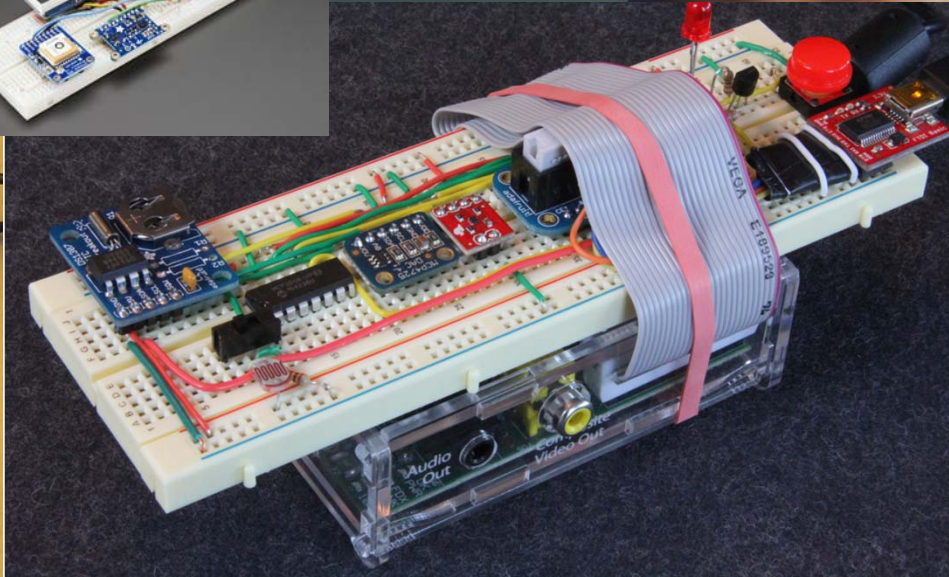
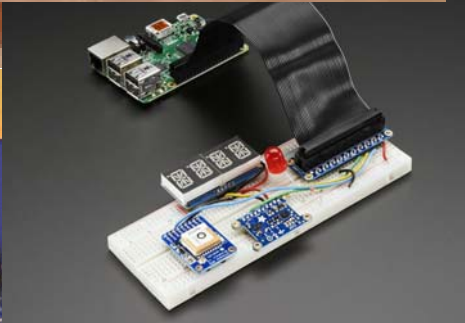
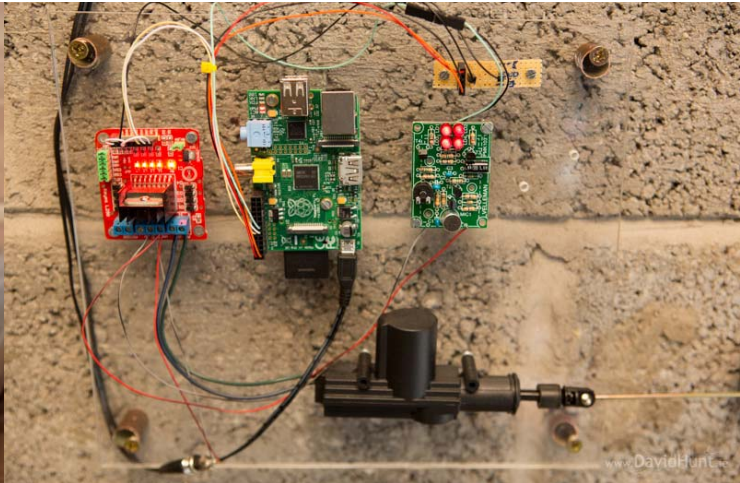
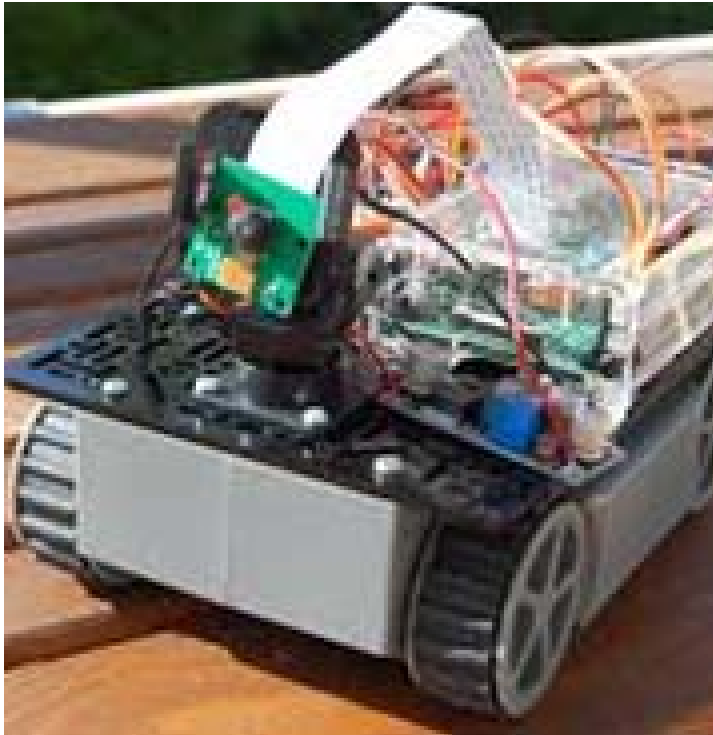
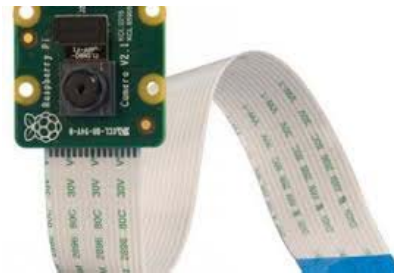
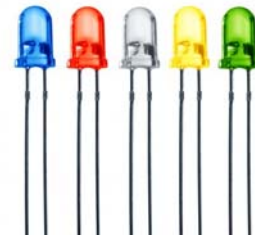


