



LAB 4

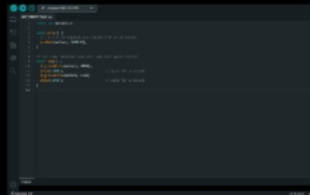
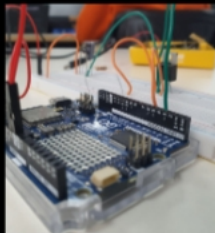
MOTORI ELETTRICI CC

ELECTRIC DC MOTORS

DI CAPOZZI RICCARDO, MARINI NICCOLÒ E
PARMA CHRISTIAN

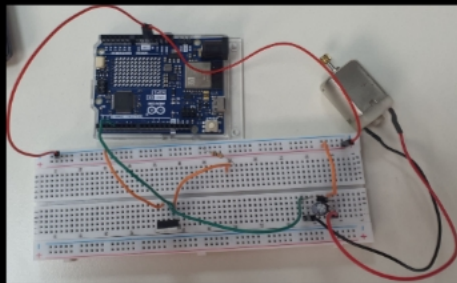
Riassunto

IN QUESTA PRESENTAZIONE SPIEGHEREMO COME REALIZZARE VARI CIRCUITI UTILIZZANDO IL MOTORE ELETTRICO PRESENTE NEL KIT DI ARDUINO UNO R3.



Summary

IN THIS PRESENTATION WE ARE GOING TO EXPLAIN HOW TO REALIZE VARIOUS ELECTRIC CIRCUITS USING THE ELECTRIC DC MOTOR INCLUDED IN THE ARDUINO R3 KIT.



▶ CONTENUTI / *CONTENTS*

01. CIRCUITO 1 / *CIRCUIT 1*

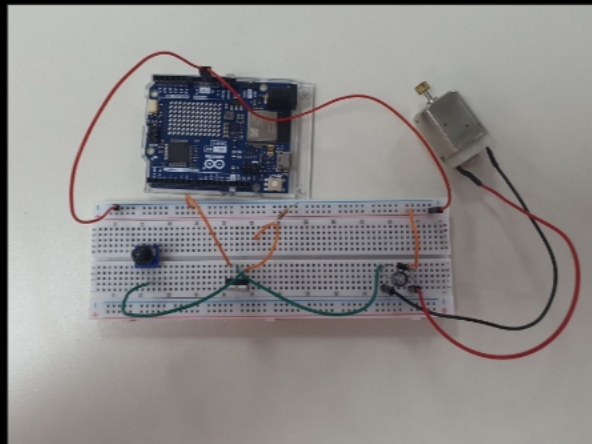
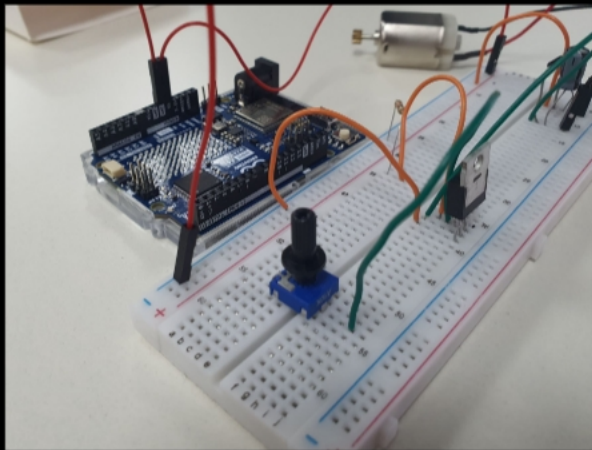
02. CIRCUITO 2 / *CIRCUIT 2*

