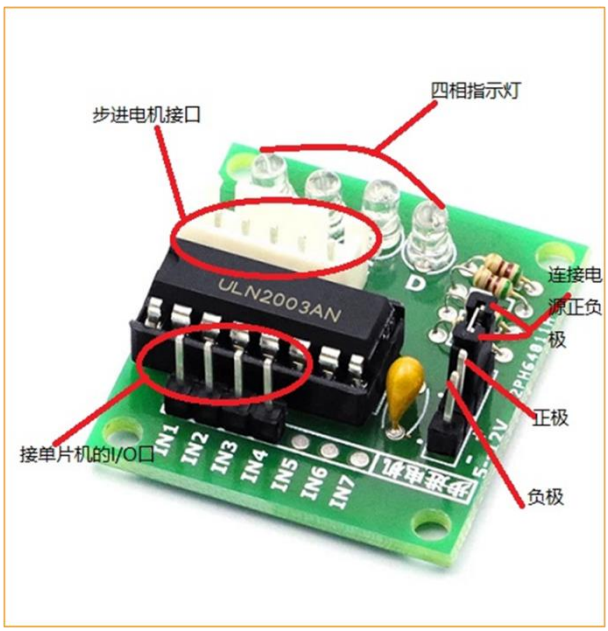
DC-Motor Experiment

Introduction to dc motor

A dc motor is a motor that converts dc energy into mechanical energy. Because of its good speed regulation performance, it is widely used in electric drive. According to the excitation mode, dc motor is divided into permanent magnet, other excitation and self-excitation 3 categories, self-excitation is divided into shunt excitation, series excitation and compound excitation 3 kinds

When the dc power supply is supplied to the armature winding by the electric brush, the n-pole conductor on the armature surface can flow the current in the same direction. The conductor under the s-pole on the surface of the armature also flows a current in the same direction, and the conductor will also be subjected to a counterclockwise torque according to the left-hand rule. In this way, the whole armature winding, the rotor, will rotate counterclockwise, and the input dc energy will be converted into the output mechanical energy on the rotor shaft. Composed of stator and rotor, stator: base, main magnetic pole, commutator pole, brush device, etc. Rotor (armature) : armature core, armature winding, commutator, shaft and fan, etc.

ULN2003 stepper motor drive plate: A, B, C, D leds indicate the state of the four-phase stepper motor at work. It is equipped with standard interface of stepper motor, which can be directly inserted and pulled out when using.



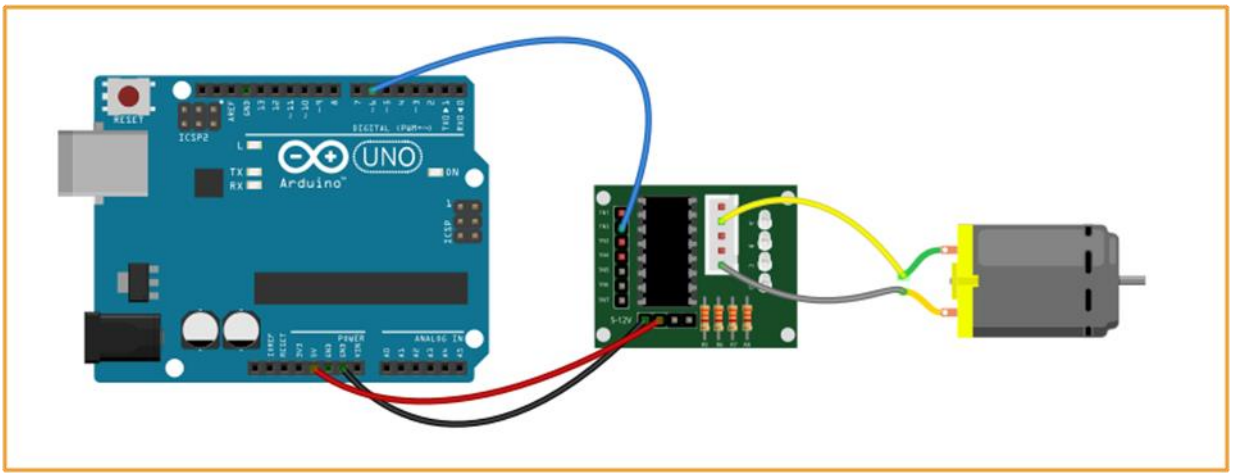
Experiment purpose

Use Arduino control board to control dc motor rotation

Component List

- Keywish Arduino UNO R3 motherboard
- Breadboard
- USB cable
- Dc motor *1
- Motor drive plate
- The fan blade
- Jumper wires