Intro to Robotics

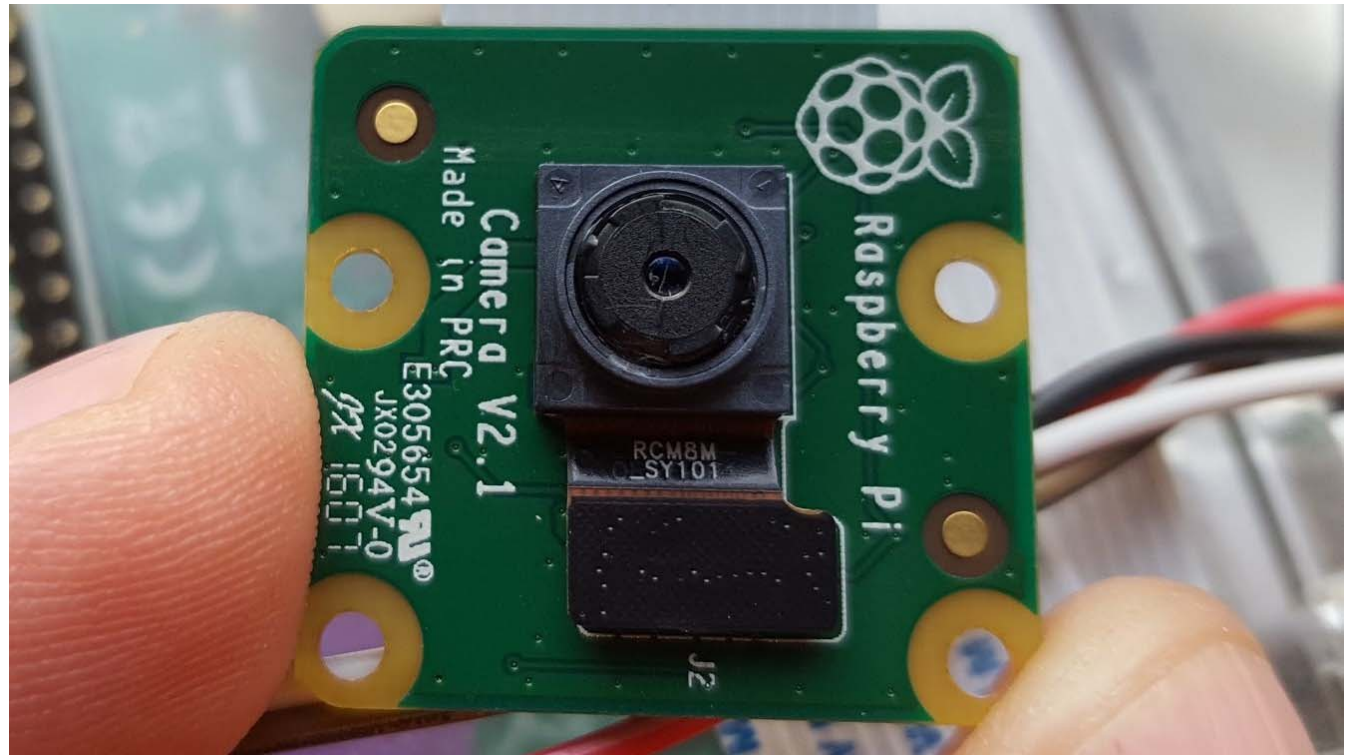


From the robotics lab assignment ...

