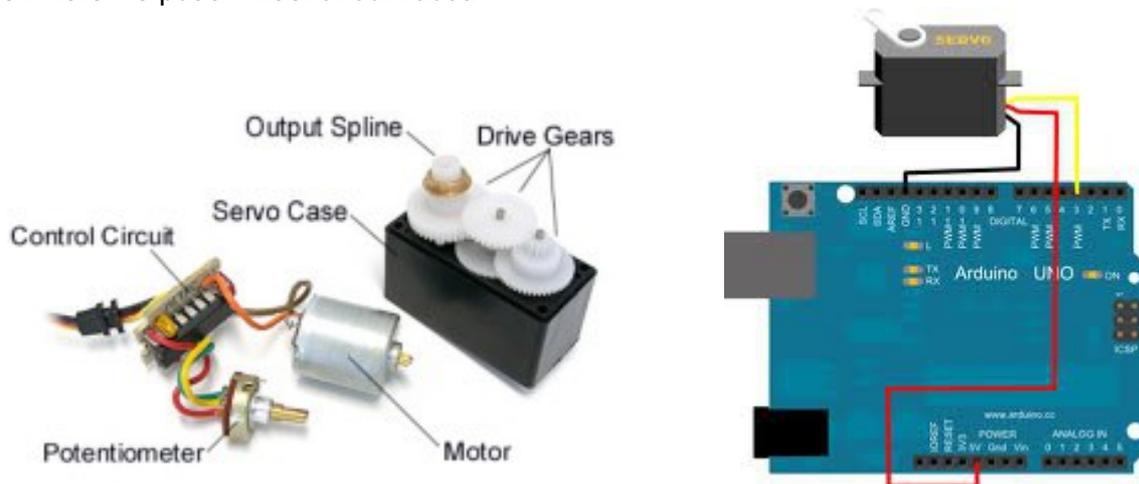


ROBOTICS WITH ARDUINO III

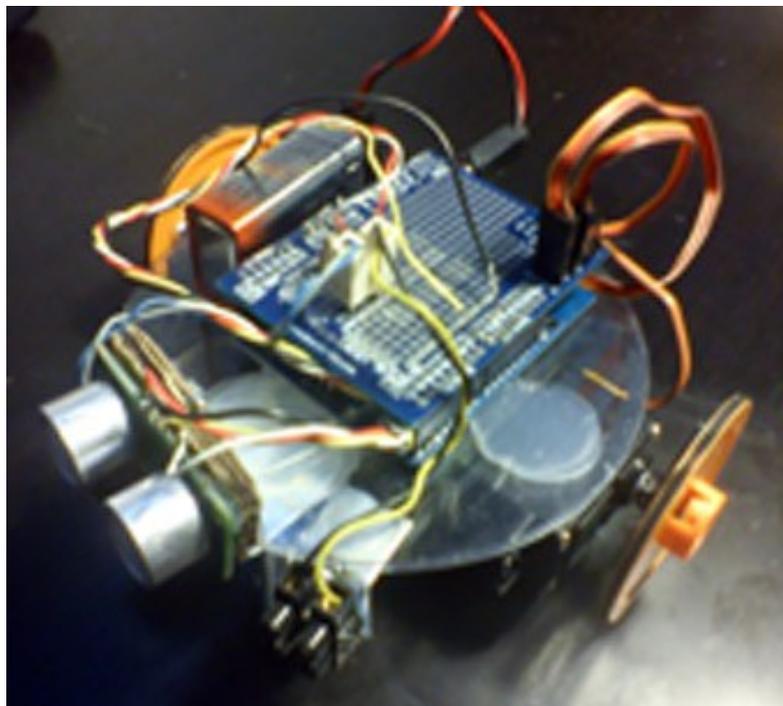
4) CONNECTING SERVOMOTORS

In previous chapters we've connected in our examples of educational robots two small motors which are in movement using a specific driver to provide them enough continuous current to work properly and at the same time, this driver organize how to control them in each trajectory we've programmed.