03. CIRCUITO 3 / *CIRCUIT 3*

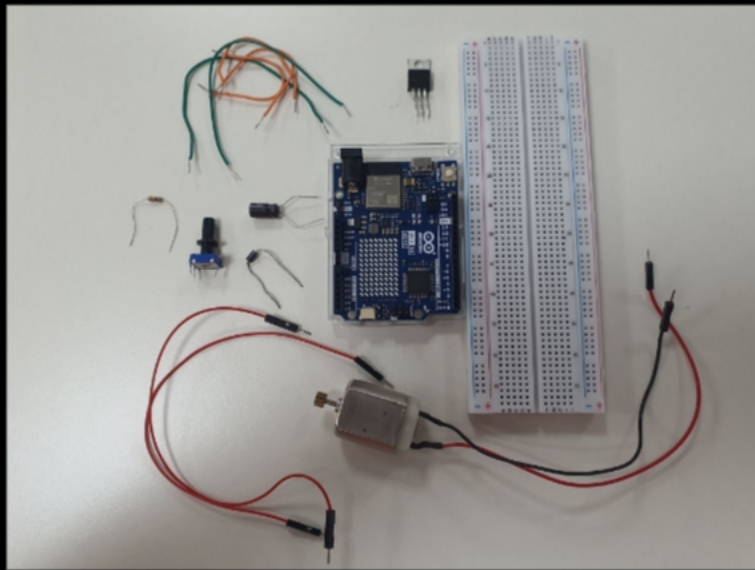
04. CIRCUITO 4 / *CIRCUIT 4*

CIRCUITO 1 / CIRCUIT 1

In questo circuito vi spiegheremo come utilizzare il potenziometro per far partire gradualmente il motore.



In this circuit we are going to explain to you how to use the potentiometer to make a DC motor spin gradually.



CIRCUITO 1 / CIRCUIT 1 COMPONENTI / MATERIALS NEEDED

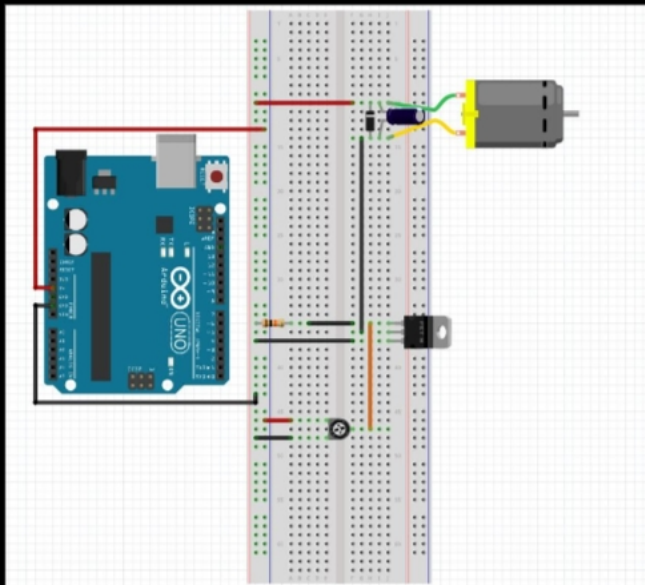
Per realizzare questo circuito,
serviranno:

- Scheda Arduino Uno R3 / R4;
- Breadboard;
- 2x Cavi Jumper;
- 7x Ponticelli;
- Potenzenziometro da 10k;
- Motore;
- Mosfet (IRF520N);
- Diodo (1N4007 / MIC);
- Resistenza da 10k Ω ;
- Condensatore (100 μ F / 16V).

*In order to realize this circuit, you will
need:*

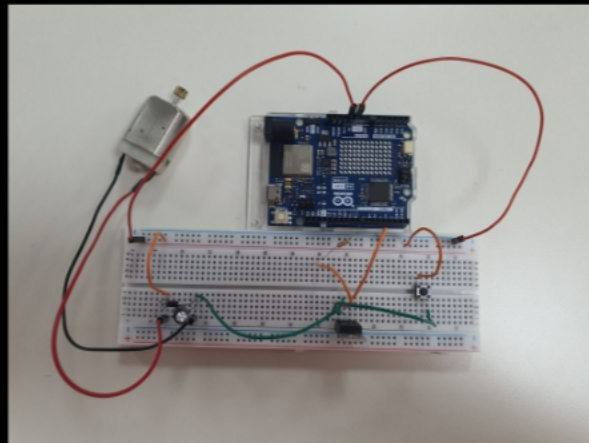
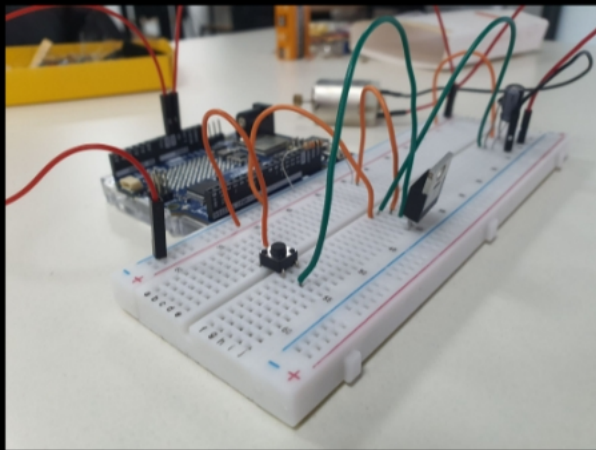
- Arduino Uno Board R3 / R4;
- Breadboard;
- 2x Jumper Cables;
- 7x Cables;
- 10k Potentiometer;
- Motor;
- Mosfet (IRF520N);
- Diode (1N4007 / MIC);
- 10k Ω Resistor;
- Capacitor (100 μ F / 16V).