- RPi 3
- GPIO
- Resistors
- LED
- Button
- Servo
- Ultrasound
- Picam camera



Camera

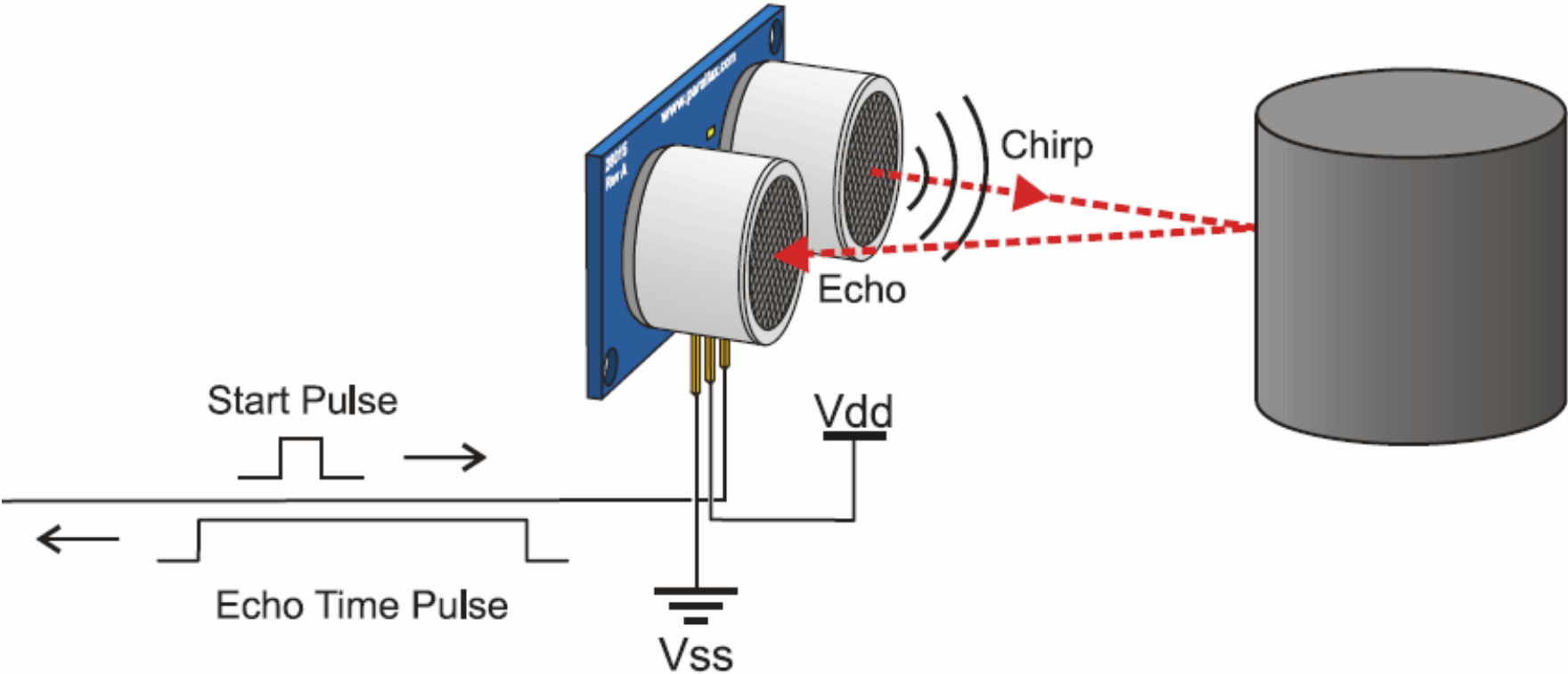


- Picam v2
- Pictures: 8 megapixel
