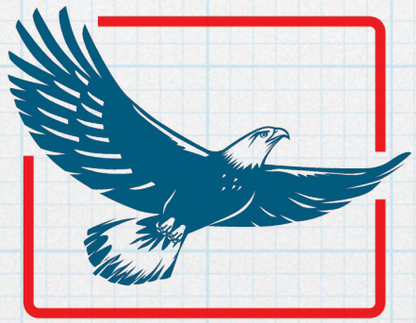

# Ultrasonik Mesafe Sensörü ile Park Sensörü Yapımı

ANTALYA SINAV ANADOLU LİSESİ ROBOTİK TOPLULUĞU



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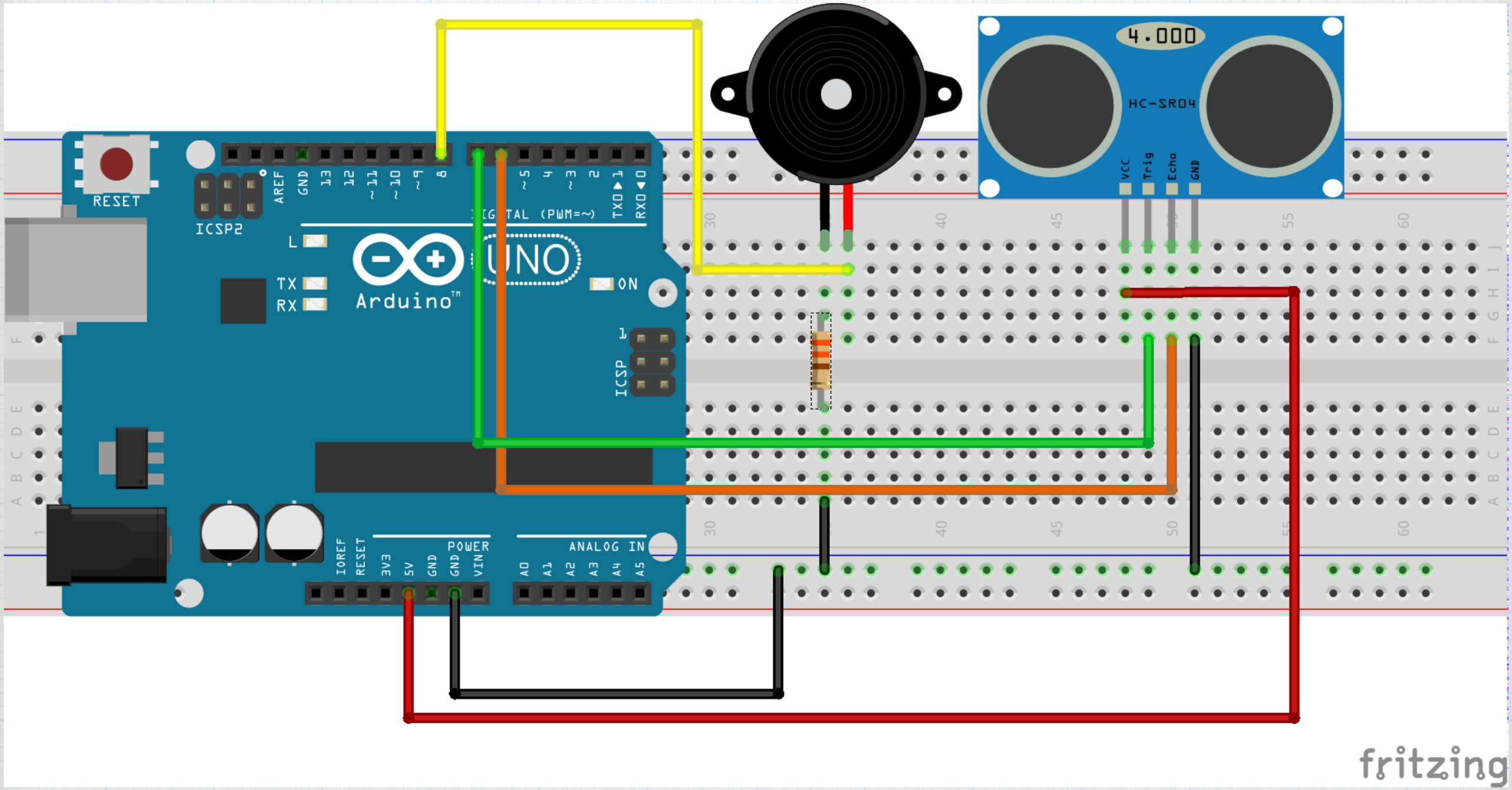
# Park Sensörü Uygulaması

## Gerekenler;

* Arduino UNO
* Breadboard
* 1 adet Buzzer
* 1 adet 330Ω direnç
* 1 adet HC-SR04 ultrasonik mesafe sensörü (2cm -400cm)
* İki ucu erkek jumper kablo

# Devre Şeması



# HC-SR04 Ultrasonik Mesafe Sensörü


**Özellikler**

- Güç Kaynağı _____: +5V DC
- Minimum akım _____: <2mA
- Çalışma akımı _____: 15mA
- Çalışma frekansı _____: 40 kHZ
- Efektif Açı _____: <15 derece
- Mesafe ölçüm arası _____: 2cm – 400cm
- Hassasiyet _____: 0.3cm
- Tetikleme girişi darbe genişliği ___: 10uS
- Boyut _____:45mm x 20mm x 15mm

http://sinancanbayrak.com/hc-rs04-ultrasonik-mesafe-sensoru-nedir-nasil-calisir/

# Ses Hızı

## Practical formula for dry air [ edit ]

The approximate speed of sound in dry (0% humidity) air, in meters per second, at temperatures near 0 °C, can be calculated from

$$c_{\text{air}} = (331.3 + 0.606 \cdot \vartheta) \quad \text{m/s},$$

where $\vartheta$ is the temperature in degrees Celsius (°C).

