Arduino - Ultrasonic Sensor with LED's and buzzer by RuiSantos

Author: RuiSantos   Random Nerd Tutorials

Hi guys, My name is Rui Santos. Who am I? I'm a 19 years old student currently studying at FEUP Electrical Engineering. I'm Portuguese. I've created this account to share my electronics projects. If you guys enjoy my projects you can visit my website for more information. Or contact me by sending an email to rffsantos16 at gmail.com

Intro: Arduino - Ultrasonic Sensor with LED's and buzzer

Hi guys this is my first tutorial, I've just started a few months ago learning electronics (previously I've just knew how to program in C and Python). When I finished this project (took me about 5 hours or something) I've decided to share to help anyone that is starting in electronics.

What's this project about?
Basically we have an Ultrasonic sensor that measures the distance and the LED's bar graph will light up according to our distance from the sensor and as we get closer the buzzer beeps in a different way. This circuit can work as a parking sensor! It's easy and cheap.

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You can see this project working right now: http://www.youtube.com/randomnerdtutorials

Parts Required:
1 x Arduino
1 x 74HC595 8 Bit Shift Register
1 x Breadboard
8 x LED's (for example: 3x red, 3x yellow, 2x green)
9 x 220 Ohm Resisters
1 x Buzzer
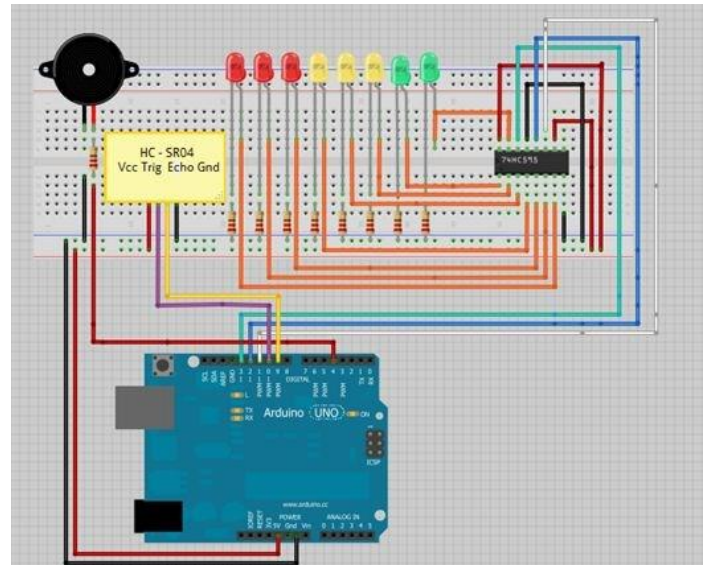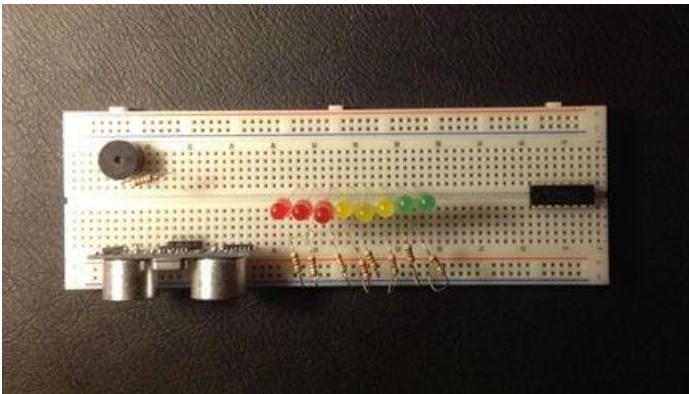1 x Ultrasonic Sensor (for exemple: HC-SR 04)
Jumper Wires
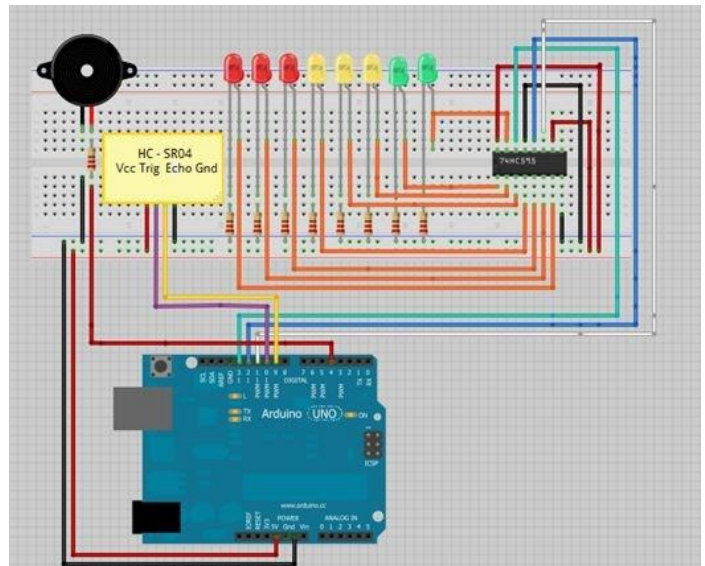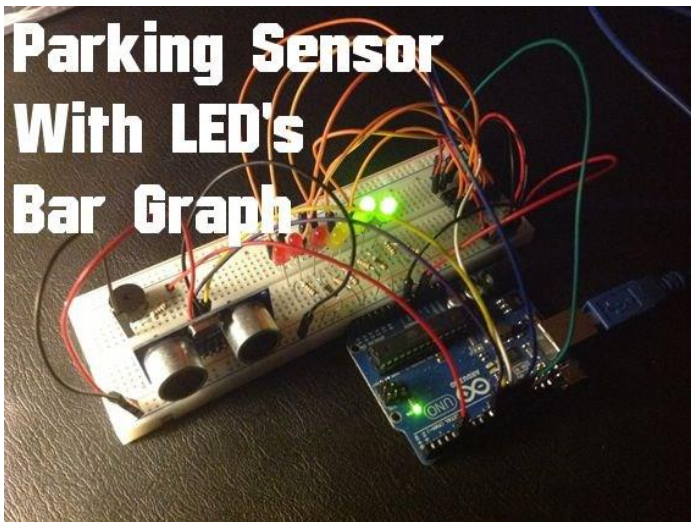
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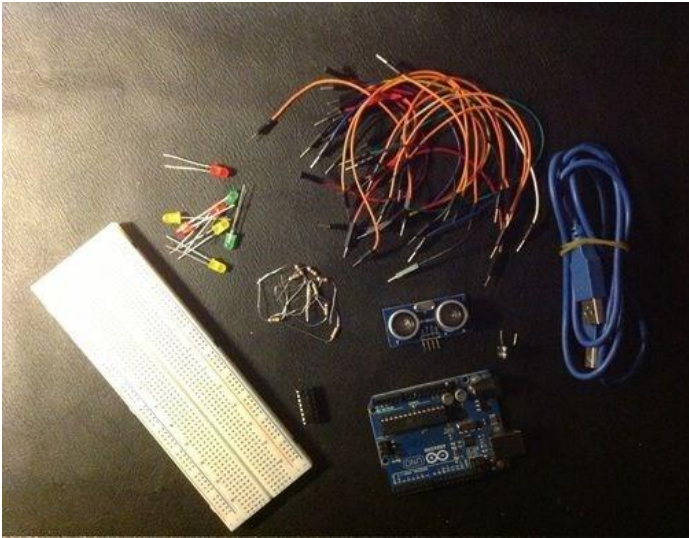
Step 1: Let's start