- Video: 1080p at 30 fps, 720 at 60 fps

Ultrasound Sensor

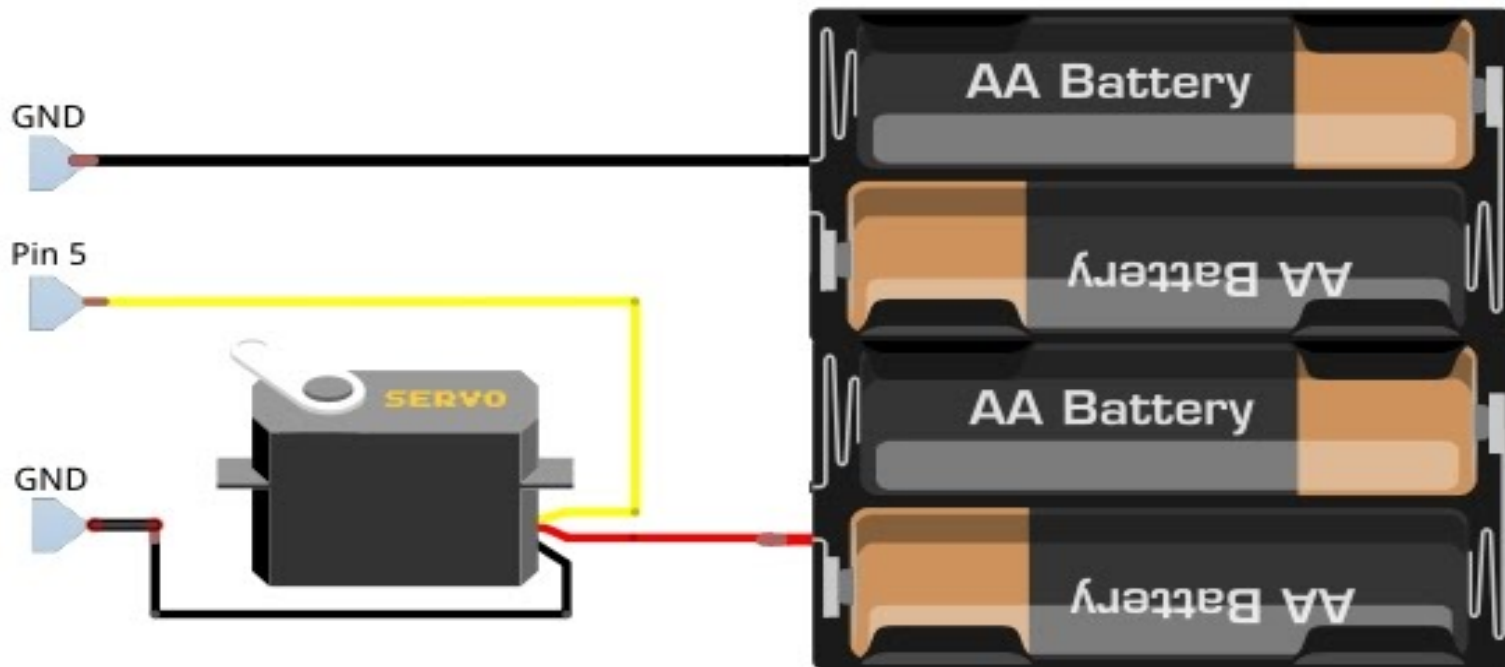


- Pins:
- Vcc
 - Gnd
 - Trig
 - Echo

