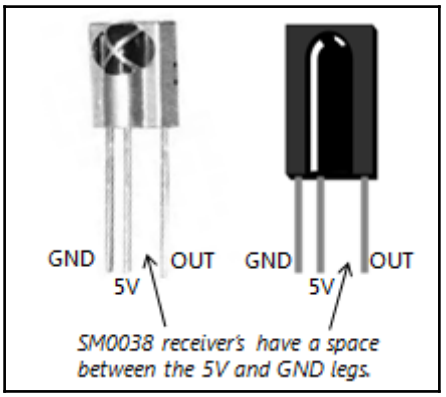

Computer ▸ SYSTEM (C:) ▸ Program Files (x86) ▸ Arduino ▸ libraries ▸
Search libraries
File Edit View Tools Help
Organize Open Include in library Share with New folder
Arduino
dist
drivers
examples
hardware
java
lib
libraries
Arduino-IRrer
Bridge
Esplora
Ethernet
Firmata
GSM
Keyboard
LiquidCrystal
Mouse
Robot_Contrc
Robot_Motor
SD
Name
Date modified
Type
Size
Arduino-IRremote-master 11/04/2017 22:24 File folder
Bridge 08/07/2016 23:34 File folder
Esplora 08/07/2016 23:34 File folder
Ethernet 08/07/2016 23:34 File folder
Firmata 08/07/2016 23:34 File folder
GSM 08/07/2016 23:34 File folder
Keyboard 08/07/2016 23:34 File folder
LiquidCrystal 08/07/2016 23:34 File folder
Mouse 08/07/2016 23:34 File folder
Robot_Control 08/07/2016 23:34 File folder
Robot_Motor 08/07/2016 23:34 File folder
SD 08/07/2016 23:34 File folder
Servo 08/07/2016 23:34 File folder
SpacebrewYun 08/07/2016 23:34 File folder
Stepper 08/07/2016 23:34 File folder
Temboo 08/07/2016 23:34 File folder
TFT 08/07/2016 23:34 File folder
WiFi 08/07/2016 23:34 File folder
Arduino-IRremote-master Date modified: 11/04/2017 22:24
File folder
1 item selected
Computer

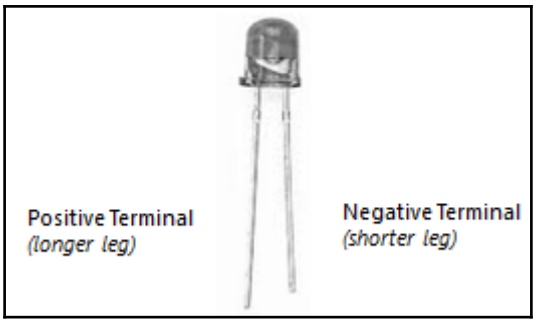

Protruding front face of TSOP1738
OUT
5V
GND
Without metallic casing
Protruding front face of TSOP1838
OUT
5V
GND
With metallic casing

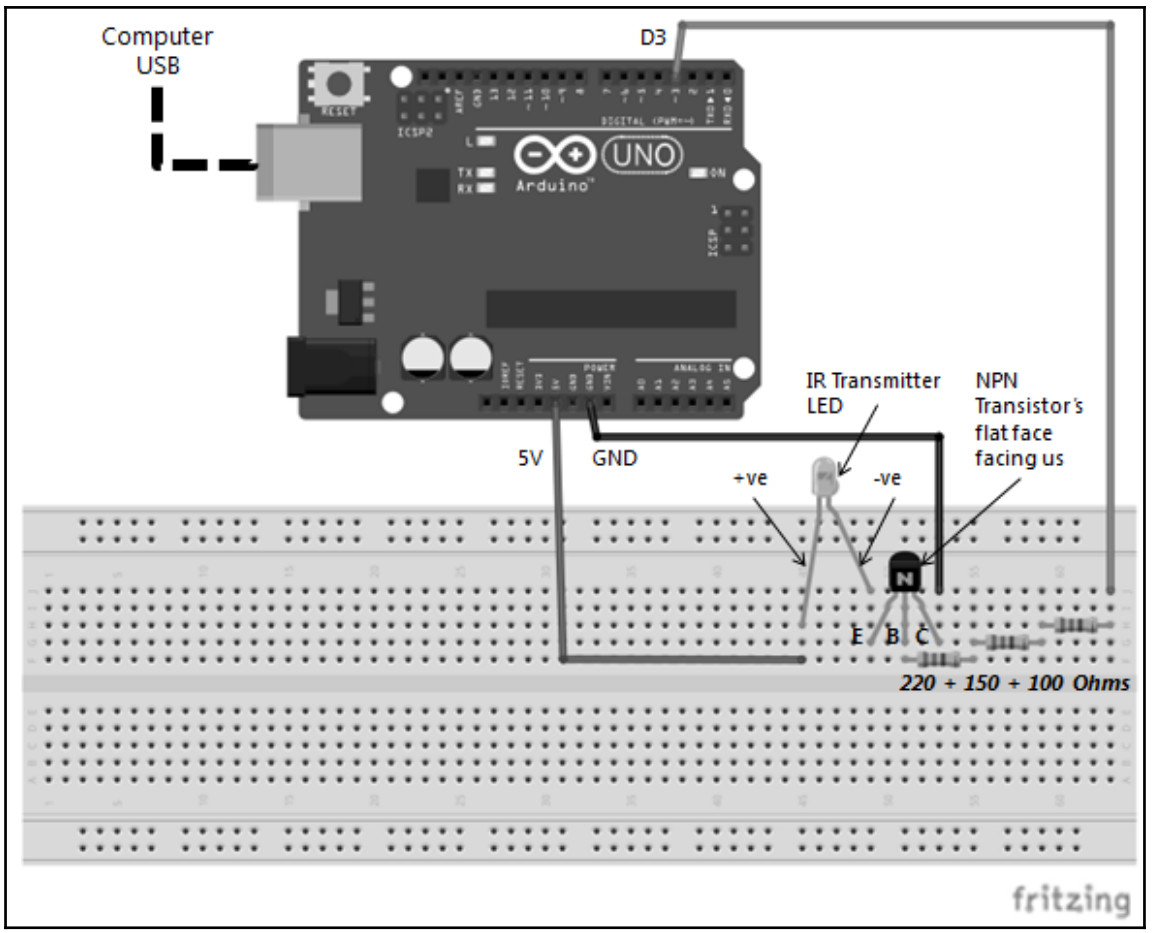

Computer
USB
D11
RESET
UNO
Arduino
Protruding front face of
TSOP1738/TSOP1838
should face towards you
5V
GND
fritzing


IRrecvDemo | Arduino 1.6.9
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Open Recent
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
AzureIoTProtocol_MQTT
AzureIoTUtility
Bridge
DHT sensor library
EEPROM
Esplora
Ethernet
Firmata
Robot Control
Robot Motor
SD
Servo
SoftwareSerial
SPI
Temboo
Wire
Examples from Custom Libraries
GSM
IRremote
AiwaRCT501SendDemo
IRrecord
IRrecvDemo
IRrecvDump
IRrecvDumpV2
IRrelay
IRsendDemo
IRsendRawDemo
IRtest
IRtest2
JVCPanasonicSendDemo
LGACSendDemo
1 Navigate to File > Examples > IRremote menu
2 Load the sketch titled 'IRrecvDemo'