First you should place all the components on the breadboard, check the picture.

Step 2: Wires...

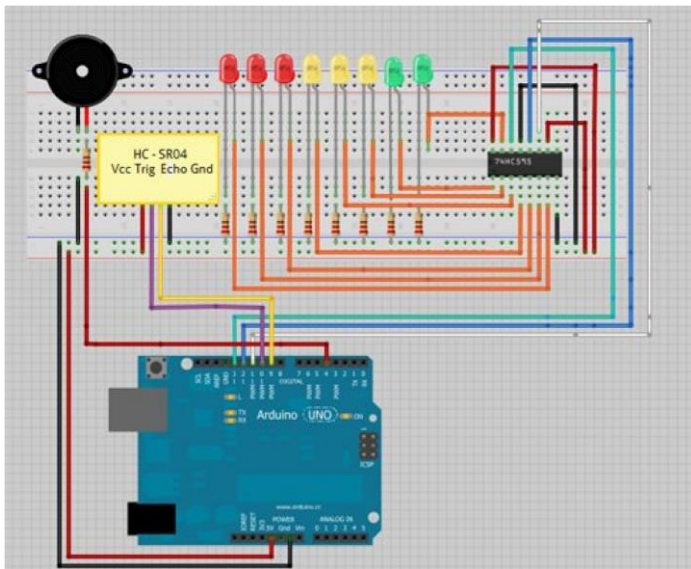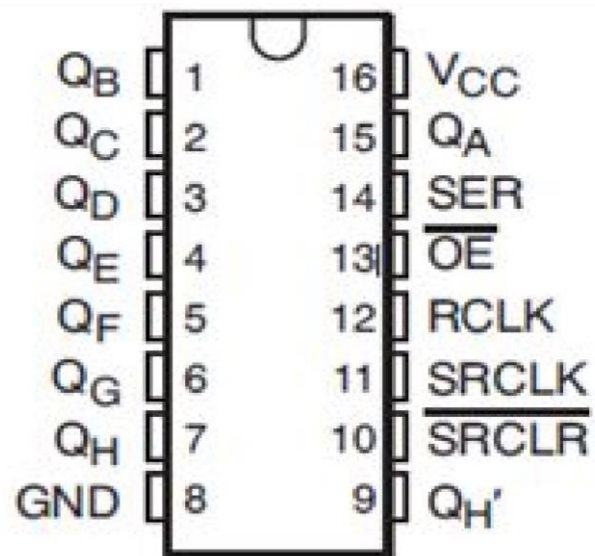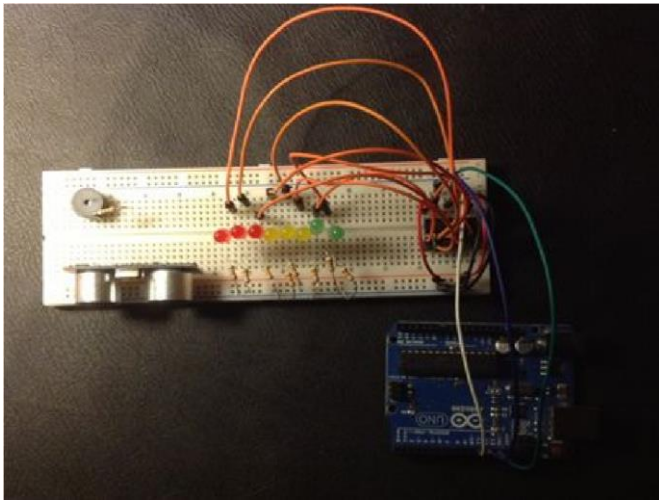**Wire connection: 74HC595 8 Bit Shift Register**
Ground (black wire) – Pin 8 and Pin 13
5 V (red wire) – Pin 10 and Pin 16
IC Pin 11 (white wire) - Arduino Pin 11
IC Pin 12 (blue wire) – Arduino Pin 12
IC Pin 14 (gree wire)– Arduino Pin 13
1 st LED (orange wire) – IC Pin 15
2 nd LED (orange wire) to 8th LED – IC Pin 1 to IC Pin 8
Note this connections to the LED's must be to their positive lead (this means the longer one)

Wire connection: LED's
Now to the negative lead use one resistor per led and connect them to the ground (black wires)

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Q_B	1	16	V_{CC}

Q_B — 1 — 16 — V_{CC}
Q_C — 2 — 15 — Q_A
Q_D — 3 — 14 — SER
Q_E — 4 — 13 — $\overline{OE}$
Q_F — 5 — 12 — RCLK
Q_G — 6 — 11 — SRCLK
Q_H — 7 — 10 — $\overline{SRCLR}$
GND — 8 — 9 — Q_H'

Step 3: More wires...

Wire connection: Ultrasonic Sensor: HC-SR04

VCC (red wire) – 5V
Trig (violet wire) – Arduino Pin 9
Echo (yellow wire) – Arduino Pin 10
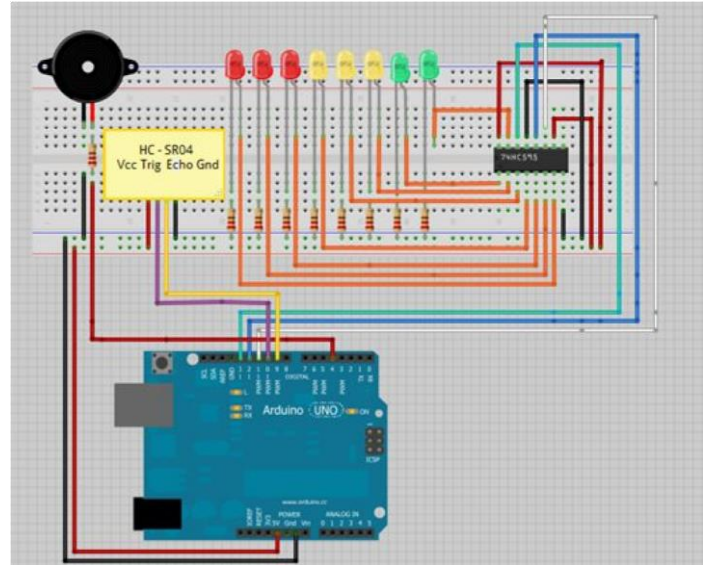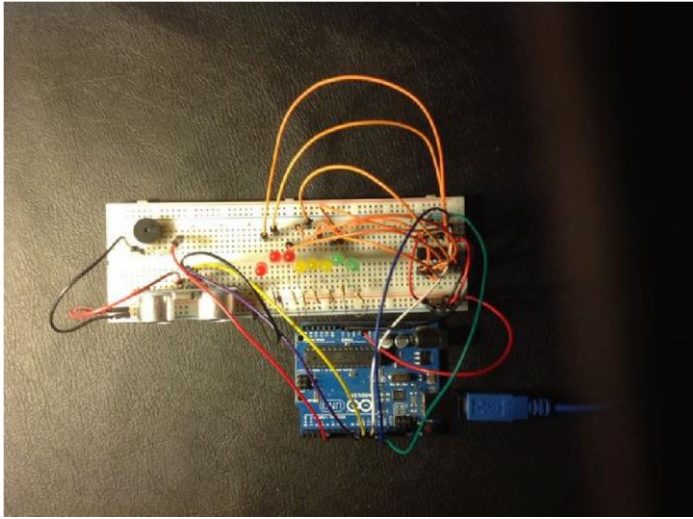Ground (black wire) –GND