CIRCUITO 1 / CIRCUIT 1
SCHEMA FRITZING / FRITZING SCHEME

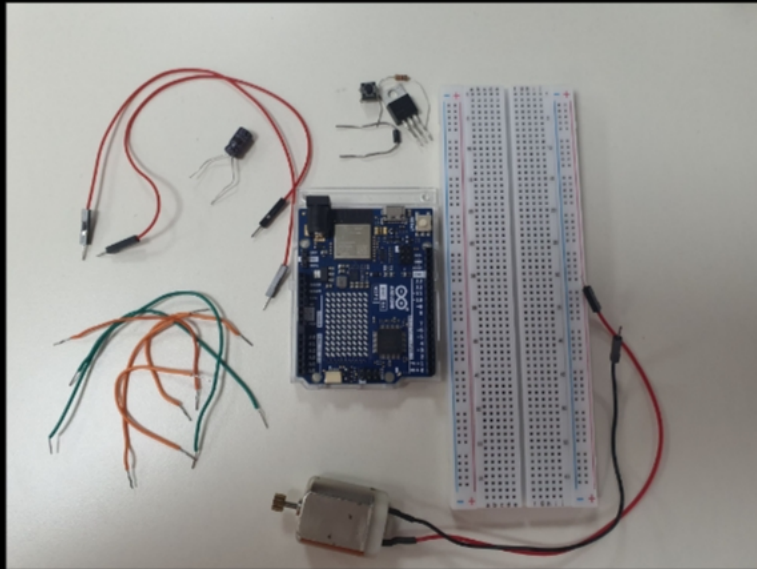


CIRCUITO 2 / CIRCUIT 2

In questo circuito vi spiegheremo come utilizzare un pushbutton per accendere e spegnere il motore.



In this circuit we are going to explain to you how to use a pushbutton in order to make a motor spin and then stop.



CIRCUITO 2 / CIRCUIT 2 COMPONENTI / MATERIALS NEEDED

Per realizzare questo circuito,
serviranno:

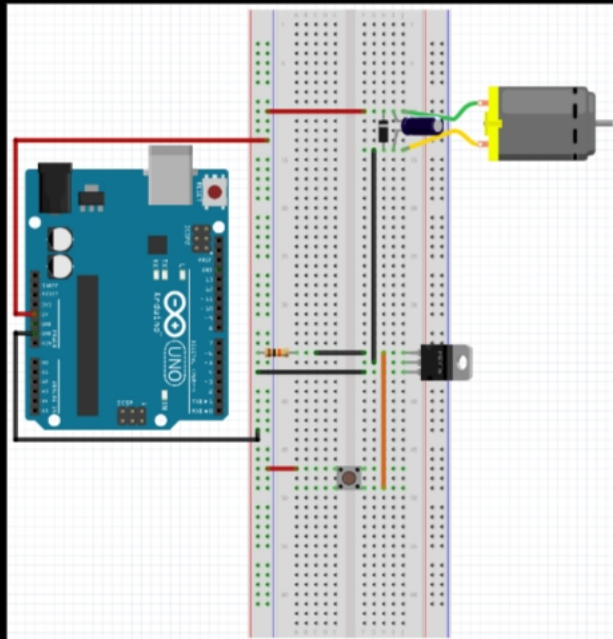
- Scheda Arduino Uno R3 / R4;
- Breadboard;
- 2x Cavi Jumper;
- 6x Ponticelli;
- Pushbutton;
- Motore;
- Mosfet (IRF520N);
- Diodo (1N4007 / MIC);
- Resistenza da 10kΩ;
- Condensatore (100μF / 16V).