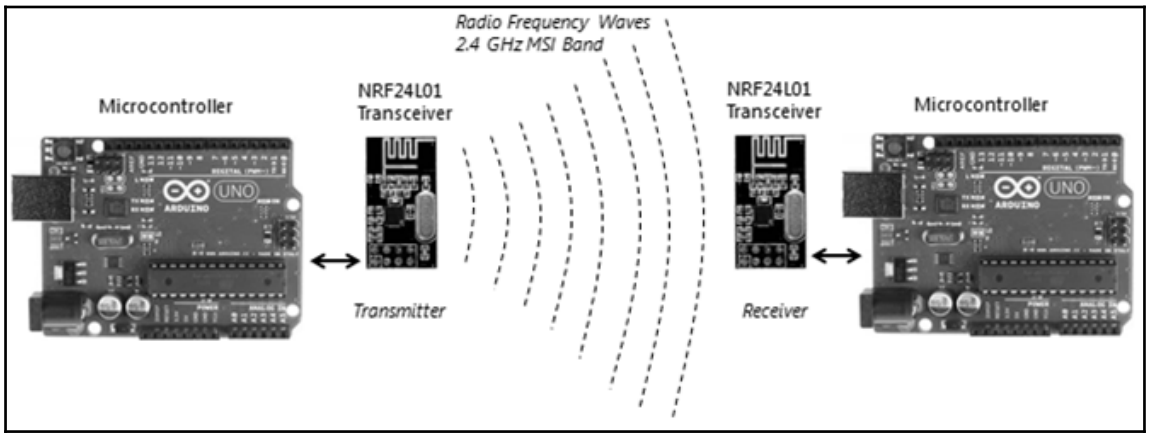

COM8 (Arduino/Genuino Uno)
Send
Receiver Started...
290623A5
FFFFFFFF
FFFFFFFF
E244
FFFFFFFF
FFFFFFFF
E244
FFFFFFFF
FFFFFFFF
E244
FFFFFFFF
FFFFFFFF
E254
FFFFFFFF
FFFFFFFF
ABAC1F99
FFFFFFFF
FFFFFFFF
E254
FFFFFFFF
FFFFFFFF
E254
FFFFFFFF
FFFFFFFF
Pressed Volume UP button in a Panasonic TV remote.
Pressed Volume UP button in a Panasonic TV remote consecutively for 3 more times.
Keep clicking (press-leave-press) the Volume UP key until a consistent pattern of IR codes is repeated.
Pressed Volume DOWN button in a Panasonic TV remote twice, but did not get consistent results.
Click (press-leave-press) the Volume DOWN button in a Panasonic TV remote until we get consistent results.
Autoscroll
Both NL & CR
9600 baud

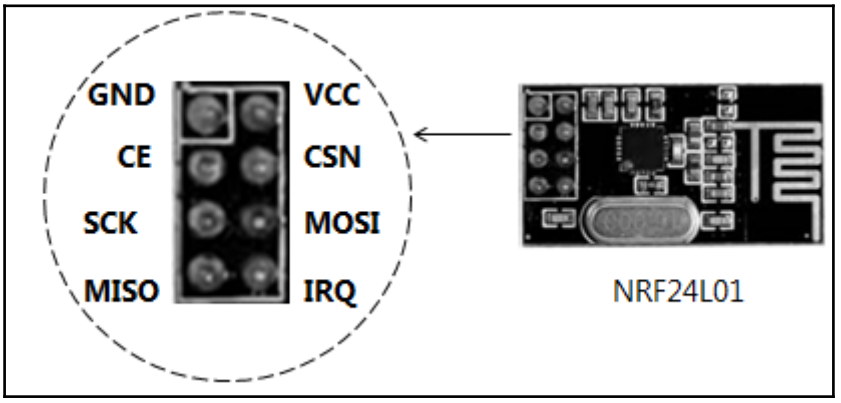

GND
OUT
5V
GND
OUT
5V
SM0038 receiver's have a space between the 5V and GND legs.

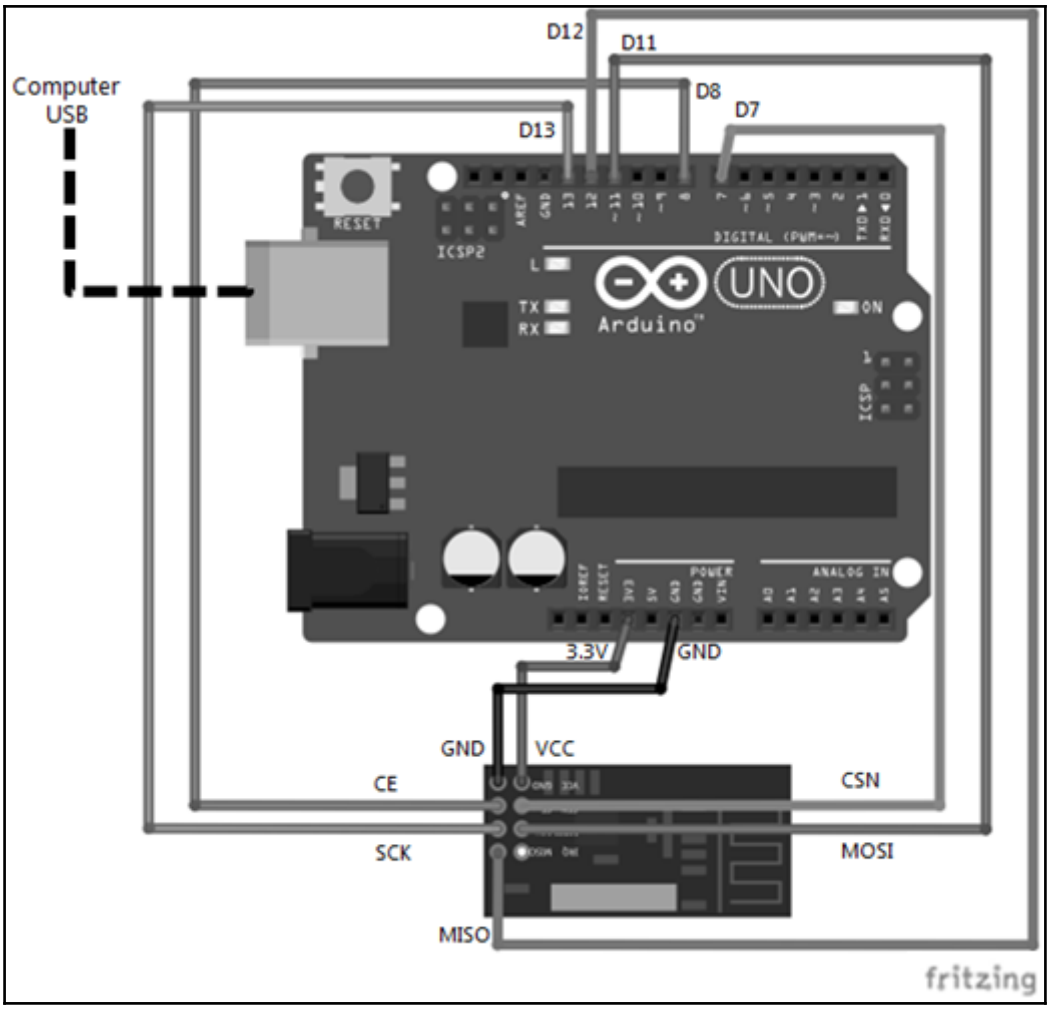

Positive Terminal
(longer leg)
Negative Terminal
(shorter leg)


Computer
USB
D3
IR Transmitter
LED
NPN
Transistor's
flat face
facing us
5V
GND
+ve
-ve
E
B
C
220 + 150 + 100 Ohms
fritzing

