

```
// Arduino Theremin!
```

```
// by Smitha Pisupati
```

```
// Last update: November 2015
```

```
// arduino_theremin_final.ino
```

```
/******
```

```
* Note Constants Start
```

```
*****/
```

```
#define NOTE_B0 31
```

```
#define NOTE_C1 33
```

```
#define NOTE_CS1 35
```

```
#define NOTE_D1 37
```

```
#define NOTE_DS1 39
```

```
#define NOTE_E1 41
```

```
#define NOTE_F1 44
```

```
#define NOTE_FS1 46
```

```
#define NOTE_G1 49
```

```
#define NOTE_GS1 52
```

```
#define NOTE_A1 55
```

```
#define NOTE_AS1 58
```

#define NOTE_B1 62

#define NOTE_C2 65

#define NOTE_CS2 69

#define NOTE_D2 73

#define NOTE_DS2 78

#define NOTE_E2 82

#define NOTE_F2 87

#define NOTE_FS2 93

#define NOTE_G2 98

#define NOTE_GS2 104

#define NOTE_A2 110

#define NOTE_AS2 117

#define NOTE_B2 123

#define NOTE_C3 131

#define NOTE_CS3 139

#define NOTE_D3 147

#define NOTE_DS3 156

#define NOTE_E3 165

#define NOTE_F3 175

#define NOTE_FS3 185

#define NOTE_G3 196

#define NOTE_GS3 208

#define NOTE_A3 220

#define NOTE_AS3 233

#define NOTE_B3 247

#define NOTE_C4 262

#define NOTE_CS4 277

#define NOTE_D4 294

#define NOTE_DS4 311

#define NOTE_E4 330

#define NOTE_F4 349

#define NOTE_FS4 370

#define NOTE_G4 392

#define NOTE_GS4 415

#define NOTE_A4 440

#define NOTE_AS4 466

#define NOTE_B4 494

#define NOTE_C5 523

#define NOTE_CS5 554

#define NOTE_D5 587

#define NOTE_DS5 622

#define NOTE_E5 659

```
#define NOTE_F5 698

#define NOTE_FS5 740

#define NOTE_G5 784

#define NOTE_GS5 831

#define NOTE_A5 880

#define NOTE_AS5 932

#define NOTE_B5 988

#define NOTE_C6 1047

#define NOTE_CS6 1109

#define NOTE_D6 1175

#define NOTE_DS6 1245

#define NOTE_E6 1319

#define NOTE_F6 1397

#define NOTE_FS6 1480

#define NOTE_G6 1568

#define NOTE_GS6 1661

#define NOTE_A6 1760

#define NOTE_AS6 1865

#define NOTE_B6 1976

#define NOTE_C7 2093

#define NOTE_CS7 2217
```

```
#define NOTE_D7 2349
```

```
#define NOTE_DS7 2489
```

```
#define NOTE_E7 2637
```

```
#define NOTE_F7 2794
```

```
#define NOTE_FS7 2960
```

```
#define NOTE_G7 3136
```

```
#define NOTE_GS7 3322
```

```
#define NOTE_A7 3520
```

```
#define NOTE_AS7 3729
```

```
#define NOTE_B7 3951
```

```
#define NOTE_C8 4186
```

```
#define NOTE_CS8 4435
```

```
#define NOTE_D8 4699
```

```
#define NOTE_DS8 4978
```

```
/******
```

```
* Note Constants Done
```

```
*****/
```

```
int piezo = 3;
```

```
int trigger = 4;
```

```
int echo = 5;
```

```
int ledg3 = 6;
```

```
int ledg2 = 7;
```

```
int ledg1 = 8;
```

```
int ledy2 = 9;
```

```
int ledy1 = 10;
```

```
int ledr3 = 11;
```

```
int ledr2 = 12;
```

```
int ledr1 = 13;
```

```
unsigned long count = 0;
```

```
unsigned long distanceInCm = 0;
```

```
void setup()
```

```
{
```

```
  pinMode(trigger, OUTPUT);
```

```
  pinMode(echo, INPUT);
```

```
  pinMode(piezo, OUTPUT);
```

```
  pinMode(ledr1, OUTPUT);
```

```
  pinMode(ledr2, OUTPUT);
```

```
pinMode(ledr3, OUTPUT);
```

```
pinMode(ledy1, OUTPUT);
```

```
pinMode(ledy2, OUTPUT);
```

```
pinMode(ledg1, OUTPUT);
```

```
pinMode(ledg2, OUTPUT);
```

```
pinMode(ledg3, OUTPUT);
```

```
digitalWrite(trigger, LOW);
```

```
Serial.begin(9600);