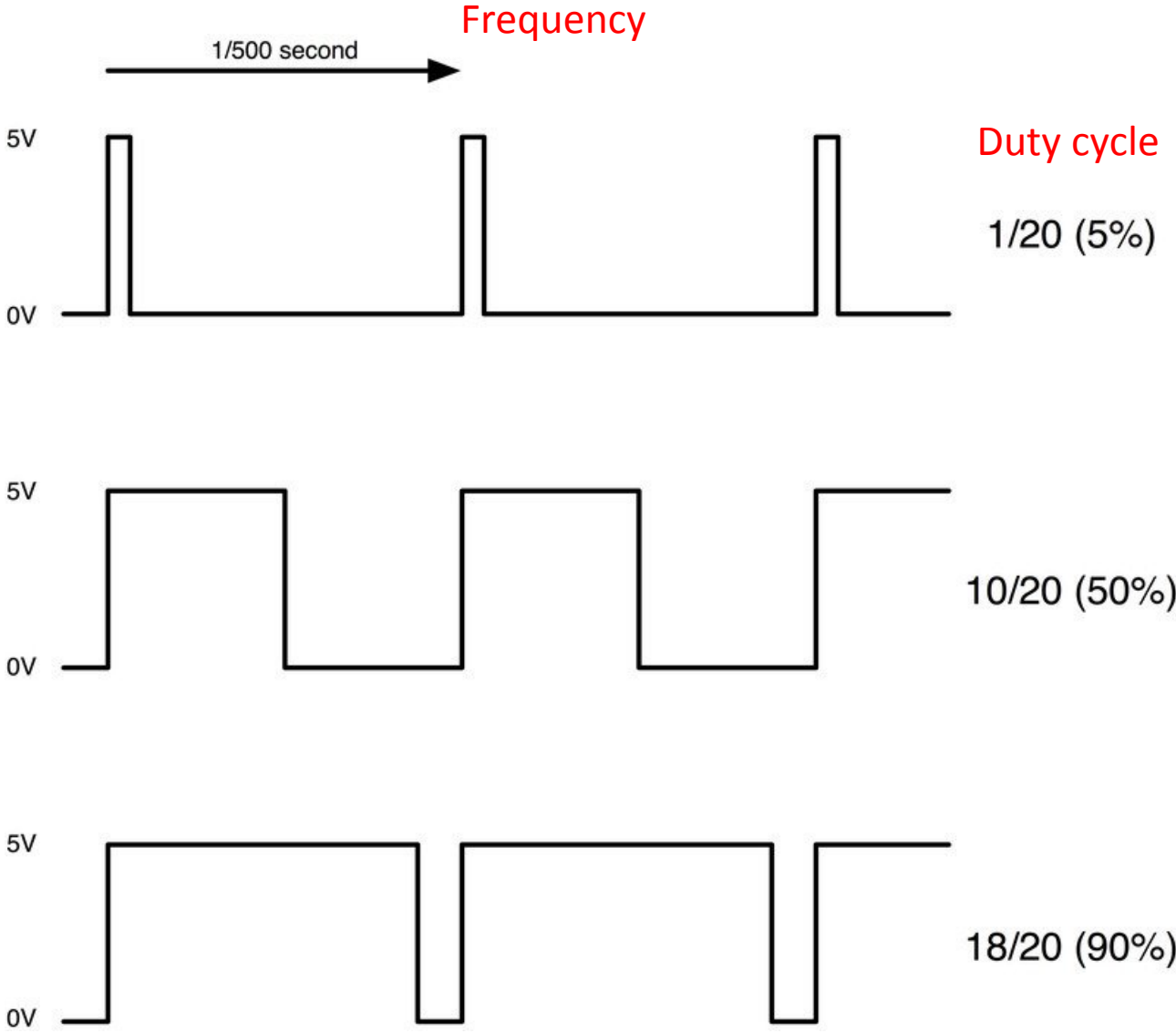


Servo

- Standard servo
- Continuous rotation servo
- May need external batteries

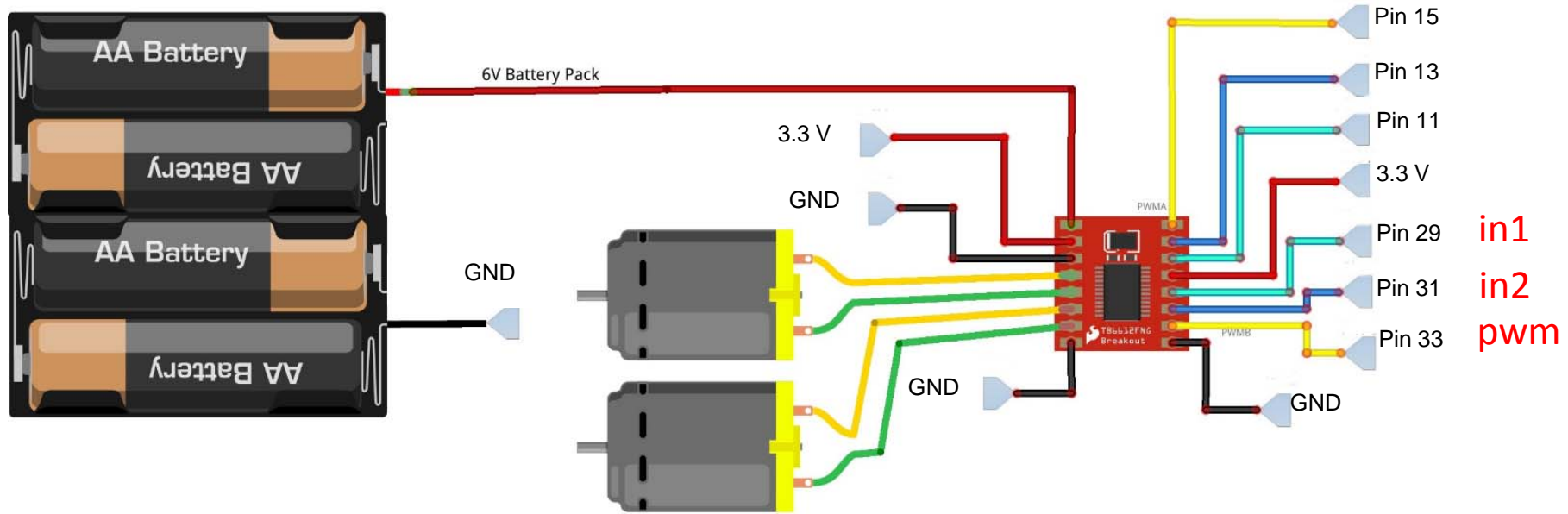