Chapter 10: Day 8 - Short Range Wireless Communications







Arduino driver for nRF24L01 http://maniacbug.github.com/RF24

214 commits | 6 branches | 0 releases | 2 contributors

Branch: master | New pull request | Find file | Clone or download

maniacbug Add isValid

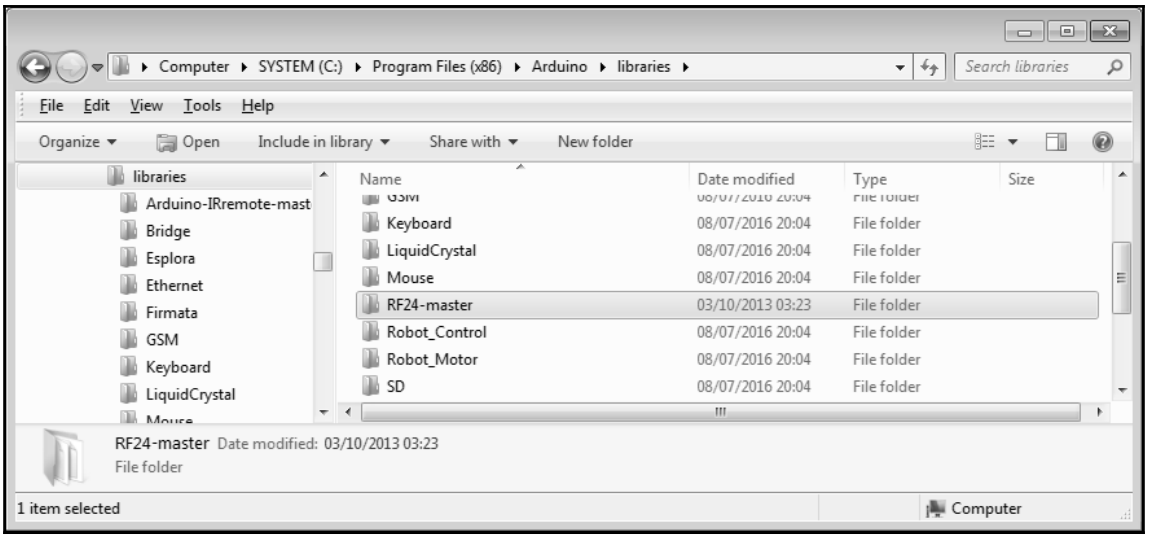
examples	Update examples/led_remote/led_remote.pde
tests	Fix bug introduced in the move to PROGMEM. Props to @basilrx
.gitignore	Update docs for 1.0

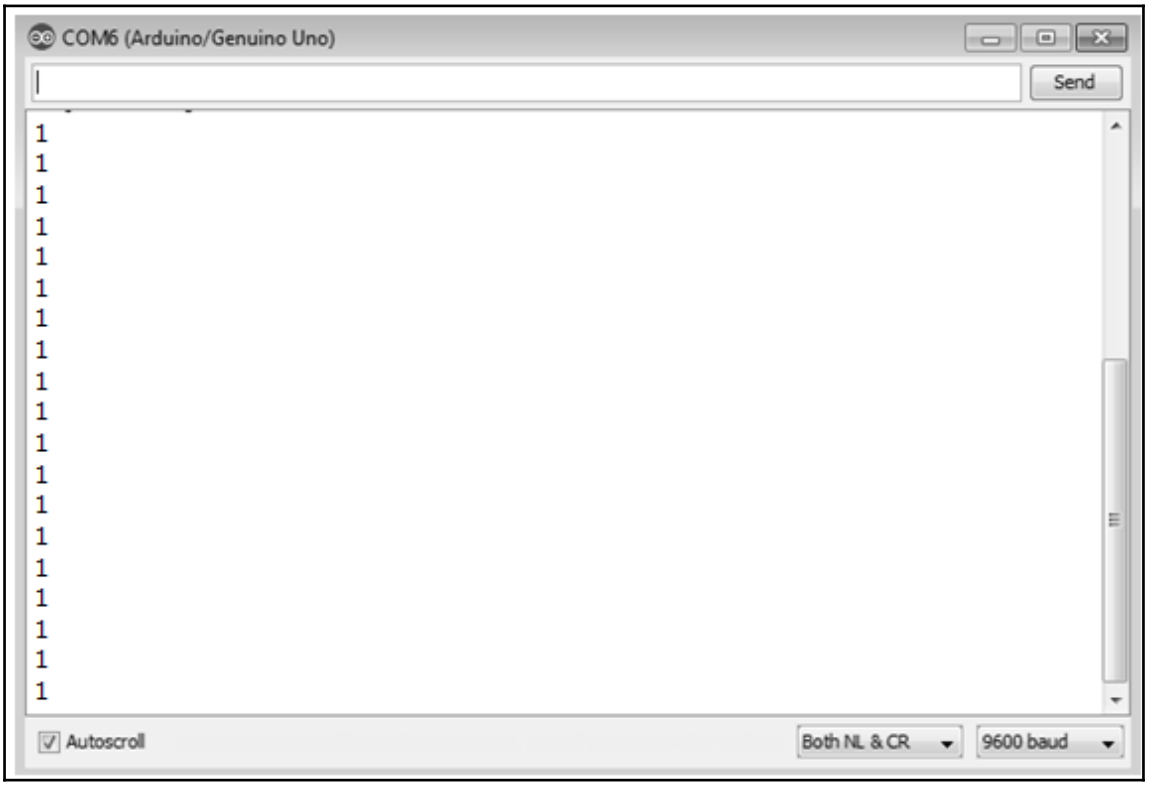
Clone with HTTPS

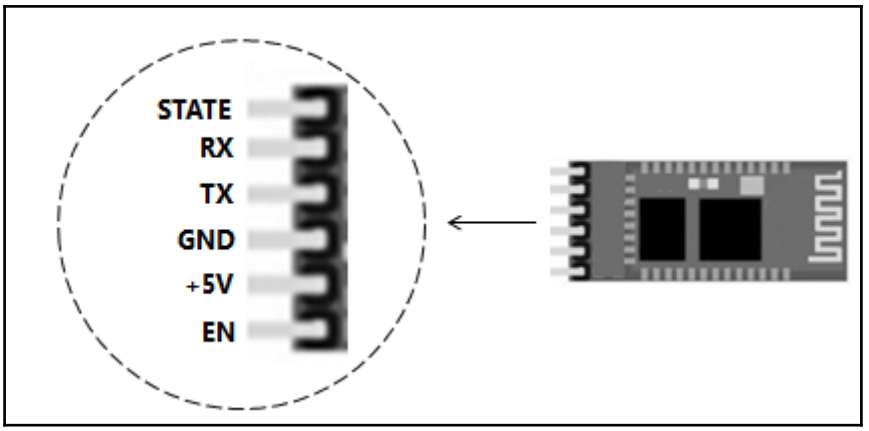
Use Git or checkout with SVN using the web URL.