```

```
}
```

```
void loop()
```

```
{
```

```
// hold trigger high for 10us to trigger the ultrasonic distance sensor
```

```
digitalWrite(trigger, HIGH);
```

```
delayMicroseconds(10);
```

```
digitalWrite(trigger, LOW);
```

```
// Get the width of the pulse on echo
```

```
count = pulseIn(echo, HIGH);
```

```
// get distance in cm. Divide by 148 for inches
```

```
distanceInCm = count / 58;
```

```
Serial.println(distanceInCm);
```

```
if((distanceInCm > 4) && (distanceInCm < 25))
```

```
{
```

```
    if(distanceInCm < 8)
```

```
    {
```

```
        tone(piezo,NOTE_C3);
```

```
        digitalWrite(ledr1, HIGH);
```

```
        digitalWrite(ledr2, HIGH);
```

```
        digitalWrite(ledr3, LOW);
```

```
        digitalWrite(ledy1, LOW);
```

```
        digitalWrite(ledy2, LOW);
```

```
        digitalWrite(ledg1, LOW);
```

```
        digitalWrite(ledg2, LOW);
```

```
        digitalWrite(ledg3, LOW);
```

```
    }
```

```
    else if(distanceInCm < 10)
```

```
    {
```

```
        tone(piezo,NOTE_F3);
```

```
        digitalWrite(ledr1, HIGH);
```

```
digitalWrite(ledr2, HIGH);

digitalWrite(ledr3, HIGH);

digitalWrite(ledy1, LOW);

digitalWrite(ledy2, LOW);

digitalWrite(ledg1, LOW);

digitalWrite(ledg2, LOW);

digitalWrite(ledg3, LOW);

}

else if(distanceInCm < 12)

{

tone(piezo,NOTE_C4);

digitalWrite(ledr1, HIGH);

digitalWrite(ledr2, HIGH);

digitalWrite(ledr3, HIGH);

digitalWrite(ledy1, HIGH);

digitalWrite(ledy2, LOW);

digitalWrite(ledg1, LOW);

digitalWrite(ledg2, LOW);

digitalWrite(ledg3, LOW);

}
```

```
else if(distanceInCm < 14)
```

```
{
```

```
tone(piezo,NOTE_F4);
```

```
digitalWrite(ledr1, HIGH);
```

```
digitalWrite(ledr2, HIGH);
```

```
digitalWrite(ledr3, HIGH);
```

```
digitalWrite(ledy1, HIGH);
```

```
digitalWrite(ledy2, HIGH);
```

```
digitalWrite(ledg1, LOW);
```

```
digitalWrite(ledg2, LOW);
```

```
digitalWrite(ledg3, LOW);
```

```
}
```

```
else if(distanceInCm < 18)
```

```
{
```

```
tone(piezo,NOTE_C5);
```

```
digitalWrite(ledr1, HIGH);
```

```
digitalWrite(ledr2, HIGH);
```

```
digitalWrite(ledr3, HIGH);
```

```
digitalWrite(ledy1, HIGH);
```

```
digitalWrite(ledy2, HIGH);
```

```
digitalWrite(ledg1, HIGH);
```

```
digitalWrite(ledg2, LOW);

digitalWrite(ledg3, LOW);

}

else if(distanceInCm < 22)

{

tone(piezo,NOTE_F5);

digitalWrite(ledr1, HIGH);

digitalWrite(ledr2, HIGH);

digitalWrite(ledr3, HIGH);

digitalWrite(ledy1, HIGH);

digitalWrite(ledy2, HIGH);

digitalWrite(ledg1, HIGH);

digitalWrite(ledg2, HIGH);

digitalWrite(ledg3, LOW);

}

else

{

tone(piezo,NOTE_C6);

digitalWrite(ledr1, HIGH);

digitalWrite(ledr2, HIGH);

digitalWrite(ledr3, HIGH);
```

```
    digitalWrite(ledy1, HIGH);

    digitalWrite(ledy2, HIGH);

    digitalWrite(ledg1, HIGH);

    digitalWrite(ledg2, HIGH);

    digitalWrite(ledg3, HIGH);

}

}

else

{

    noTone(piezo);

    digitalWrite(ledr1, LOW);

    digitalWrite(ledr2, LOW);

    digitalWrite(ledr3, LOW);

    digitalWrite(ledy1, LOW);

    digitalWrite(ledy2, LOW);

    digitalWrite(ledg1, LOW);

    digitalWrite(ledg2, LOW);

    digitalWrite(ledg3, LOW);

}

count = 0;
```

```
delay(100);
```

```
}
```