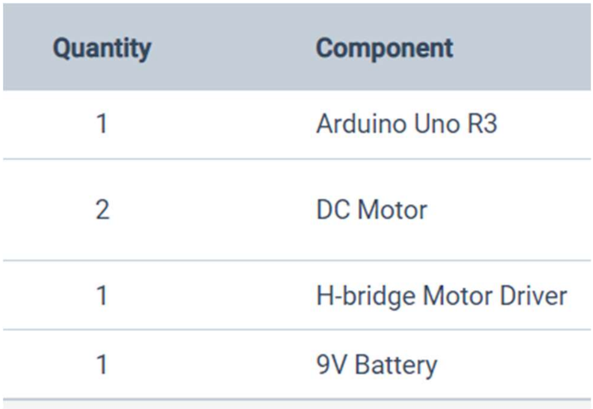
Practical No. 21

Aim: Write a program to control two DC motors with Arduino.

Component:



Quantity	Component
1	Arduino Uno R3
2	DC Motor
1	H-bridge Motor Driver
1	9V Battery

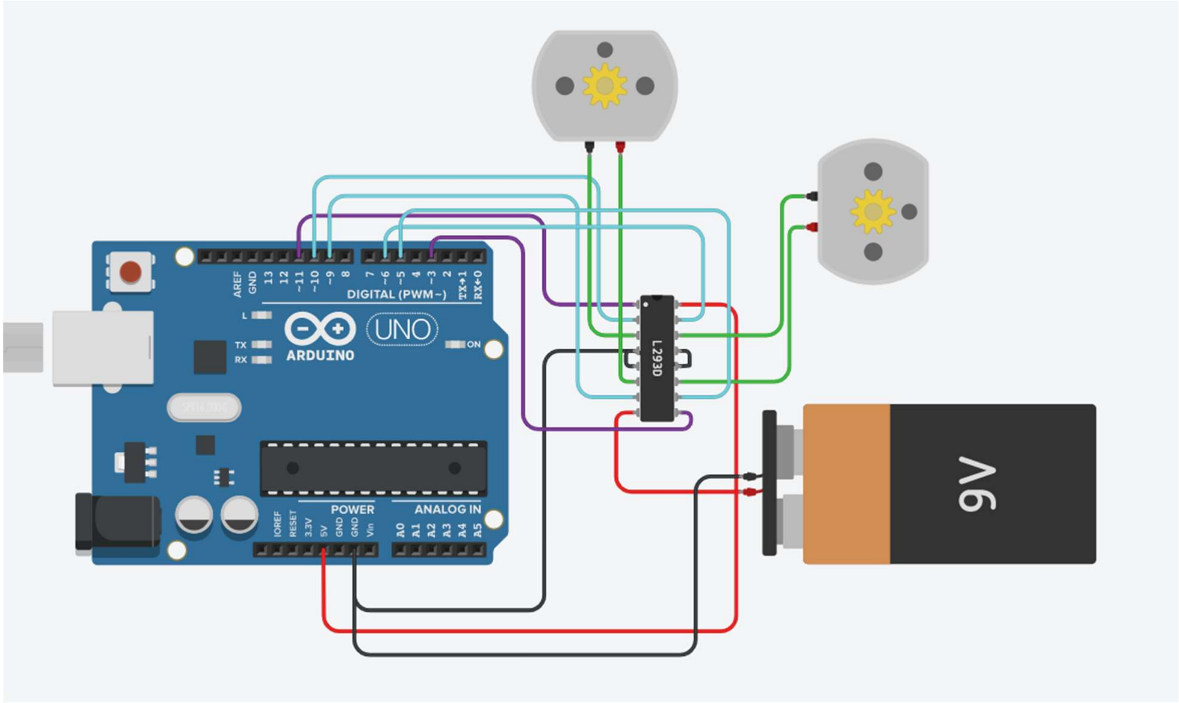
Theory:

DC Motor:

A direct current (DC) motor is a type of electric machine that converts electrical energy into mechanical energy. DC motors take electrical power through direct current, and convert this energy into mechanical rotation.

DC motors use magnetic fields that occur from the electrical currents generated, which powers the movement of a rotor fixed within the output shaft. The output torque and speed depend upon both the electrical input and the design of the motor.