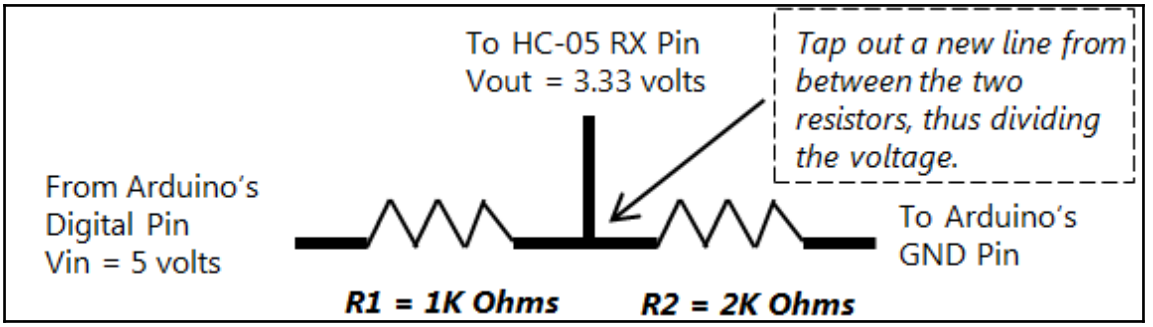
https://github.com/maniacbug/RF24.git

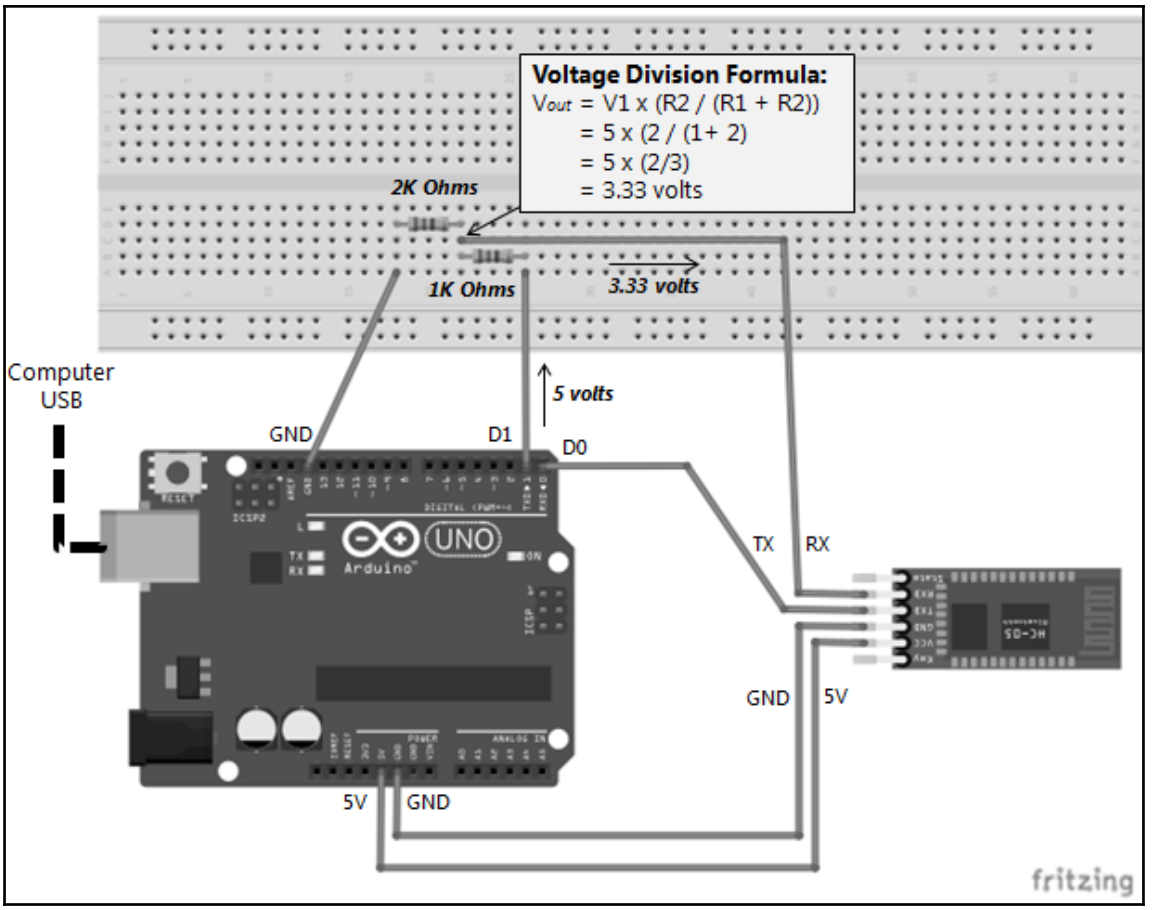
Open in Desktop | Download ZIP


Computer ▸ SYSTEM (C:) ▸ Program Files (x86) ▸ Arduino ▸ libraries ▸
Search libraries
File Edit View Tools Help
Organize Open Include in library Share with New folder
libraries
Arduino-IRremote-mast
Bridge
Esplora
Ethernet
Firmata
GSM
Keyboard
LiquidCrystal
Mouse
Name
Date modified
Type
Size
Keyboard 08/07/2016 20:04 File folder
LiquidCrystal 08/07/2016 20:04 File folder
Mouse 08/07/2016 20:04 File folder
RF24-master 03/10/2013 03:23 File folder
Robot_Control 08/07/2016 20:04 File folder
Robot_Motor 08/07/2016 20:04 File folder
SD 08/07/2016 20:04 File folder
RF24-master Date modified: 03/10/2013 03:23
File folder
1 item selected
Computer


COM6 (Arduino/Genuino Uno)
Send
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
Autoscroll
Both NL & CR
9600 baud

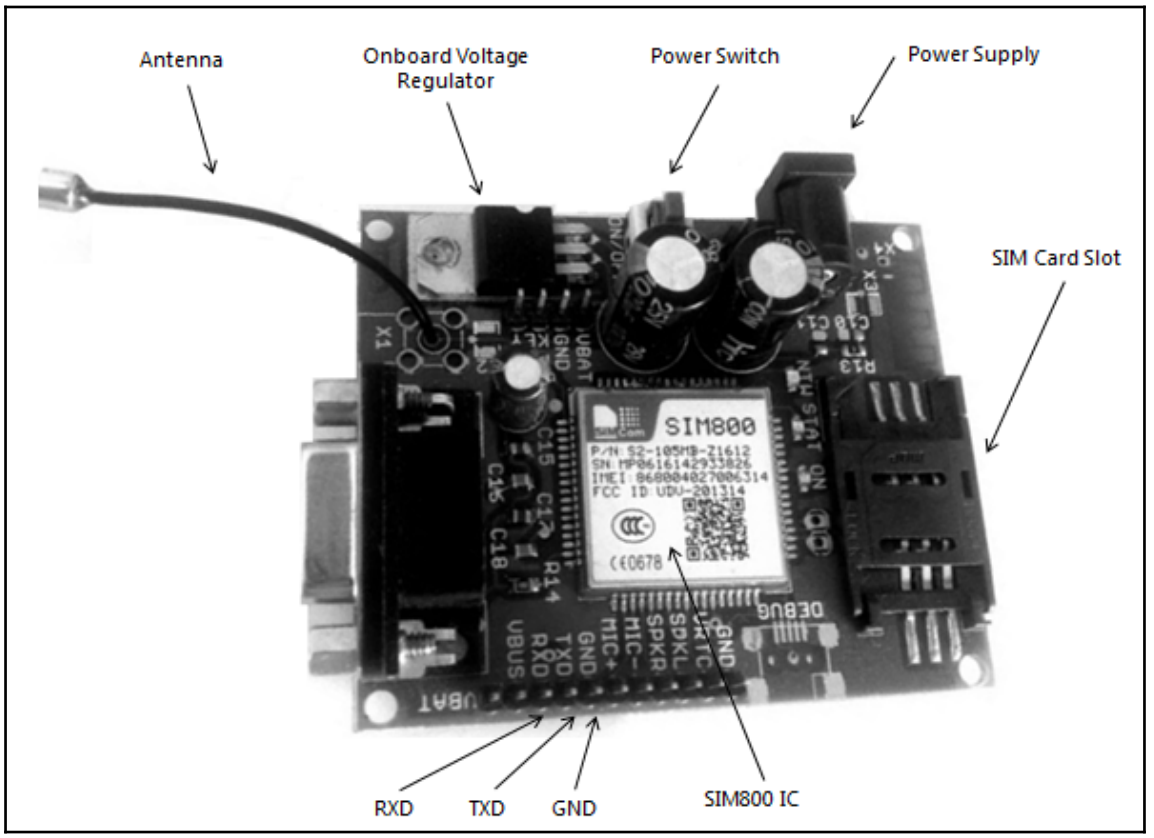

STATE
RX
TX
GND
+5V
EN

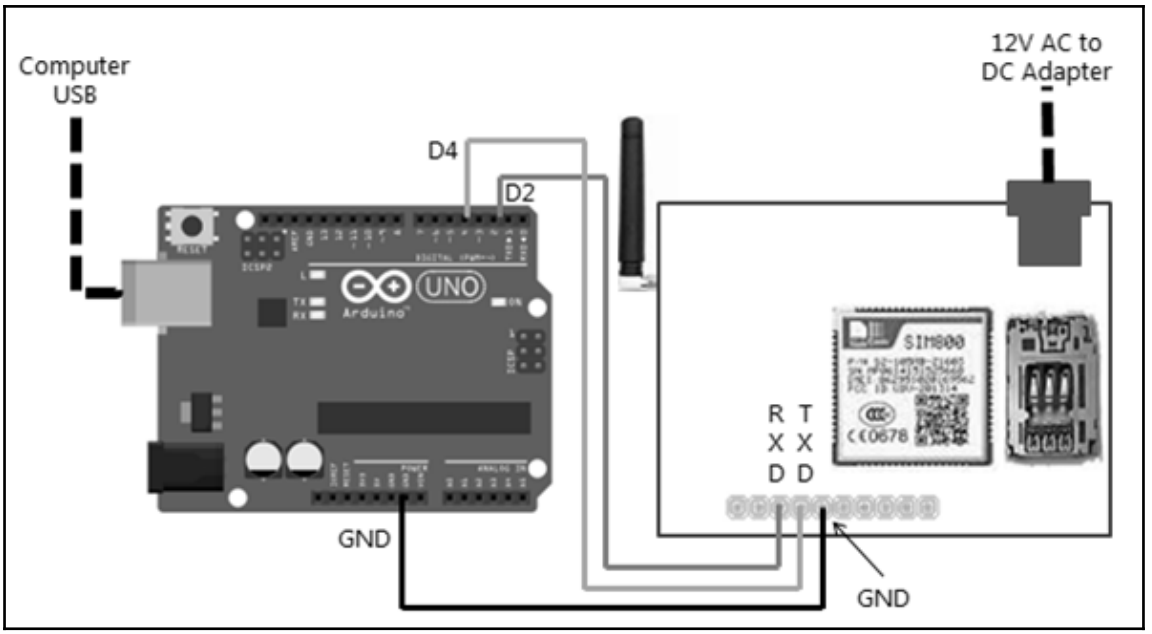

To HC-05 RX Pin
Vout = 3.33 volts
Tap out a new line from between the two resistors, thus dividing the voltage.
From Arduino's Digital Pin
Vin = 5 volts
To Arduino's GND Pin
R1 = 1K Ohms
R2 = 2K Ohms