*In order to realize this circuit, you will
need:*

- Arduino Uno Board R3 / R4;
- Breadboard;
- 2x Jumper Cables;
- 6x Cables;
- Pushbutton;
- Motor;
- Mosfet (IRF520N);
- Diode (1N4007 / MIC);
- 10kΩ Resistor;
- Capacitor (100μF / 16V).

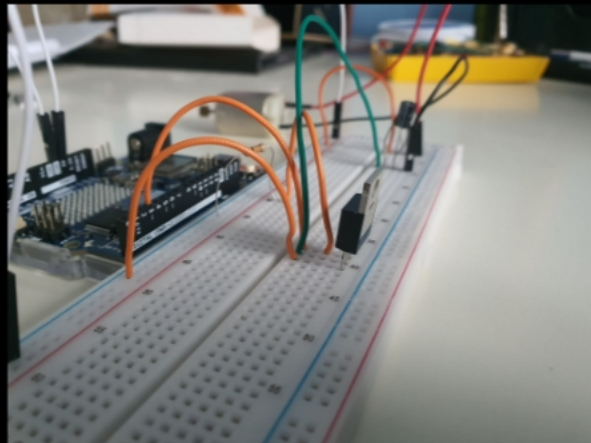
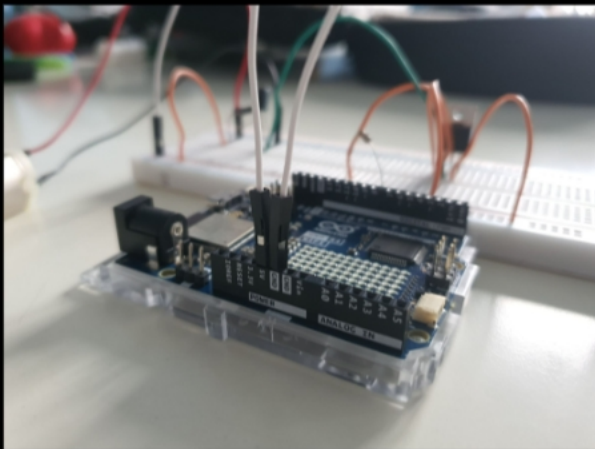
CIRCUITO 2 / CIRCUIT 2

SCHEMA FRITZING / FRITZING SCHEME

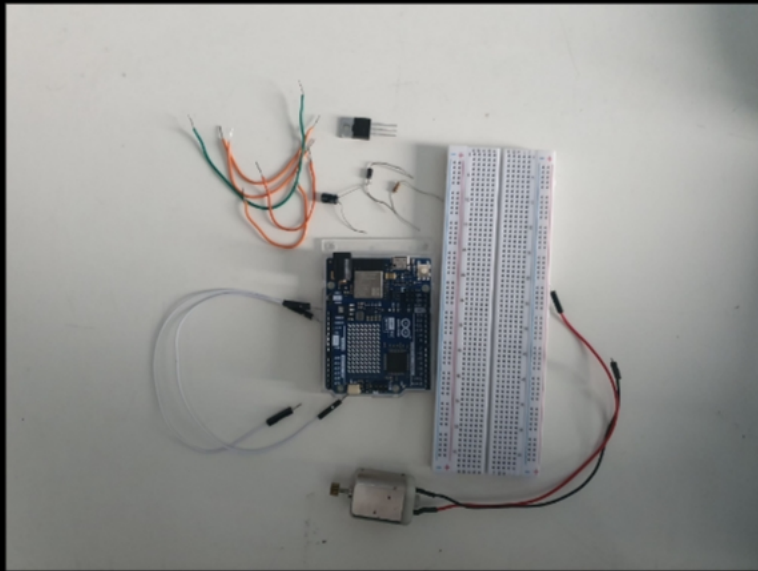


CIRCUITO 3 / CIRCUIT 3

In questo circuito vi spiegheremo come utilizzare Arduino IDE per accendere il motore in svariati modi.



In this circuit we are going to explain to you how to use Arduino IDE in order to make a DC motor spin in various ways.