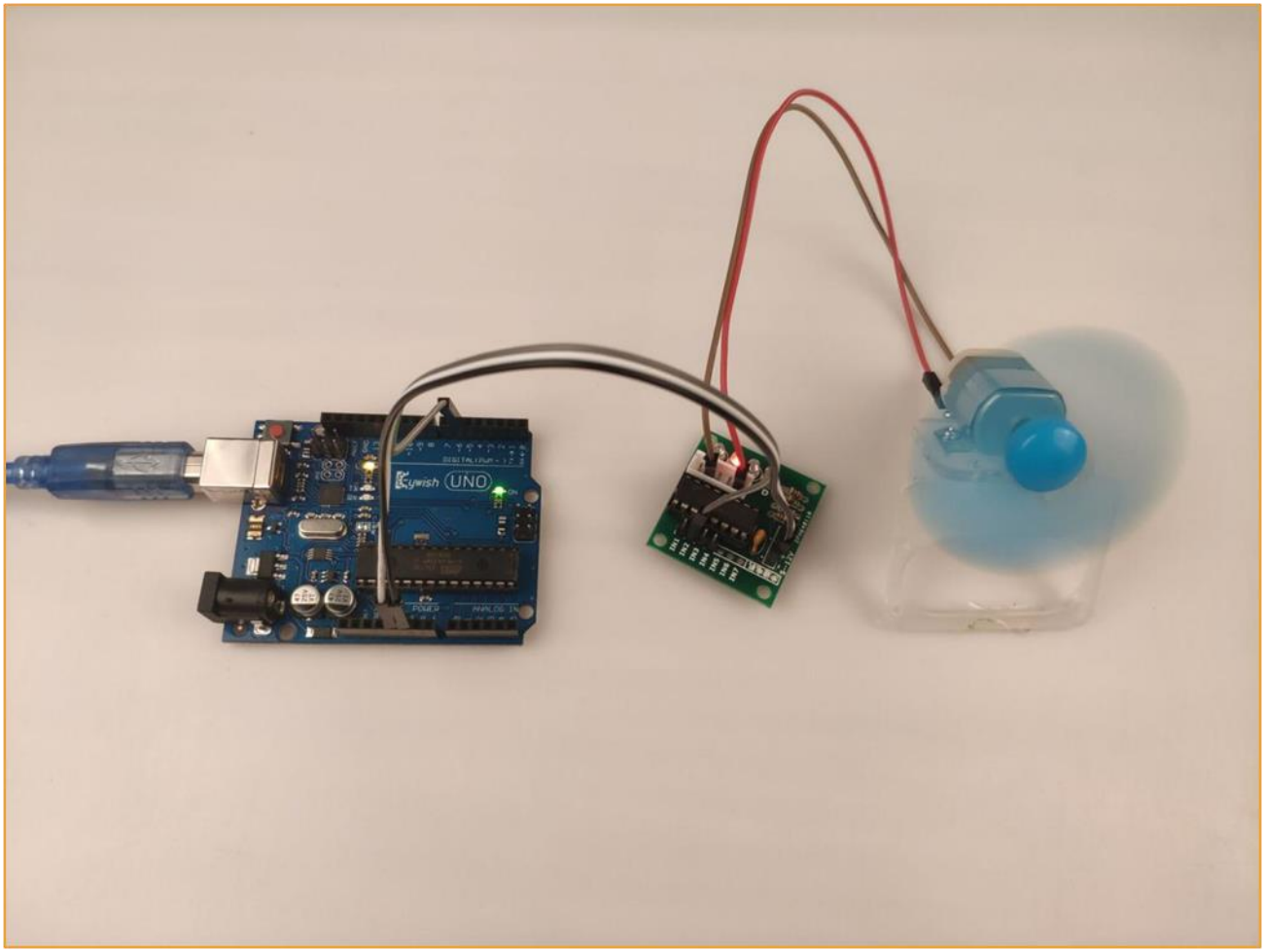
Wiring of Circuit



Code

```
int motor=6;
void setup(){
   pinMode(motor,OUTPUT);
}
void loop()
{
  digitalWrite(motor,HIGH);
 }
```