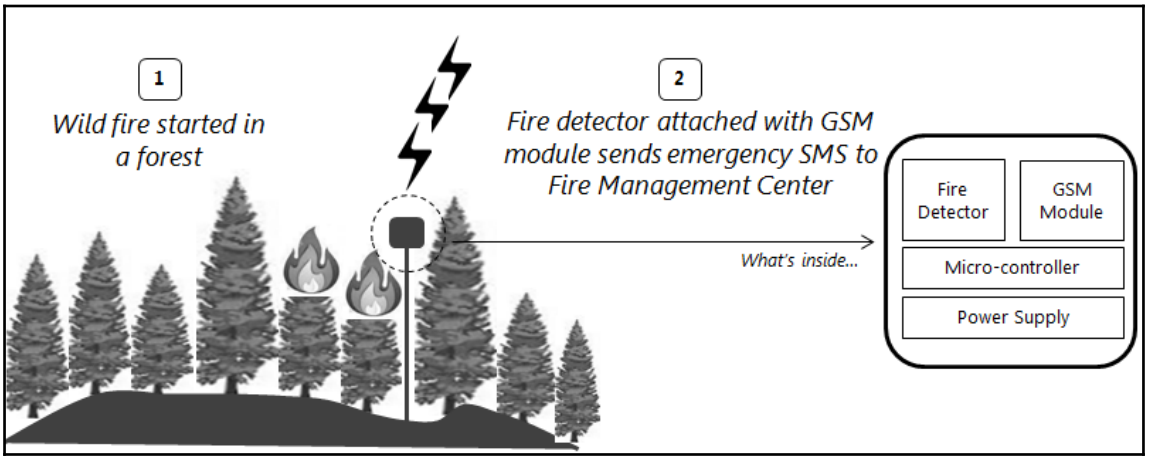

Voltage Division Formula:
Vout = V1 x (R2 / (R1 + R2))
= 5 x (2 / (1+ 2)
= 5 x (2/3)
= 3.33 volts
2K Ohms
1K Ohms
3.33 volts
5 volts
Computer
USB
GND
D1
D0
TX
RX
GND
5V
5V
GND
fritzing


1:39
BT Terminal
Communication
Connected
> 1
> 2
>>

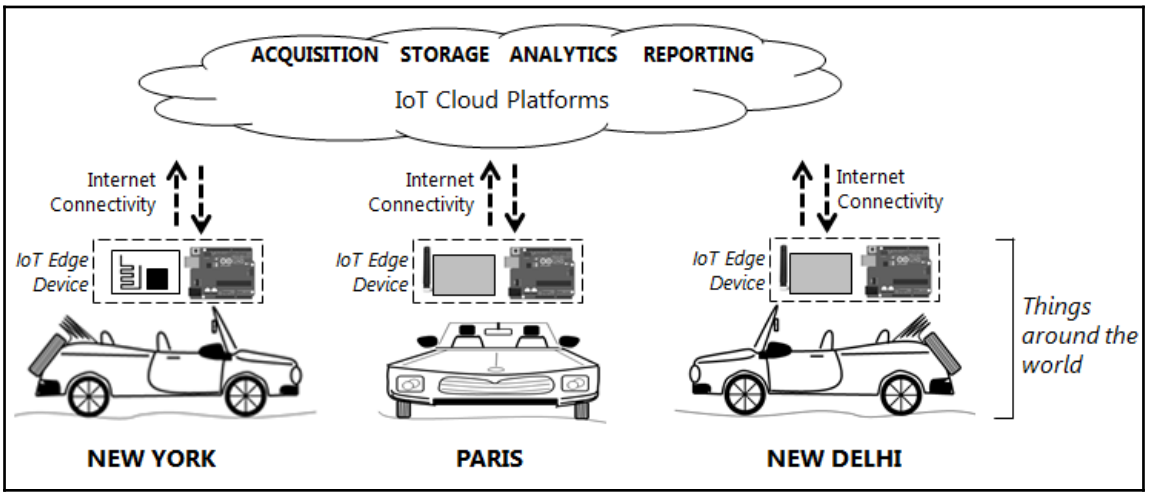
Chapter 11: Day 9 - Long-Range Wireless Communications