This equation is derived from the first two terms of the Taylor expansion of the following more accurate equation:

$$c_{\text{air}} = 331.3 \sqrt{1 + \frac{\vartheta}{273.15}} \quad \text{m/s}.$$

Dividing the first part, and multiplying the second part, on the right hand side, by √273.15 gives the exactly equivalent form

$$c_{\text{air}} = 20.05 \sqrt{\vartheta + 273.15} \quad \text{m/s}.$$

The value of 331.3 m/s, which represents the speed at 0 °C (or 273.15 K), is based on theoretical (and some measured) values of the heat capacity ratio, γ, as well as on the fact that at 1 atm real air is very well described by the ideal gas approximation. Commonly found values for the speed of sound at 0 °C may vary from 331.2 to 331.6 due to the assumptions made when it is calculated. If ideal gas γ is assumed to be 7/5 = 1.4 exactly, the 0 °C speed is calculated (see section below) to be 331.3 m/s, the coefficient used above.

This equation is correct to a much wider temperature range, but still depends on the approximation of heat capacity ratio being independent of temperature, and for this reason will fail, particularly at higher temperatures. It gives good predictions in relatively dry, cold, low pressure conditions, such as the Earth's stratosphere. The equation fails at extremely low pressures and short wavelengths, due to dependence on the assumption that the wavelength of the sound in the gas is much longer than the average mean free path between gas molecule collisions. A derivation of these equations will be given in the following section.

A graph comparing results of the two equations is at right, using the slightly different value of 331.5 m/s for the speed of sound at 0 °C.

https://en.wikipedia.org/wiki/Speed_of_sound

# Do It Yourself (DIY)

Bu hafta bedava kod yok! :)

# Algoritma

Adım0: BAŞLA
Adım 1: Pinleri Tanımla
Adım 2: Değişkenleri tanımla
Adım3: Giriş, çıkış pinlerini ayarla
Adım4: Mesafe sensrünü tetikle
Adım 5: Yansıyan dalganın süresini ölç
Adım6: Geçen süreden dalganın ne kadar mesafe aldığını bul
Adım 7: Eğer bu mesafe sınırlar içinde değilse hata mesajı yazdır. Değilse mesafeyi yazdır
Adım8: Buzzer mesafe oranınca aktif et
Adım9: Kısa bir süre bekle
Adım1 1: SON

# Neler Lazım?

Mesafe sensörünün dalga üretebilmesi için gerekli süre ;

```
delayMicroseconds(10);
```

Ses dalgasının geri dönmesi için gereken süre ölçümü;

```
pulseIn(echoPin, HIGH);
```

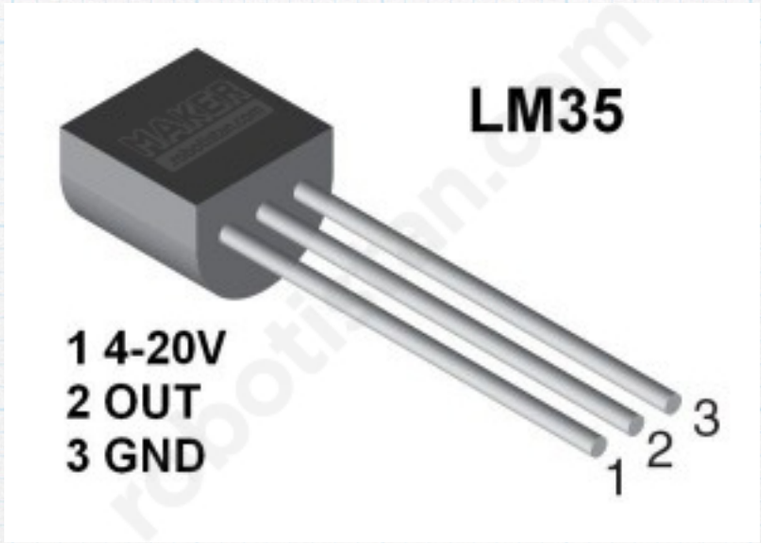
Buzzer'a Belirli Frekansta Ses Komutu Gönderme;

```
tone(buzzerPin, 440);
```

Buzzer'ı kapatma;

```
noTone(buzzerPin);
```

# Ek Olarak!
# Sıcaklık Sensörü İle Hassas Mesafe Ölçümü




Park sensörüne haftaya eklemeniz gereken sensör!

http://maker.robotistan.com/arduino-dersleri-11-sicaklik-olcumu/

* To be continued...