With servomotors we don't need a shield made with integrated circuits or transistors because they include a small electronic control circuit with a potentiometer inside its black box to drive a small DC motor. In the same box, motor axis is joined to a group of gears to reduce speed of an outside axis where we put a wheel of our robot.



A modulated signal of current from a output pin of the Arduino board provides the control to moves our servos because they have two more pins connected to GND and +5V which powers them. So usually we have to design or buy a small shield to interface between servos and board.

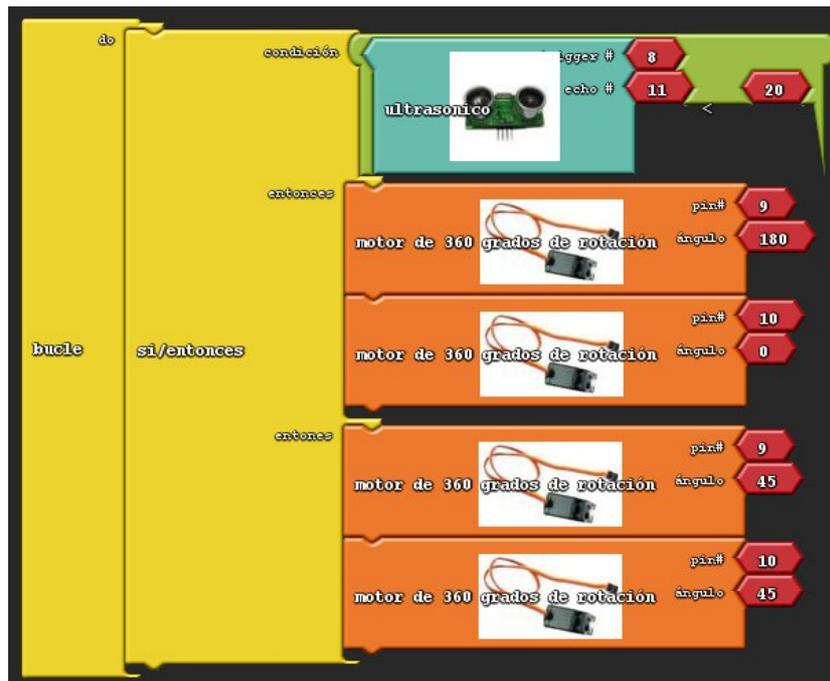


I've made a low cost robot joining parts with a thermal-glove gun in both sides of a double CD disk.

In my case, I've connected two servos on a special prototyping shield which has two separates male pins corresponding at numbers 9 and 10 of Arduino board. Using servos with Arduino is extremely easy due to the Servo library `<Servo.h>` included with the IDE.

After creating the servo objects and telling them what pin the servos are connected to, we just use the `Servo.write(value)` function to set the speed and direction. The `Servo.write(value)` function has a parameter whose value may be between 0 and 180 (this is because standard servos typically rotate between 0 and 180 degrees), where 0 is full speed one direction, 90 is neutral, and 180 is full speed the other direction.

Of course Ardublocks generates this kind of code when you create a graphic sequence of orders choosing a block included in the DFRobot menu at left of screen. In my example I will adapt the same program of second chapter of this tutorial with two servos: if ultrasonic sensor (on pins 8 and 11, see description in previous chapter) doesn't detect anything, robot turns (I wrote 45 as value in both servos to turn with a medium speed) and when I put my hand in front of sensor, robot goes straight ahead following my hand.



```
sketch_jan30a $

#include <Servo.h>
Servo servo_pin_10;
Servo servo_pin_9;
int ardublockUltrasonicSensorCodeAutoGeneratedReturnCM(int trigPin, int echoPin)

void setup(){
  digitalWrite( 8 , LOW );
  servo_pin_10.attach(10);
  servo_pin_9.attach(9);
}

void loop(){
  if ( ( ardublockUltrasonicSensorCodeAutoGeneratedReturnCM( 8 , 11 ) ) < ( 20 ) )
  {
    servo_pin_9.write( 180 );
    servo_pin_10.write( 0 );
  }
  else{
    servo_pin_9.write( 45 );
    servo_pin_10.write( 45 );
  }
}
```