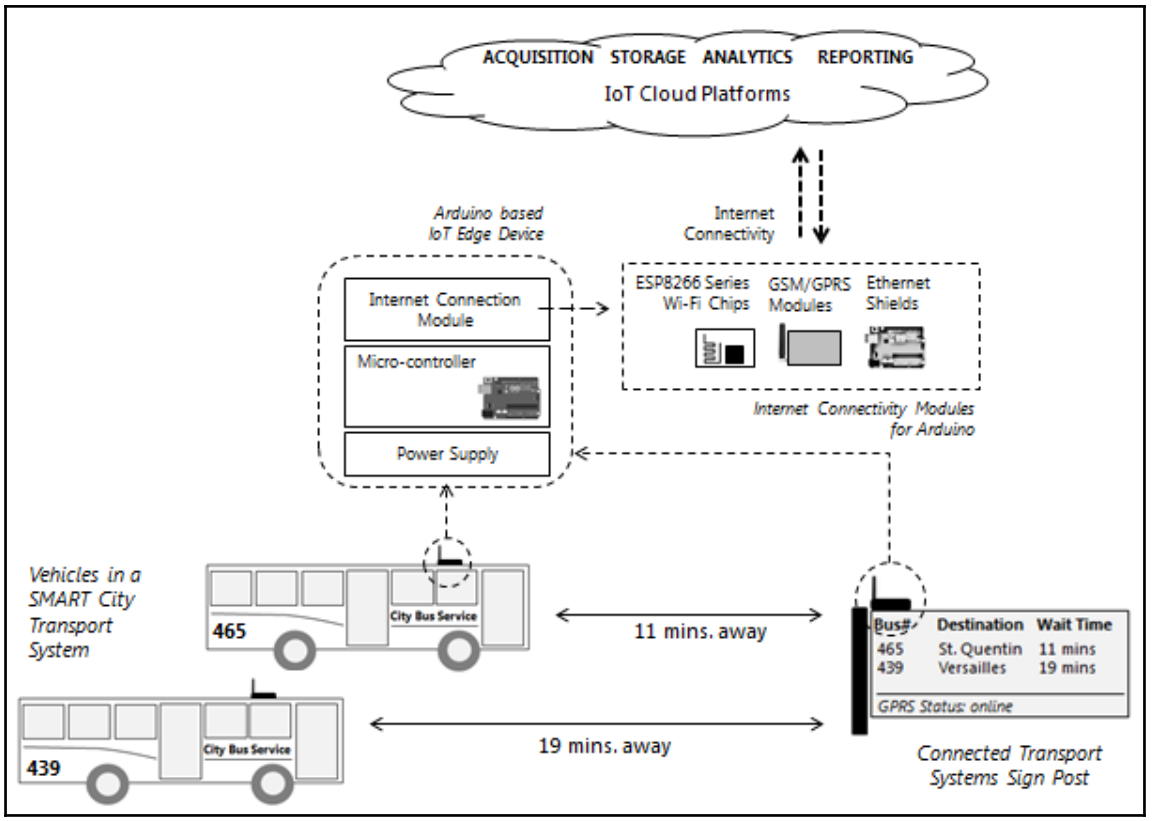


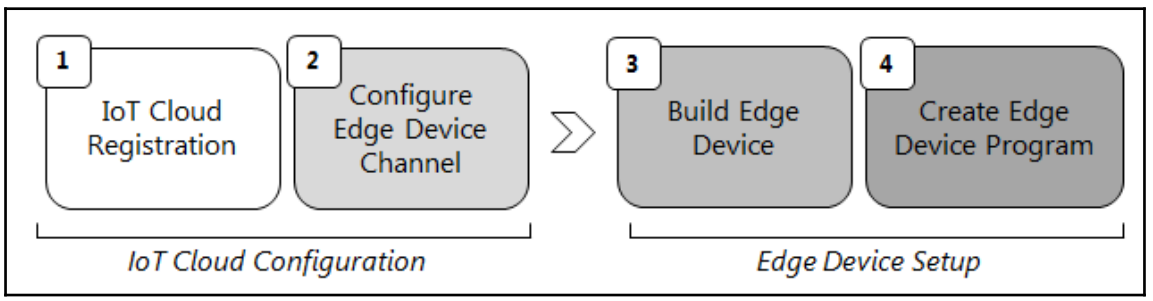

Computer
USB
12V AC to
DC Adapter
D4
D2
UNO
Arduino
SIM800
R T
X X
D D
GND
GND

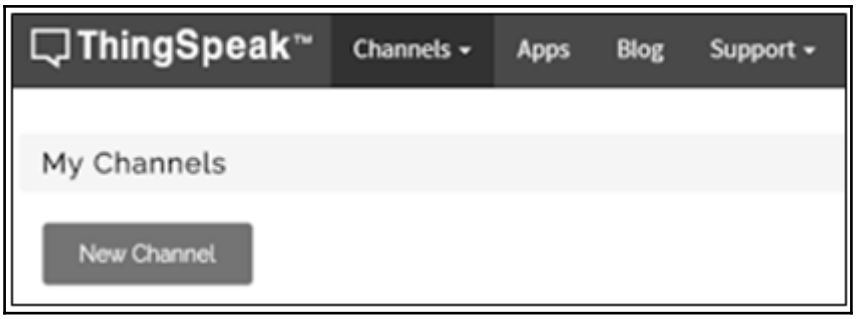

1
Wild fire started in
a forest
2
Fire detector attached with GSM
module sends emergency SMS to
Fire Management Center
What's inside...
Fire
Detector
GSM
Module
Micro-controller
Power Supply

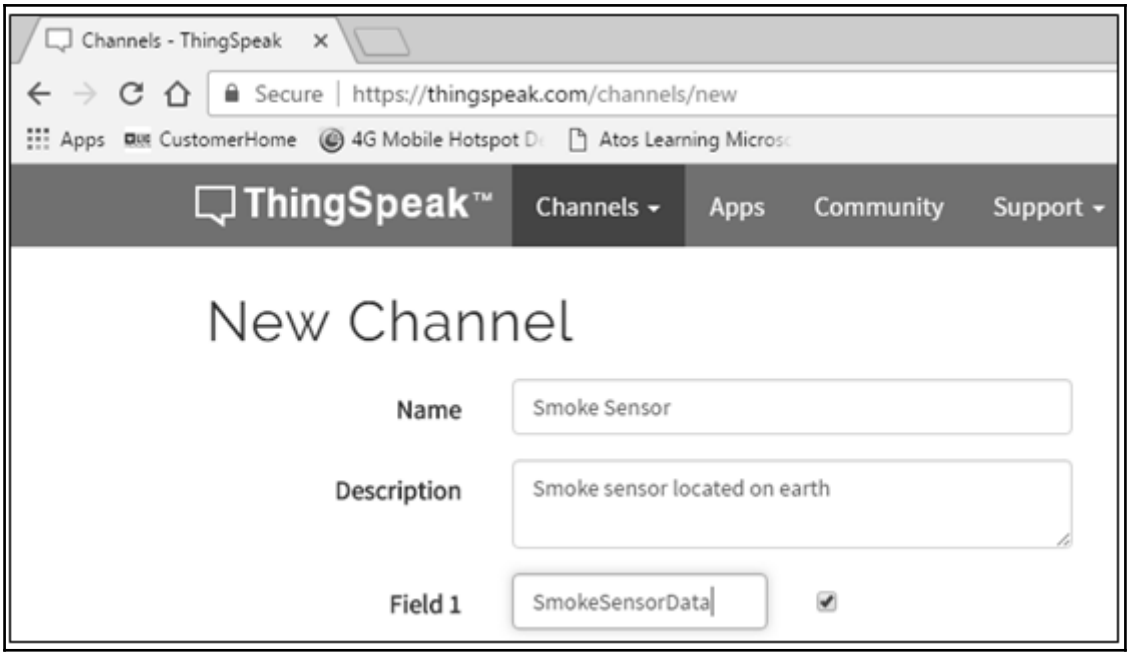
Chapter 12: Day 10 - The Internet of Things