CIRCUITO 3 / CIRCUIT 3 COMPONENTI / MATERIALS NEEDED

Per realizzare questo circuito,
serviranno:

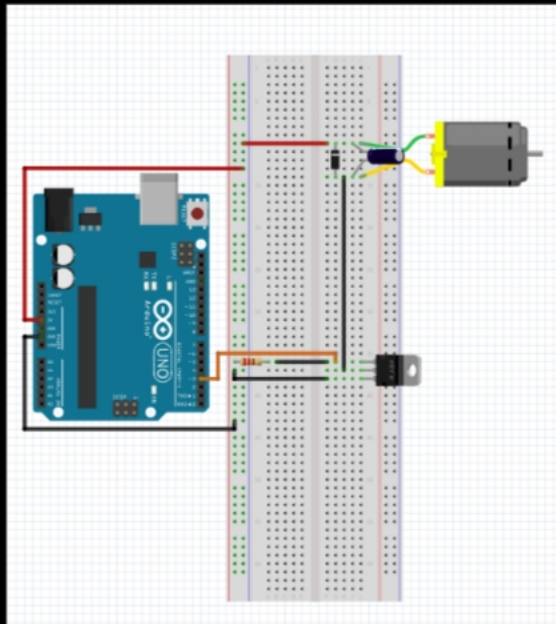
- Scheda Arduino Uno R3 / R4;
- Breadboard;
- 2x Cavi Jumper;
- 5x Ponticelli;
- Motore;
- Mosfet (IRF520N);
- Diodo (1N4007 / MIC);
- Resistenza da 10k Ω ;
- Condensatore (100 μ F / 16V).

*In order to realize this circuit, you will
need:*

- *Arduino Uno Board R3 / R4;*
- *Breadboard;*
- *2x Jumper Cables;*
- *5x Cables;*
- *Motor;*
- *Mosfet (IRF520N);*
- *Diode (1N4007 / MIC);*
- *10k Ω Resistor;*
- *Capacitor (100 μ F / 16V).*

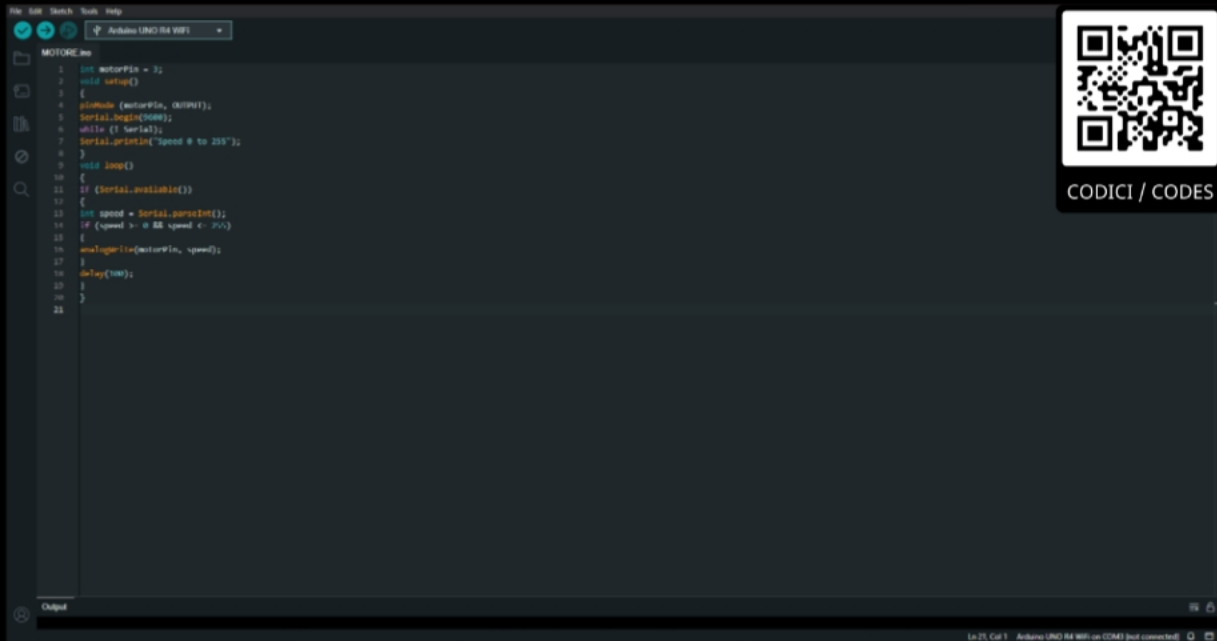
CIRCUITO 3 / CIRCUIT 3

SCHEMA FRITZING / FRITZING SCHEME




CODICE ACCENSIONE MOTORE CON MONITOR SERIALE

CODE TO SPIN THE DC MOTOR WITH THE SERIAL MONITOR



```
1 int motorPin = 3;
2 void setup()
3 {
4   pinMode(motorPin, OUTPUT);
5   Serial.begin(9600);
6   while (! Serial);
7   Serial.println("Speed 0 to 255");
8 }
9 void loop()
10 {
11   if (Serial.available())
12   {
13     int speed = Serial.parseInt();
14     if (speed >= 0 && speed <= 255)
15     {
16       analogWrite(motorPin, speed);
17     }
18     delay(100);
19   }
20 }
21
```