PWM – Pulse Width Modulation



DC Motor

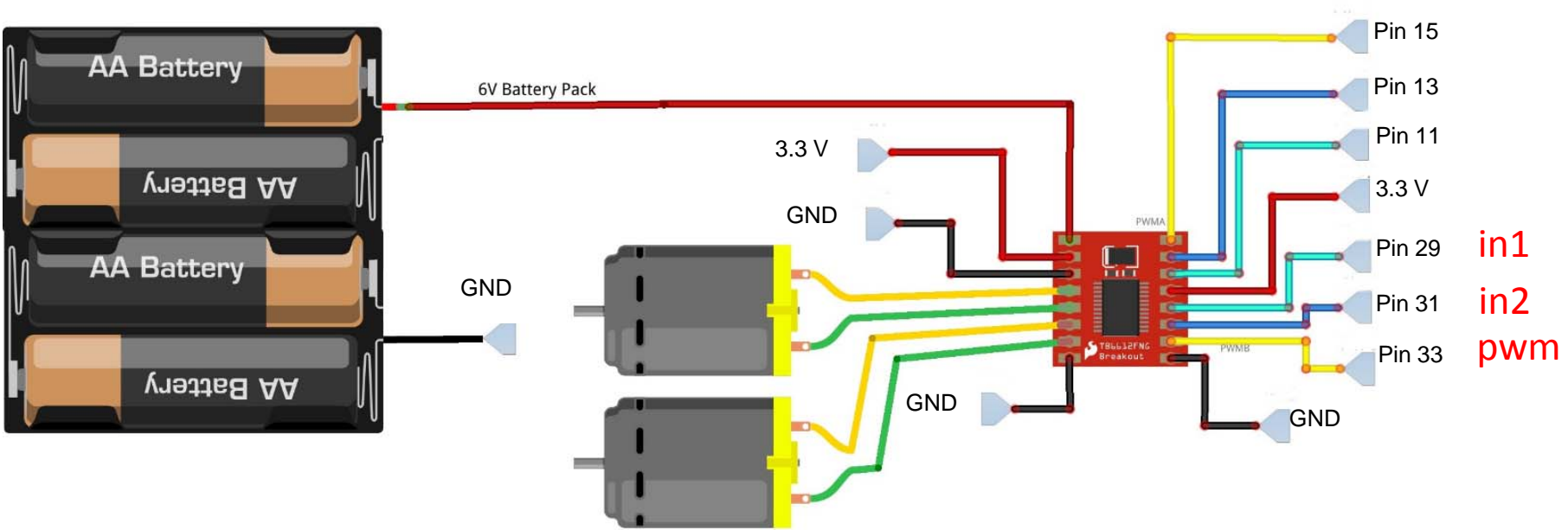
- Need external batteries
- Motor driver (H-bridge)
- Control motor speed
- Stall torque



