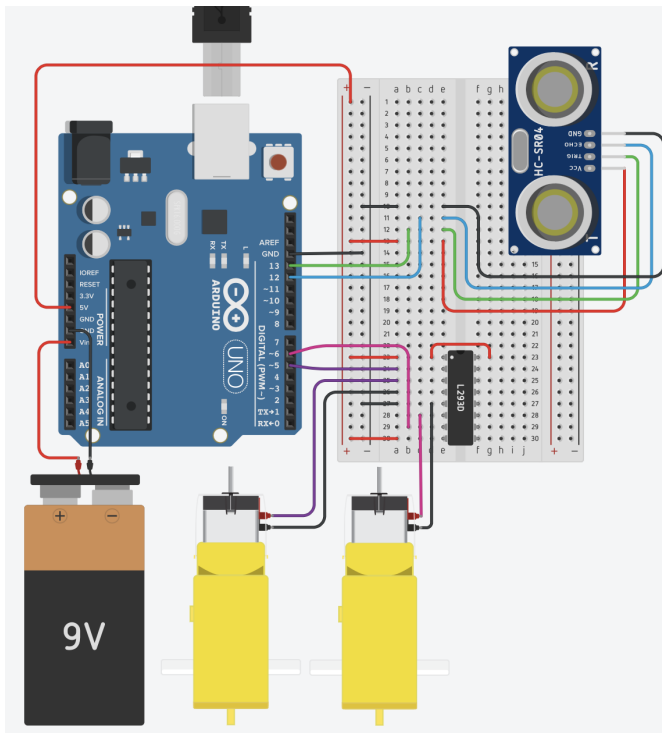# Template Project

Electronics


```arduino
1   int TRIG_PIN = 13;
2   int ECHO_PIN = 12;
3   int MOTOR_PIN1 = 6;
4   int MOTOR_PIN2 = 5;
5   float SPEED_OF_SOUND = 0.0345;
6
7   void setup() {
8     pinMode(MOTOR_PIN1, OUTPUT);
9     pinMode(MOTOR_PIN2, OUTPUT);
10    pinMode(TRIG_PIN, OUTPUT);
11    digitalWrite(TRIG_PIN, LOW);
12    pinMode(ECHO_PIN, INPUT);
13    Serial.begin(9600);
14  }
15
16  void loop() {
17    digitalWrite(TRIG_PIN, HIGH);
18    delayMicroseconds(10);
19    digitalWrite(TRIG_PIN, LOW);
20    int microsecs = pulseIn(ECHO_PIN, HIGH);
21    float cms = microsecs*SPEED_OF_SOUND/2;
22    Serial.println(cms);
23    if (cms < 30) {
24      digitalWrite(MOTOR_PIN1, LOW);
25      digitalWrite(MOTOR_PIN2, LOW);
26    } else {
27      digitalWrite(MOTOR_PIN1, HIGH);
28      digitalWrite(MOTOR_PIN2, HIGH);
29    }
30    delay(10);
31  }
```

Cardboard templates

1. Cut each paper template along the bounding rectangle of each part (body & two wheels)

2. Tape each paper template to cardboard and cut cardboard to bounding rectangle

   - (Attach body template so that long end lies along the grain of the cardboard)

3. Cut along the solid lines of each template through both paper and cardboard

   - (Make cuts against the grain first, then make cuts with the grain second)

4. Fold body:

   - score along the broken lines with a ballpoint pen
   - remove paper templates and excess material
   - fold along the broken lines (fold dashed lines toward you and dotted lines away)
   - tuck tabs into the slots at the front and back

Wiring a motor

1. Prepare two jumper wires, for each:

    - cut off one end
    - strip off 1-2 cm of outer plastic
    - twist wire end

2. Attach wires to motor

    - hook wires onto motor leads
    - twist wires to form strong mechanical and electrical connection
    - apply hot glue to form strong connection and cover exposed metal

3. Check electrical connection with multi-meter

Wiring a battery holder

1. Prepare two **female** jumper wires (recommended to prevent accidental shortage), for each:

    - cut off one end
    - strip off 1-2 cm of outer plastic
    - twist wire end

2. Prepare battery holder wires, for each:

    - strip off 1-2 cm of outer plastic
    - twist wire end

3. Attach wires to battery holder

    - hook wires together
    - twist wires to form strong mechanical and electrical connection
    - apply hot glue to form strong connection and cover exposed metal

4. Check electrical connection with multi-meter