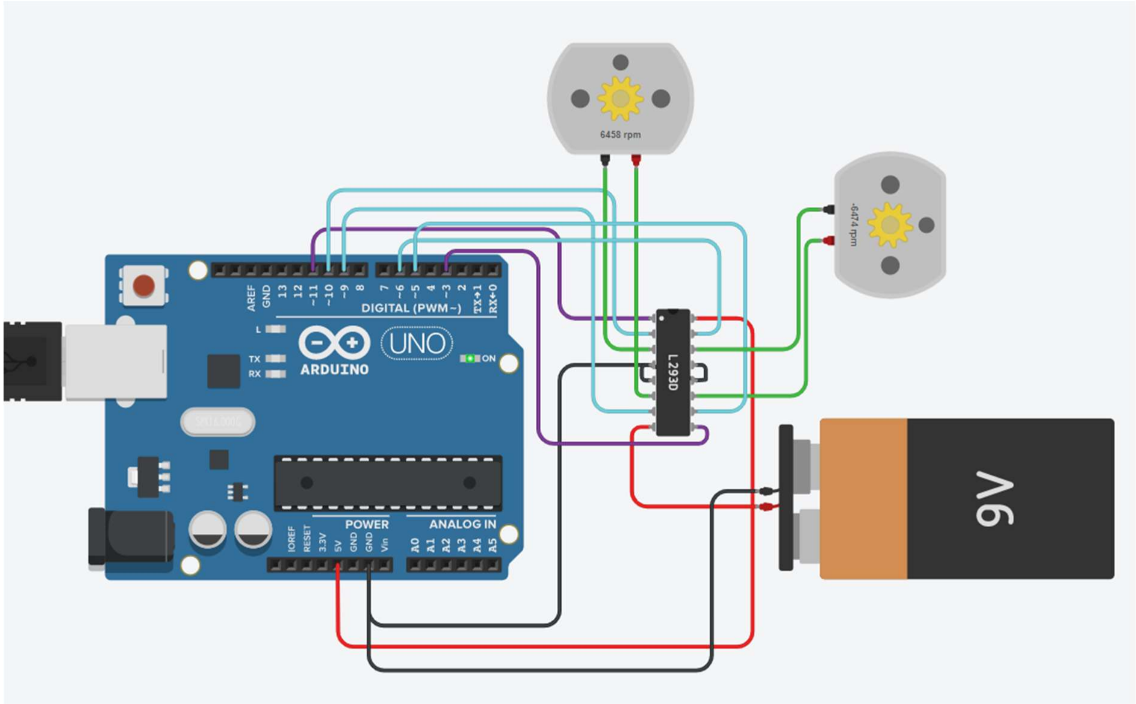
Circuit Diagram:



Program:

```
int speedPin = 11;

int speedPin2 = 3;

int dir1= 9;

int dir2= 10;

int dir3= 5;

int dir4= 6;


void setup()

{

  pinMode(speedPin, OUTPUT);

  pinMode(speedPin2, OUTPUT);

  pinMode(dir1, OUTPUT);

  pinMode(dir2, OUTPUT);

  pinMode(dir3, OUTPUT);

  pinMode(dir4, OUTPUT);
}

void loop()
{
  digitalWrite(dir1, HIGH);
  digitalWrite(dir2, LOW);
  digitalWrite(dir3, LOW);
  digitalWrite(dir4, HIGH);
  analogWrite(speedPin,100);
  analogWrite(speedPin2,100);
}
```

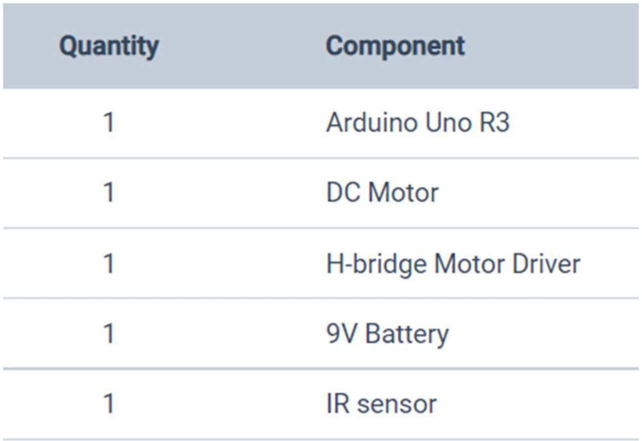
Output:



Practical No. 24

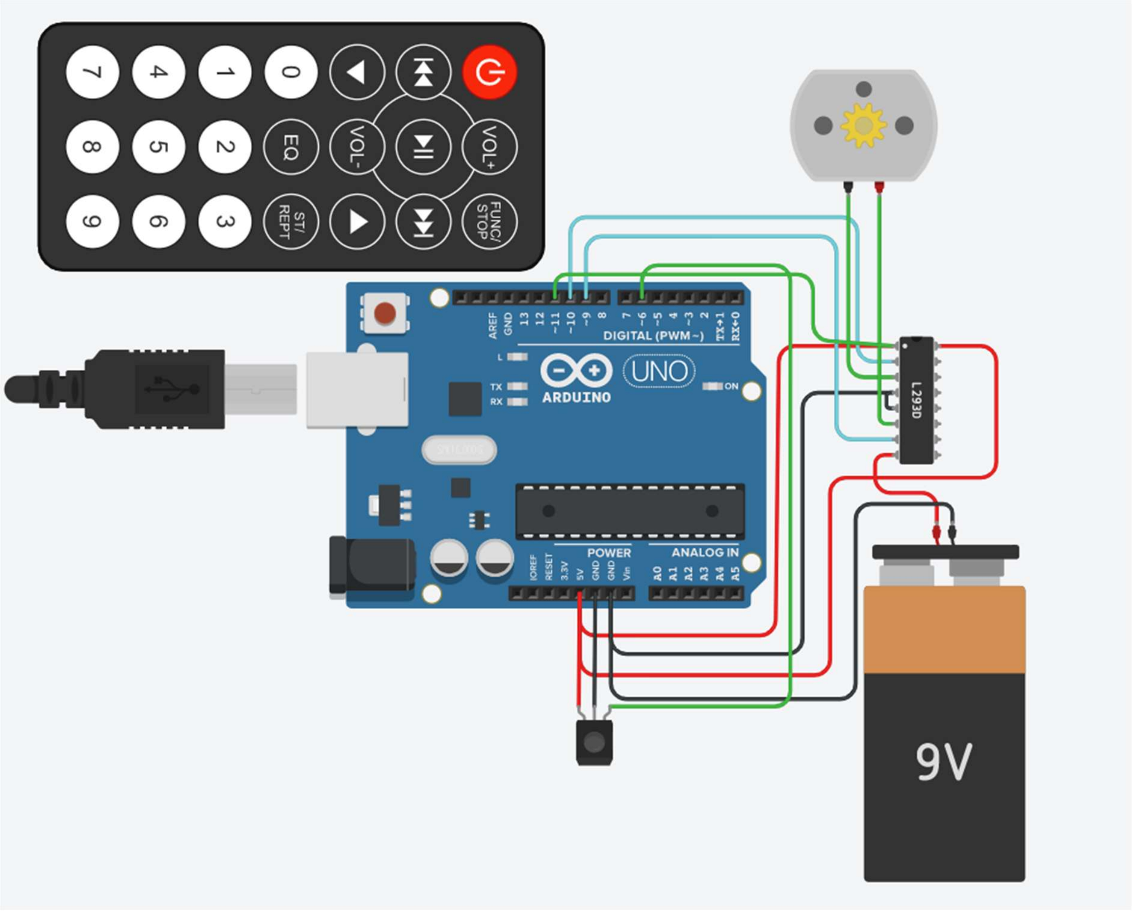
Aim: Write a program to control DC motor speed with an IR remote

Component:



Quantity	Component
1	Arduino Uno R3
1	DC Motor
1	H-bridge Motor Driver
1	9V Battery
1	IR sensor

Circuit Diagram:

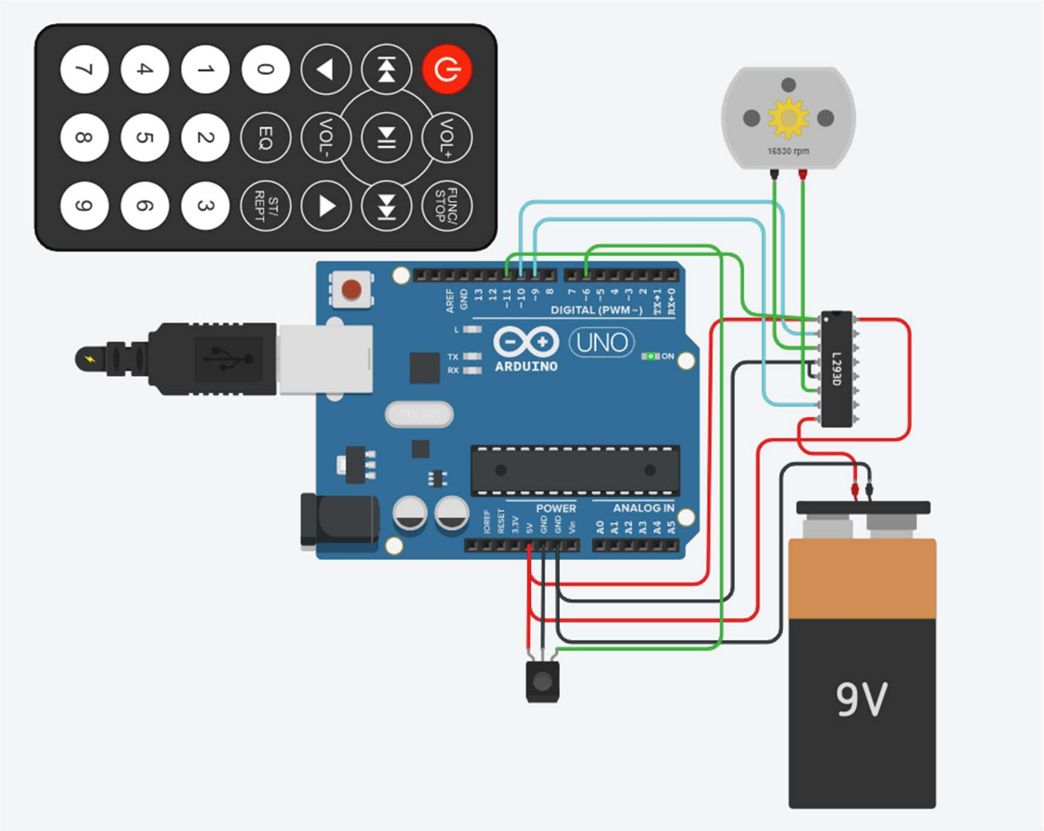


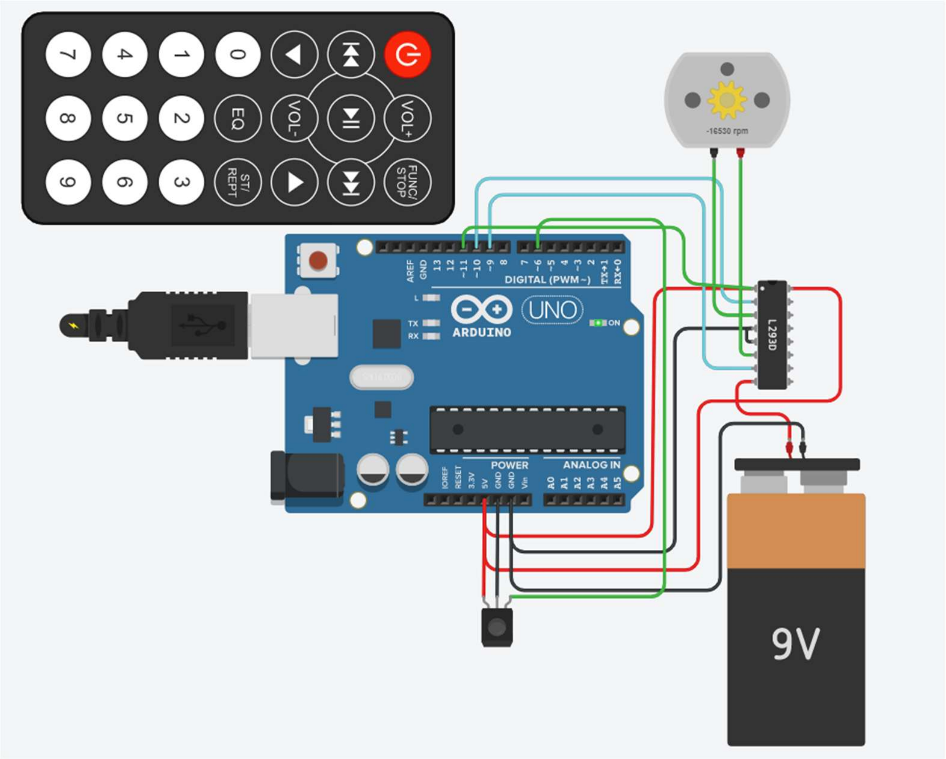
Program:

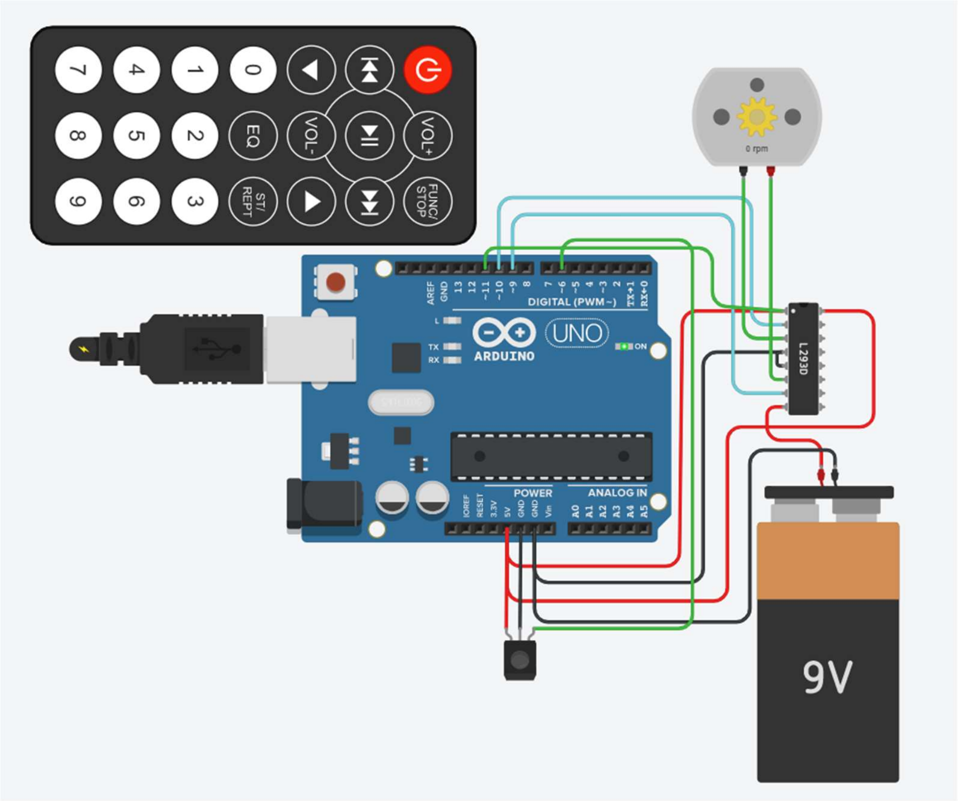
```
#include <IRremote.h>
#define speed1 2295
#define speed2 29885
#define speed4 12495
#define stop 255


// C++ code
// 1 and 2

int speedPin = 11;
int dir1= 9;
int dir2= 10;

int IRSensor = 6;

IRrecv IR(IRSensor);
decode_results results;

unsigned int value_decode;


void setup()
{
  pinMode(speedPin, OUTPUT);
  pinMode(dir1, OUTPUT);
  pinMode(dir2, OUTPUT);

  Serial.begin(9600);
  IR.enableIRIn();
}

void loop() {
  if (IR.decode(&results))
  {

    delay(1000);
    value_decode = results.value;
    Serial.println(value_decode);
    advance(value_decode);
    IR.resume(); // Receive the next value
  }
}

void advance(unsigned int option)
{
            switch(option)
    {
      case speed1:
                        digitalWrite(dir1,1);
                        digitalWrite(dir2,0);
                        analogWrite(speedPin,200);
                        break;
      case speed2:
                        digitalWrite(dir1,0);
                        digitalWrite(dir2,1);
                        analogWrite(speedPin,100);
                        break;
      case stop:
```

```
                digitalWrite(dir1,0);
                digitalWrite(dir2,0);
          break;
      default:
                digitalWrite(dir1,0);
                digitalWrite(dir2,0);
                break;
   }
}
```

Output:




-16530 rpm
L293D
ARDUINO
UNO
DIGITAL (PWM~)
POWER
ANALOG IN
9V


0 rpm
L293D
ARDUINO
UNO
DIGITAL (PWM~)
POWER
ANALOG IN
9V