DC Motor

pwm: speed of the motor

(in1, in2): (HIGH, LOW) forward
(LOW, HIGH) backward
(LOW, LOW) stop



PWM Driver

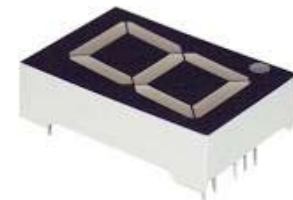


Wheel Encoders



Other Peripherals

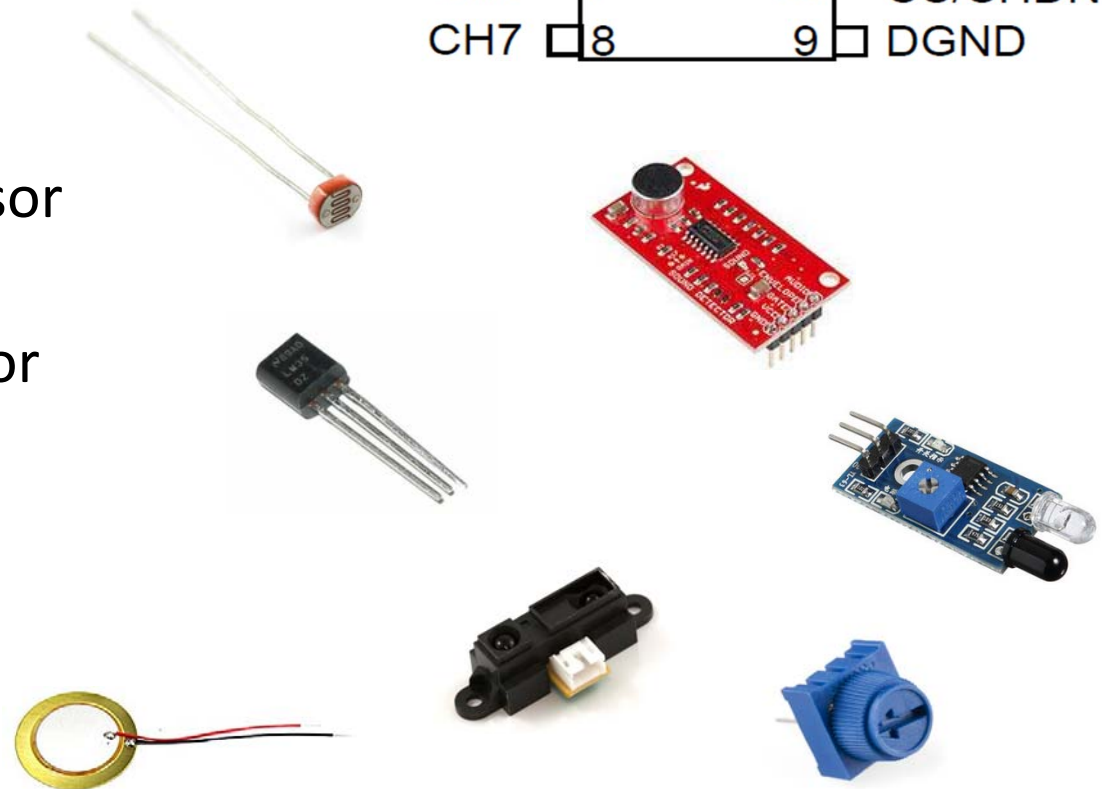
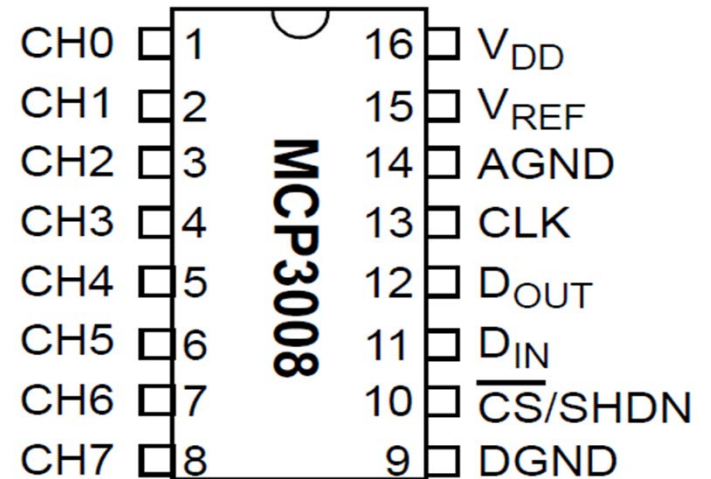
- Buzzer (used PWM)
- 7-segment display
- Bluetooth (to connect to Android App)
- PS3 Controller



Analog input sensors

- Need an analog-to-digital convertor (ADC)
- Examples:
 - Light sensor
 - Temperature sensor
 - Sound sensor
 - IR proximity sensor
 - Vibration sensor
 - Trimpot
 - ...

ADC



Summary

- **Digital input: GPIO**
 - Button, line sensor, wheel encoder, ...
- **Digital output: GPIO**
 - LED, 7-segment display, ...
- **Analog input: ADC chip**
 - Light sensor, temperature sensor, sound sensor, IR proximity sensor, vibration sensor, trimpot, ...
- **Analog output: PWM signal**
 - Standard servo, continuous rotation servo, motor, buzzer, LED, ...
- **Picam camera**

What can you do with a robot?