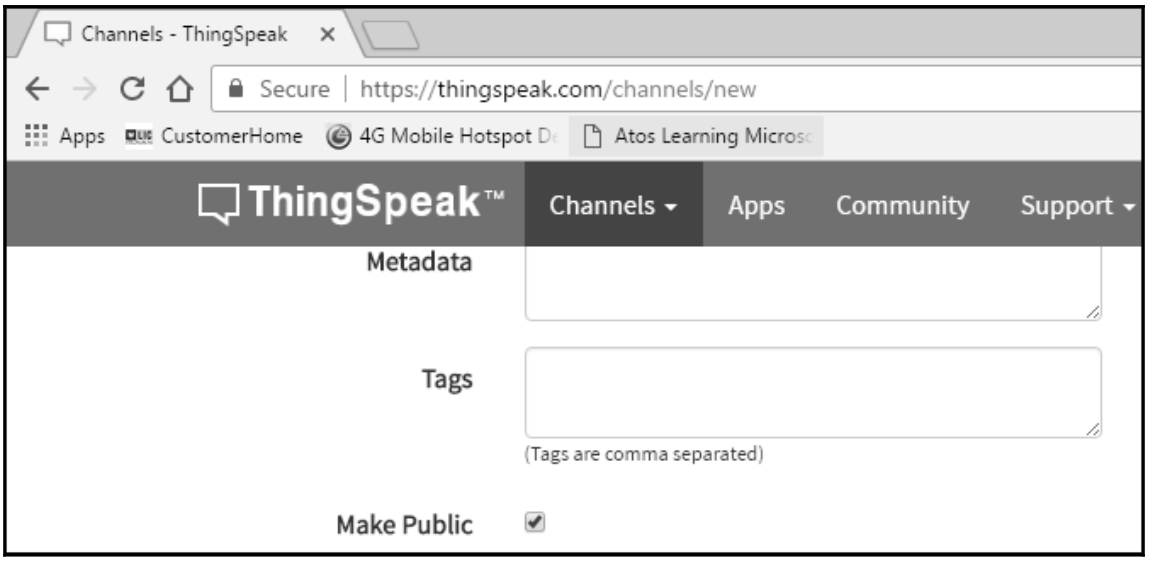


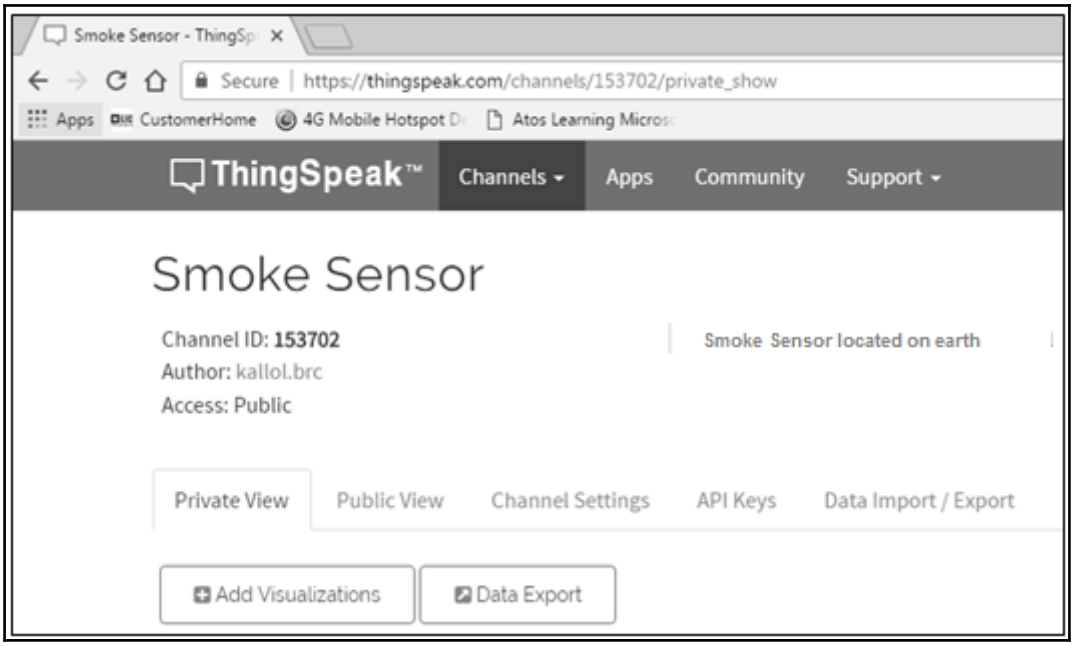

ACQUISITION STORAGE ANALYTICS REPORTING
IoT Cloud Platforms
Arduino based IoT Edge Device
Internet Connectivity
Internet Connection Module
Micro-controller
Power Supply
ESP8266 Series Wi-Fi Chips
GSM/GPRS Modules
Ethernet Shields
Internet Connectivity Modules for Arduino
Vehicles in a SMART City Transport System
465
City Bus Service
11 mins. away
439
City Bus Service
19 mins. away
Bus#
Destination
Wait Time
465
St. Quentin
11 mins
439
Versailles
19 mins
GPRS Status: online
Connected Transport Systems Sign Post


1
IoT Cloud Registration
2
Configure Edge Device Channel
3
Build Edge Device
4
Create Edge Device Program
IoT Cloud Configuration
Edge Device Setup


ThingSpeak™
Channels
Apps
Blog
Support
My Channels
New Channel


Channels - ThingSpeak
Secure
https://thingspeak.com/channels/new
Apps
CustomerHome
4G Mobile Hotspot
Atos Learning
ThingSpeak™
Channels
Apps
Community
Support
New Channel
Name
Smoke Sensor
Description
Smoke sensor located on earth
Field 1
SmokeSensorData


Channels - ThingSpeak
Secure | https://thingspeak.com/channels/new
Apps
CustomerHome
4G Mobile Hotspot D
Atos Learning Micros
ThingSpeak™
Channels
Apps
Community
Support
Metadata
Tags
(Tags are comma separated)
Make Public


Smoke Sensor - ThingSp
Secure | https://thingspeak.com/channels/153702/private_show
Apps
CustomerHome
4G Mobile Hotspot D
Atos Learning Micros
ThingSpeak™
Channels
Apps
Community
Support
Smoke Sensor
Channel ID: 153702
Author: kallol.brc
Access: Public
Smoke Sensor located on earth
Private View
Public View
Channel Settings
API Keys
Data Import / Export
Add Visualizations
Data Export

https://api.thingspeak.co

Secure | https://api.thingspeak.com/update.json?api_key=ID83C0GFDJM9B7GX&field1=58

Apps 4G Mobile Hotspot D

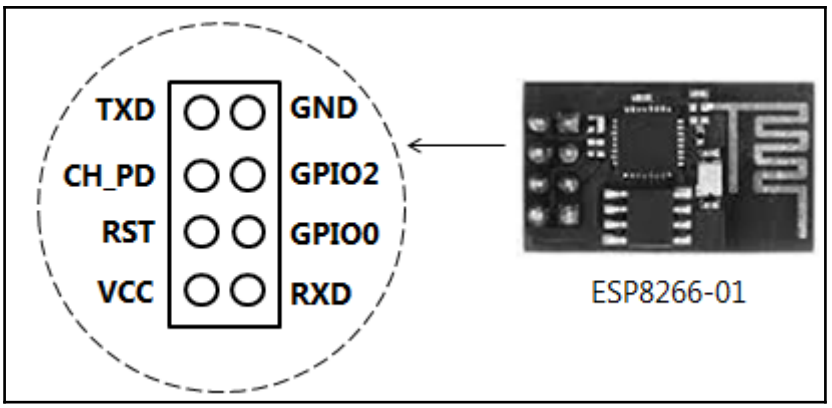

```
{"channel_id":153702,"field1":"58","field2":null,"field3":null,"fiel
d4":null,"field5":null,"field6":null,"field7":null,"field8":null,"cr
eated_at":"2017-06-
12T18:04:07Z","entry_id":37,"status":null,"latitude":null,"longitude
":null,"elevation":null}
```