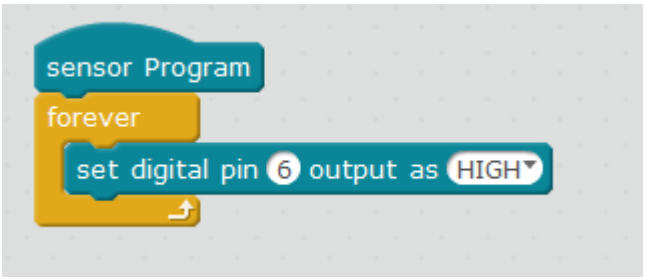
Experiment Result



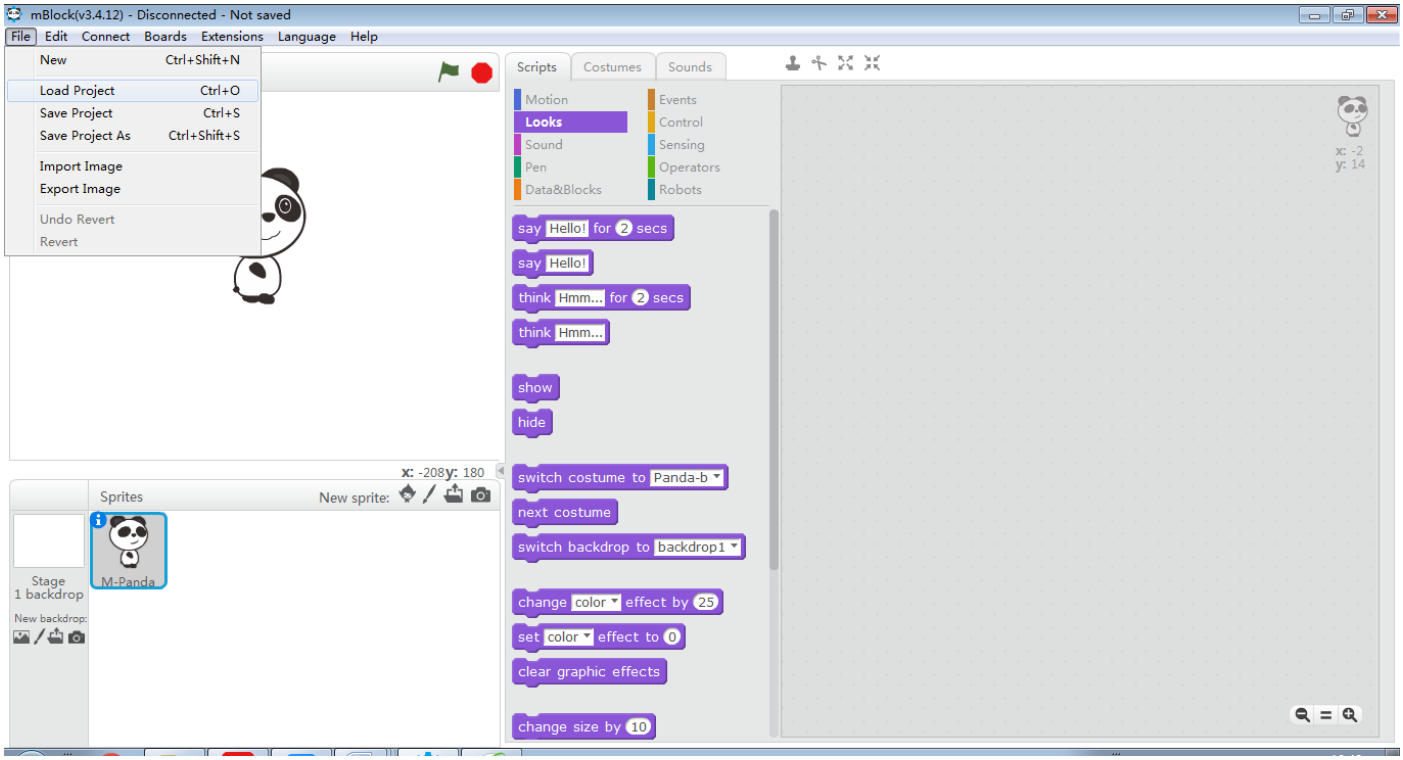
Through this experiment, we learned to control the rotation of the dc motor by the Arduino control motherboard. After loading the program, we could see the fan switch to, but it would stop after a while. This is because the Arduino current required by the motor could not be provided.