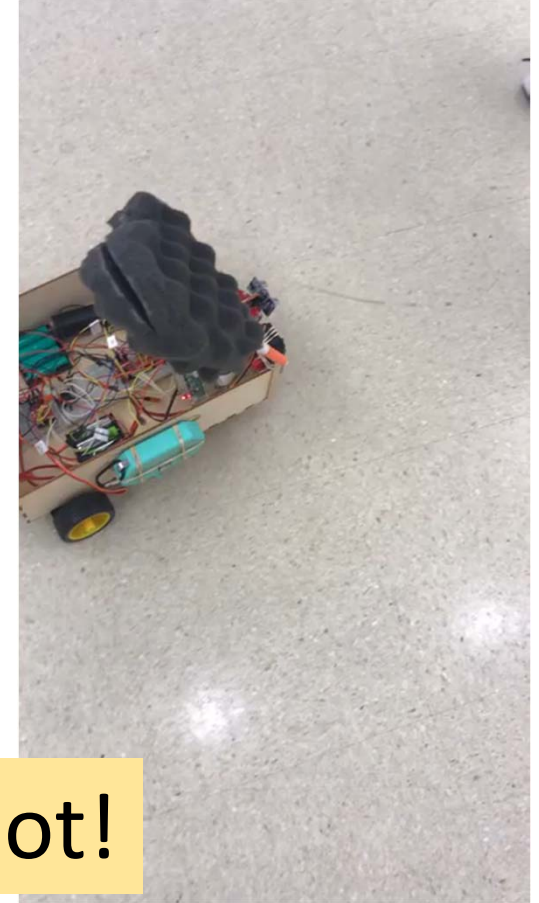
Draw



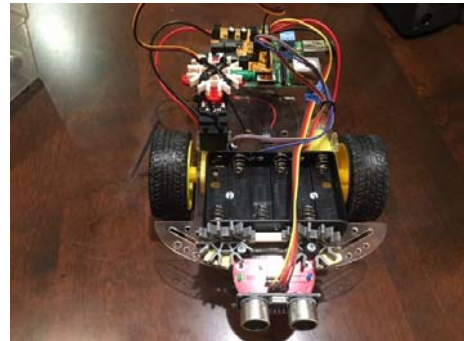
Chase a color



Avoid things



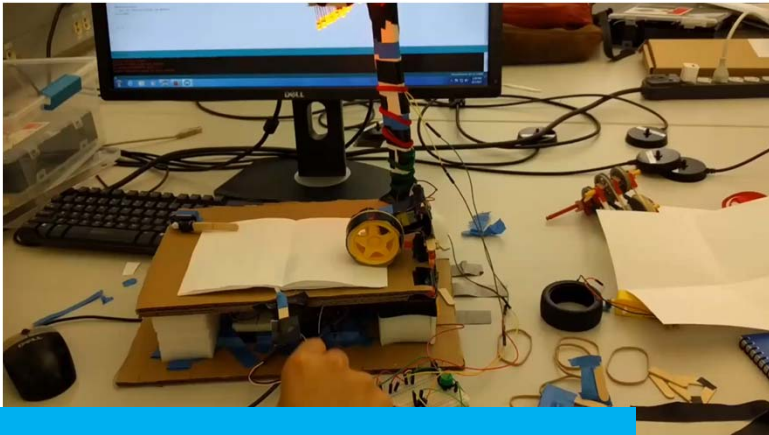
Mimic picobot!



Solve a line maze

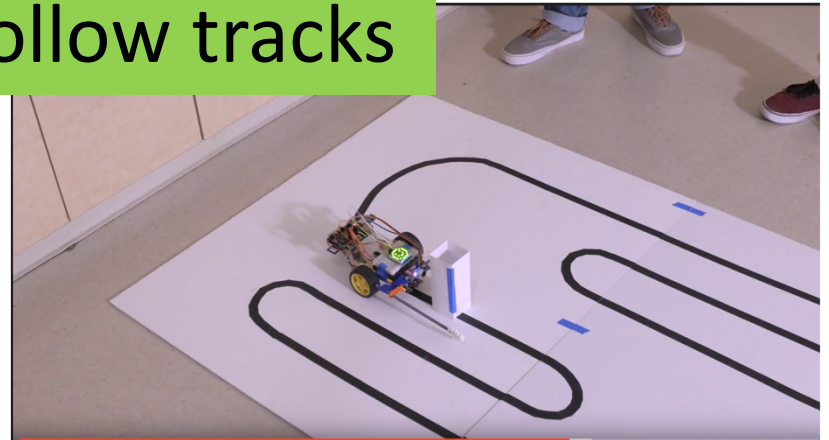


What can you do with a robot?



Do tasks

Follow tracks



Create a game



Go around obstacles



