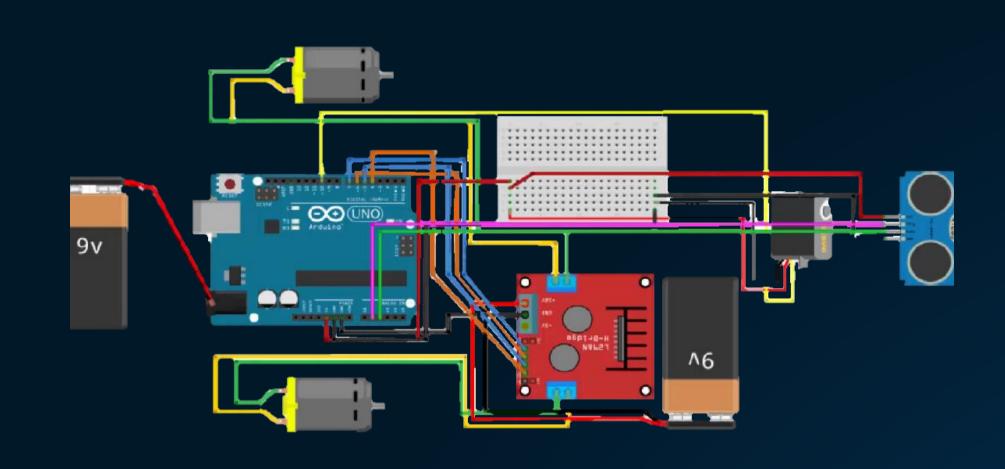
# Transformer

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### **Our Goal**

Our device can transform its body to be big or small, named Transformer. We improve the smart car to make it not only avoid obstacle but also cross the obstacle which is small enough. In addition, if the obstacle is bigger than it, Transformer would turn to right direction.



Main circuit to drive the DC motor and servo motor

#### (G') Cross it **Programming flow-chart** (A) Input coding, DC motor drives No (C) The distance (B) Ultrasonic sensor detects (E) Raise Transformer is less than safe the distance to the obstacle distance Yes Yes Yes (C) The distance (D) Calculate the width of the obstacle is less than safe is less than it (G) Fall down Transformer distance No (E') Decide to turn left or turn right (D') Keep going

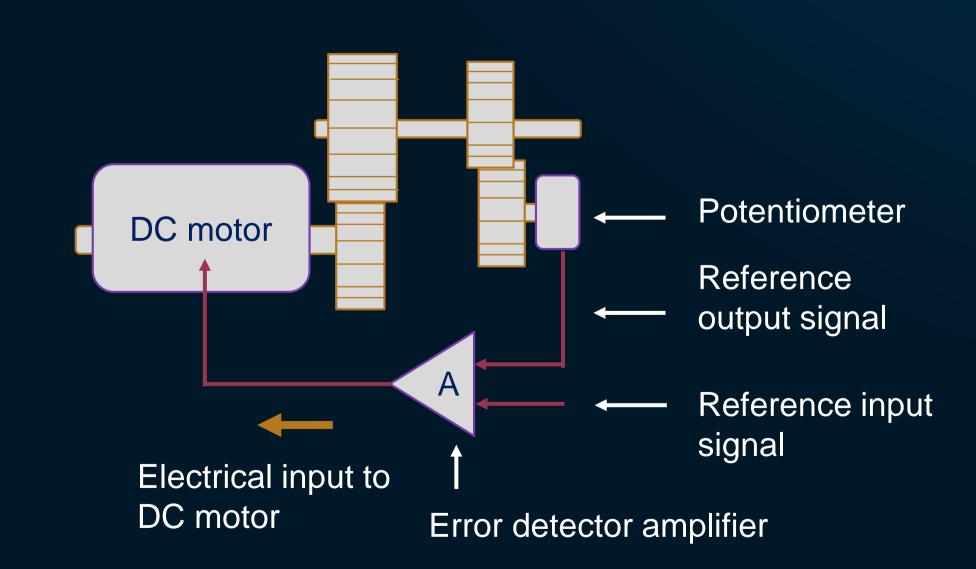
Refuge or step over?