Wire connection: Buzzer

Shorter lead (black wire) – ground
Longer lead (resistor in series, red wire) – Arduino Pin 4

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Step 4: Programing

Now upload this code:

```
/*
* IRremote Library - Copyright 2009 Ken Shirriff
* created by Rui Santos, http://randomnerdtutorials.com
* Ultrasonic sensor with LED's and Buzzer
* 2013
*/
int tonePin = 4; //Tone - Red Jumper int
trigPin = 9; //Trig - violet Jumper int
echoPin = 10; //Echo - yellow Jumper int
clockPin = 11; //IC Pin 11 - white Jumper
int latchPin = 12; //IC Pin 12 - Blue Jumper
int dataPin = 13; //IC Pin 14 - Green
Jumper

byte possible_patterns[9] = {
B00000000,
B00000001,
B00000011,
B00000111,
B00001111,
B00011111,
B00111111,
B01111111,
B11111111,
} ;
int
proximity=0;
int duration; int
distance;

void setup() {
//Serial Port
Serial.begin (9600);

pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(clockPin, OUTPUT);
pinMode(latchPin, OUTPUT);
pinMode(dataPin, OUTPUT);
pinMode(tonePin, OUTPUT);
}

void loop() { digitalWrite(latchPin,
LOW); digitalWrite(trigPin, HIGH);
delayMicroseconds(1000);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin,
HIGH); distance = (duration/2) /
29.1;
```

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```
/*if (distance >= 45 || distance <= 0){
Serial.println("Out of range");
} else {
Serial.print(distance)
;
Serial.println(" cm");
} */
proximity=map(distance, 0, 45, 8, 0);
//Serial.println(proximity);

if (proximity <= 0){
proximity=0;
}
else if (proximity >= 3 & proximity <= 4){
tone(tonePin, 200000, 200);
}
else if (proximity >= 5 & proximity <= 6){
tone(tonePin,5000, 200);
}
else if (proximity >= 7 & proximity <= 8){
tone(tonePin, 1000, 200);
}
shiftOut(dataPin, clockPin, MSBFIRST, possible_patterns[proximity]);
digitalWrite(latchPin, HIGH);


delay(600);
noTone(tonePin);
}
```
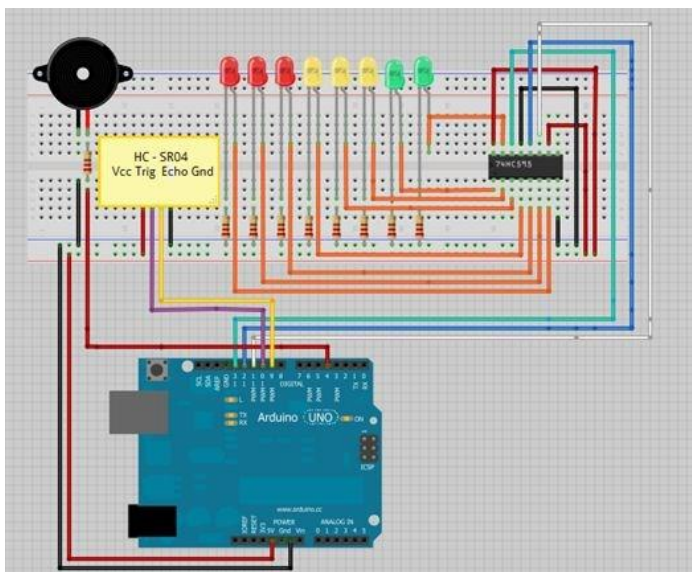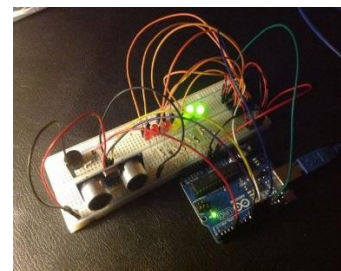

Step 5: **That's the final product.**

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Thanks For Reading!

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