CODICI / CODES

Output

Ln 21, Col 1: Arduino UNO R4 WiFi on COM4 just connected

CODICE ACCENSIONE MOTORE AD INTERMITTENZA

CODE TO SPIN THE DC MOTOR ON INTERMITTANCE

File Edit Sketch Tools Help


Arduino UNO R4 WiFi

INTERMITTENZA.ino

```
1 const int motore=3;
2
3 void setup() {
4   // Initialize digital pin LED_BUILTIN as an output.
5   pinMode(motore, OUTPUT);
6 }
7
8 // the loop function runs over and over again forever
9 void loop() {
10  digitalWrite(motore, HIGH);
11  delay(1000);           // wait for a second
12  digitalWrite(motore, LOW);
13  delay(1000);           // wait for a second
14 }
15
```

Output

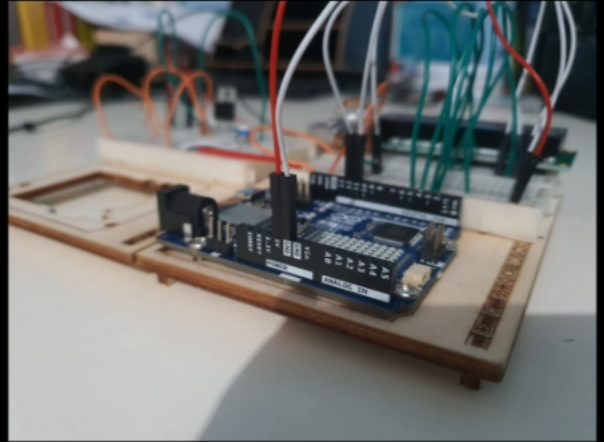
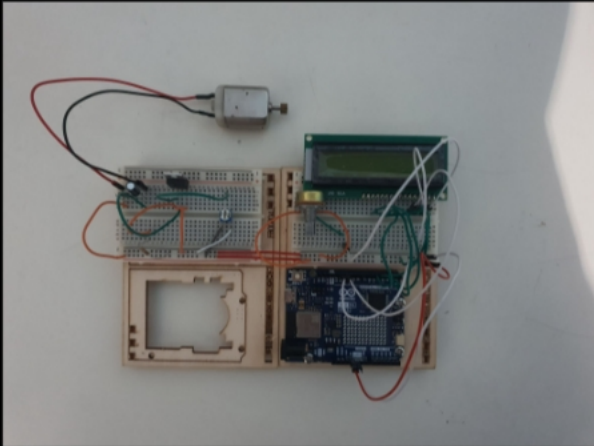
Ln 75, Col 1: Arduino UNO R4 WiFi on COM4 (just connected)



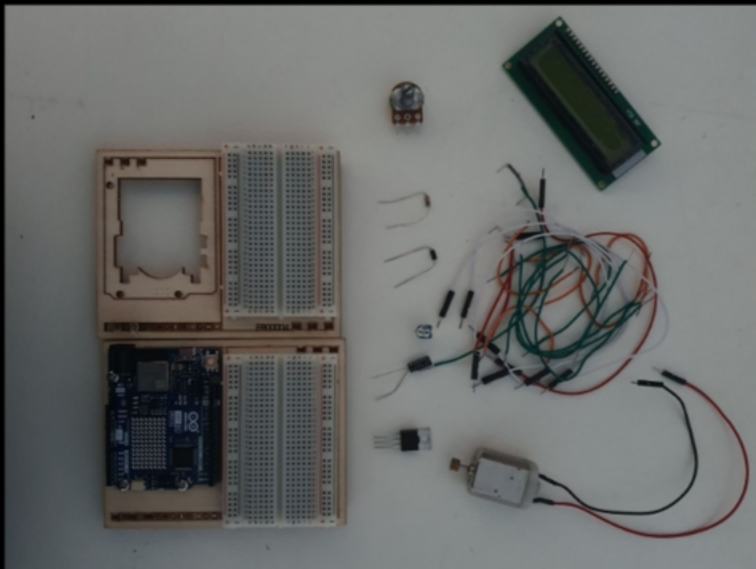
CODICI / CODES

CIRCUITO 4 / CIRCUIT 4

In questo circuito vi spiegheremo come utilizzare Arduino IDE per accendere il motore e vedere sullo schermo LCD i suoi valori.