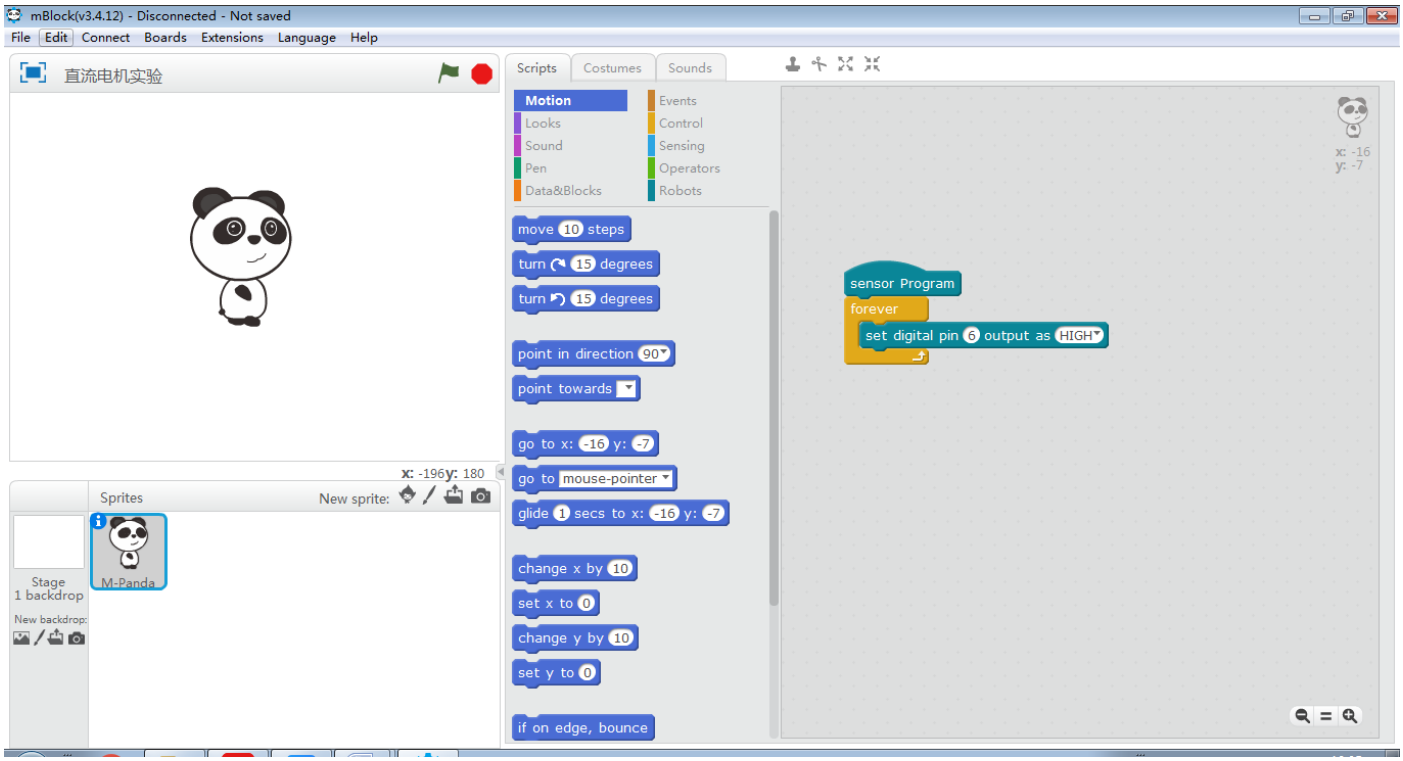
MBlock graphical programming program

The program written by mBlock is shown in the figure below:



You can also open the program file directly with mblock, which is a. Sb2 file. Here are the steps to open it:


mBlock(v3.4.12) - Disconnected - Not saved
File Edit Connect Boards Extensions Language Help
New Ctrl+Shift+N
Load Project Ctrl+O
Save Project Ctrl+S
Save Project As Ctrl+Shift+S
Import Image
Export Image
Undo Revert
Revert
Scripts Costumes Sounds
Motion Looks Sound Pen Data&Blocks
Events Control Sensing Operators Robots
say Hello! for 2 secs
say Hello!
think Hmm... for 2 secs
think Hmm...
show
hide
switch costume to Panda-b
next costume
switch backdrop to backdrop1
change color effect by 25
set color effect to 0
clear graphic effects
change size by 10
x: -208 y: 180
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
M-Panda
x: -2
y: 14


mBlock(v3.4.12) - Disconnected - Not saved
File Edit Connect Boards Extensions Language Help
直流电机实验
Scripts Costumes Sounds
Motion Looks Sound Pen Data&Blocks
Events Control Sensing Operators Robots
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: -16 y: -7
go to mouse-pointer
glide 1 secs to x: -16 y: -7
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
sensor Program
forever
set digital pin 6 output as HIGH
x: -196 y: 180
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
M-Panda
x: -16
y: -7

Mixly graphical programming program