### Scissor lift 150 150 22 20 Back view Front view There are a top board, 150 two bottoms, and two pairs of scissors with 22 two bearings. The step motor can rotate the screw and drive the scissors to raise the 20 20 car body up. 150 20 Right view Stable part -Falling down Raising up [ Unit: mm ]

### Servo motor:

Rotating part -

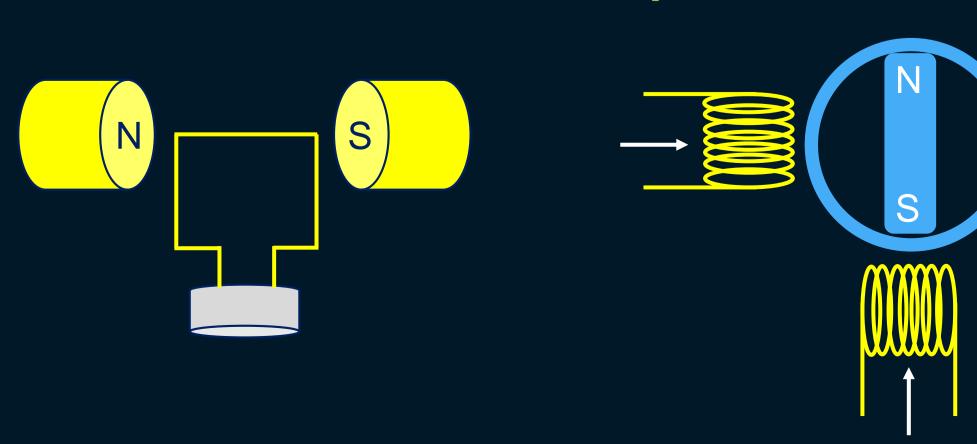
Beads



Bearing

#### DC motor:

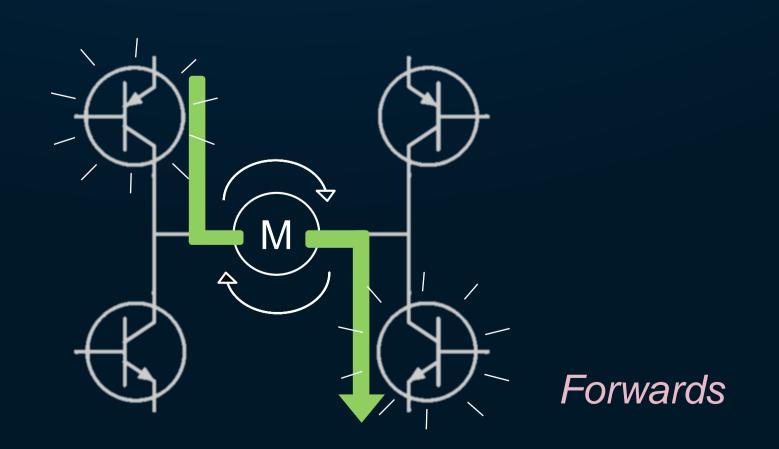
### Step motor:

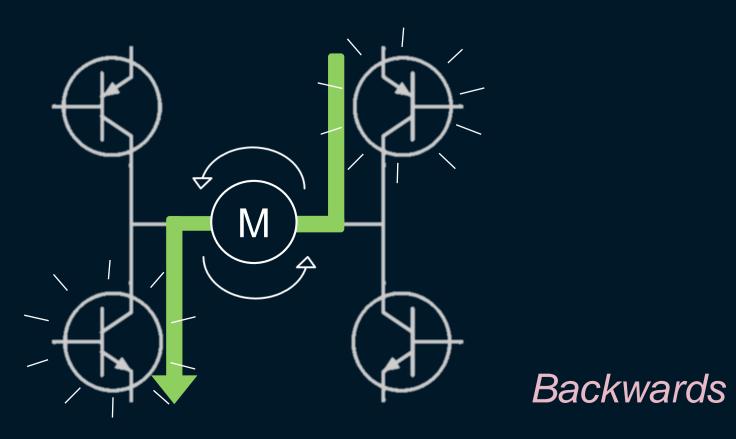


# Components

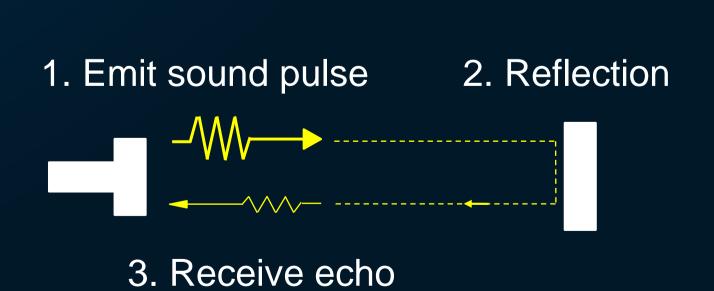
#### H-Bridge:

With four BJT, it allows DC motors to run forwards or backwards by adjusting the input voltage of the closed switches.





### Ultrasonic sensor:



## Conclusion

- 1. Utilize two DC motors to control the car go forwarding, stopping, backing, and turning around.
- 2. With the echo difference, the ultrasonic sensor can detect the safe distance.
- 3. The step motor can drive the scissor and raise up the car body.
- 4. If the obstacle is bigger, Transformer could turn to right direction.

### Reference

[1] https://www.youtube.com/watch?v=tXsP9STxdBc [2] http://mertarduinotutorial.blogspot.tw/2016/12/arduino-project-tutorial-01-obstacle.html