In this circuit we are going to explain to you how to use Arduino IDE in order to make a DC motor spin and see its values on an LCD screen.



CIRCUITO 4 / CIRCUIT 4 COMPONENTI / MATERIALS NEEDED

Per realizzare questo circuito, serviranno:

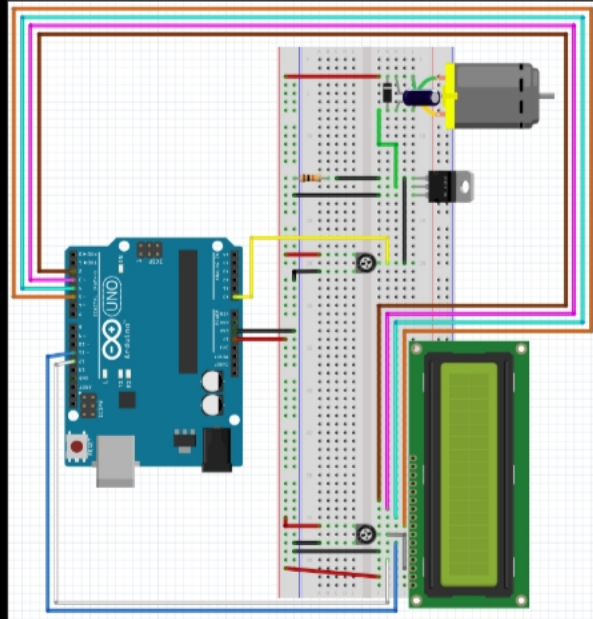
- Scheda Arduino Uno R3 / R4:
- 2x Breadboard:
- 2x Cavi Jumper:
- 19x Ponticelli:
- Motore:
- Mosfet (IRF520N):
- Diodo (1N4007 / MIC):
- Resistenza da 10k Ω :
- Condensatore (100 μ F / 16V):
- 2x Potenzimetri da 10k:
- Schermo LCD a cristalli liquidi:
- Arduino IDE Software
(<https://www.arduino.cc/en/software>)

In order to realize this circuit, you will need:

- Arduino Uno Board R3 / R4:
- Breadboard:
- 2x Jumper Cables:
- 5x Cables:
- Motor:
- Mosfet (IRF520N):
- Diode (1N4007 / MIC):
- 10k Ω Resistor:
- Capacitor (100 μ F / 16V):
- 2x 10k Potentiometers:
- LCD Liquid Crystals Screen:
- Arduino IDE Software
(<https://www.arduino.cc/en/software>)


CIRCUITO 4 / CIRCUIT 4

SCHEMA FRITZING / FRITZING SCHEME



CODICE ACCENSIONE MOTORE CON LCD

CODE TO SPIN THE DC MOTOR WITH THE LCD SCREEN



CODICI / CODES

```
File Edit Sketch Tools Help
Arduino UNO R4 WiFi

LCD.h
31 by Tom Igoe
32 modified 7 Nov 2016
33 by Arturo Guadalupi
34
35 This example code is in the public domain.
36
37 https://docs.arduino.cc/learn/electronics/lcd-display#testscroll-example
38 https://github.com/arduino-libraries/LiquidCrystal
39 */
40 // Include the library code:
41 #include <LiquidCrystal.h>
42 const int pot=A0;
43 float value;
44
45 // Initialize the library by associating any needed LCD interface pin
46 // with the Arduino pin number it is connected to
47 const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
48 LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
49
50 void setup() {
51   // set up the LCD's number of columns and rows:
52   lcd.begin(16, 2);
53   pinMode(pot, INPUT);
54 }
55
56 void loop() {
57   // set the cursor to (0,0):
58   lcd.setCursor(0, 0);
59   // print from 0 to 9:
60   value=analogRead(pot);
61   lcd.print("value is: ");
62
63   lcd.print(value);
64
65   delay(500);
66
67
68
69
70
71 }
```

Ln 71, Col 1 Arduino UNO R4 WiFi: on COM5 (just connected)

**GRAZIE PER
L'ATTENZIONE!**



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