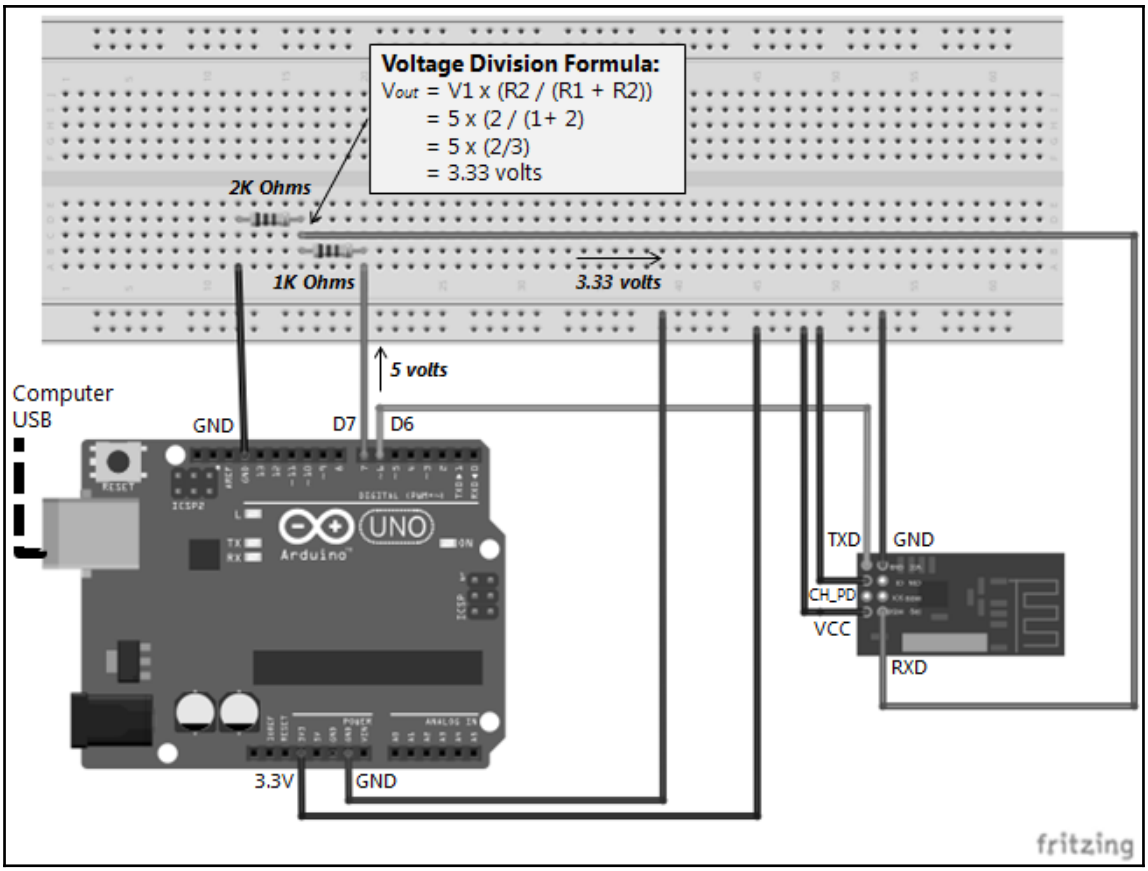

api.thingspeak.com/chan

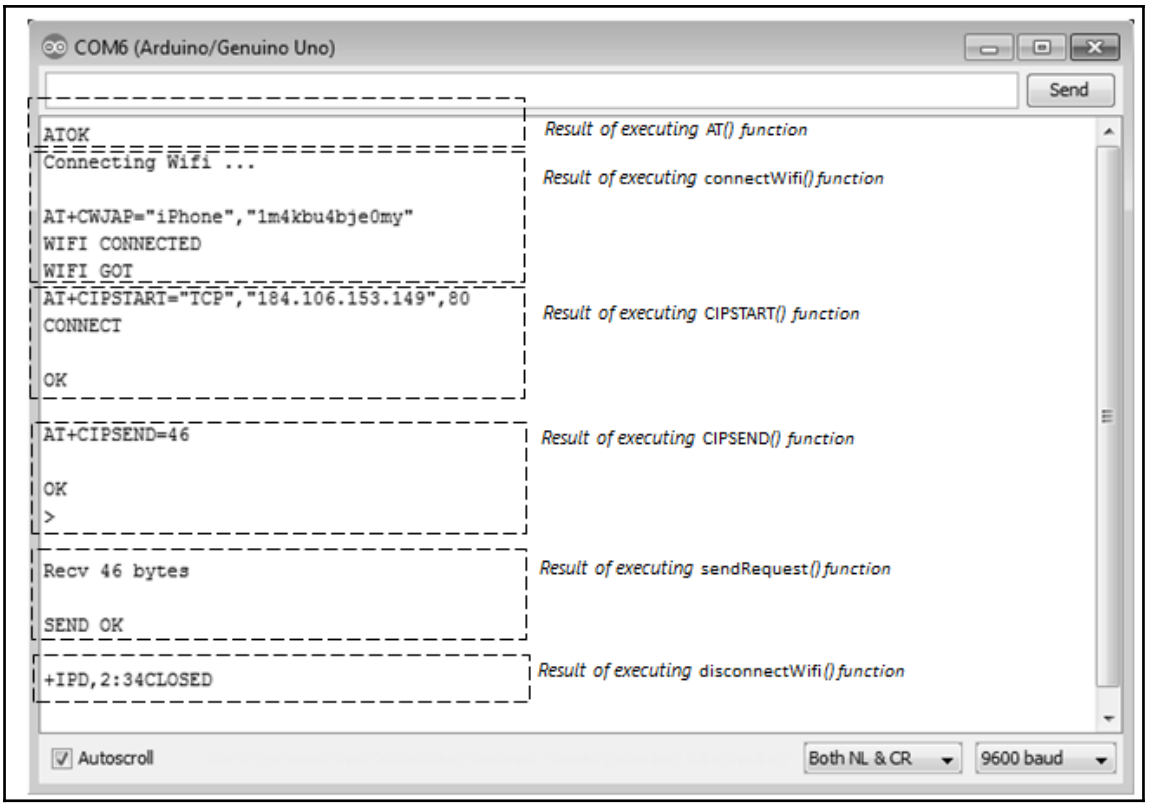
api.thingspeak.com/channels/153702/feeds.json?key=G47577QHO93IWHOU&results=1

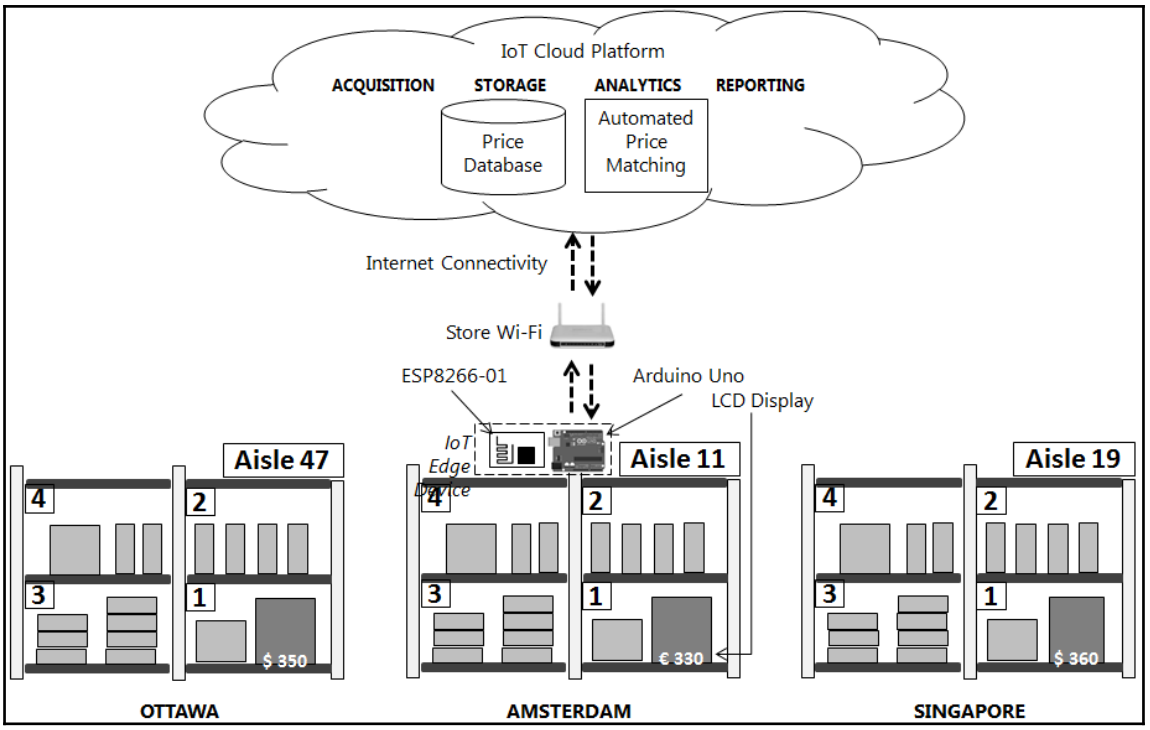
Apps 4G Mobile Hotspot D


```
{"channel":{"id":153702,"name":"Smoke Sensor","description":"Smoke
Sensor located in Public
School","latitude":"0.0","longitude":"0.0","field1":"SmokeSensorRead
ing","created_at":"2016-09-02T17:12:06Z","updated_at":"2017-06-
12T17:35:08Z","last_entry_id":36},"feeds":[{"created_at":"2017-06-
12T17:35:09Z","entry_id":36,"field1":"58"}]}
```


Voltage Division Formula:
Vout = V1 x (R2 / (R1 + R2))
= 5 x (2 / (1+ 2)
= 5 x (2/3)
= 3.33 volts
2K Ohms
1K Ohms
3.33 volts
5 volts
Computer
USB
GND
D7
D6
UNO
Arduino
TXD
GND
CH_PD
VCC
RXD
3.3V
GND
fritzing


COM6 (Arduino/Genuino Uno)
Send
AT
OK
Result of executing AT() function
Connecting Wifi ...
AI+CWJAP="iPhone","1m4kbu4bje0my"
WIFI CONNECTED
WIFI GOT
Result of executing connectWifi() function
AT+CIPSTART="TCP","184.106.153.149",80
CONNECT
OK
Result of executing CIPSTART() function
AT+CIPSEND=46
OK
>
Result of executing CIPSEND() function
Recv 46 bytes
SEND OK
Result of executing sendRequest() function
+IPD,2:34CLOSED
Result of executing disconnectWifi() function
Autoscroll
Both NL & CR
9600 baud


IoT Cloud Platform
ACQUISITION
STORAGE
ANALYTICS
REPORTING
Price Database
Automated Price Matching
Internet Connectivity
Store Wi-Fi
ESP8266-01
Arduino Uno
LCD Display
IoT Edge Device
Aisle 47
Aisle 11
Aisle 19
$ 350
€ 330
$ 360
OTTAWA
AMSTERDAM
SINGAPORE