




# **Project 9 - LED Fire Effect**

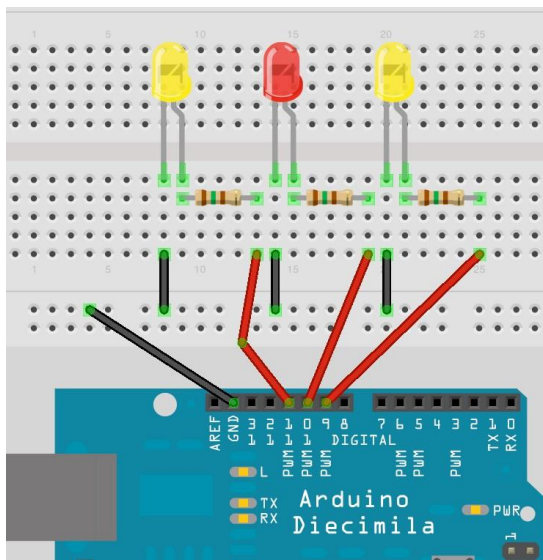
Project 9 will use LED's and a flickering random light effect, using PWM again, to recreate the effect of a flickering flame. If you were to place these LED's inside a model house on a model railway layout, for example, you could create a special effect of the house being on fire, or you could place it into a fake fireplace in your house to give a fire effect. This is a simple example of how LED's can be used to create SFX for movies, stage plays, model diorama's, model railways, etc.

### What you will need

Red Diffused LED	
2 x Yellow Diffused LED's	
3 x 150Ω Resistor	

### Connect it up

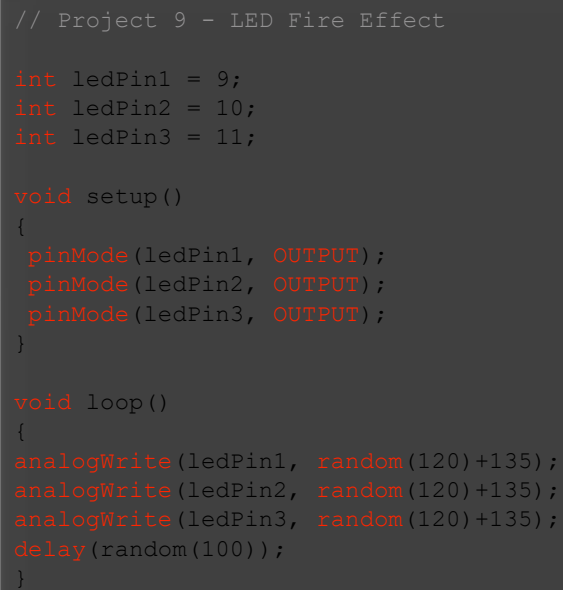
Now, first make sure that your Arduino is powered off. You can do this either by unplugging the USB cable or by taking out the Power Selector Jumper on the Arduino board. Then connect everything up like this :-



When you are happy that everything is connected up correctly, power up your Arduino and connect the USB cable.

### Enter the code

Now, open up the Arduino IDE and type in the following code :-



```
// Project 9 - LED Fire Effect

int ledPin1 = 9;
int ledPin2 = 10;
int ledPin3 = 11;

void setup()
{
  pinMode(ledPin1, OUTPUT);
  pinMode(ledPin2, OUTPUT);
  pinMode(ledPin3, OUTPUT);
}

void loop()
{
  analogWrite(ledPin1, random(120)+135);
  analogWrite(ledPin2, random(120)+135);
  analogWrite(ledPin3, random(120)+135);
  delay(random(100));
}
```

Now press the Verify/Compile button at the top of the IDE to make sure there are no errors in your code. If this is successful you can now click the Upload button to upload the code to your Arduino.

If you have done everything right you should now see the LED's flickering in a random manner to simulate a flame or fire effect.

Now let's take a look at the code and the hardware and find out how they both work.

# Project 9 - Code Overview

```
// Project 9 - LED Fire Effect
int ledPin1 = 9;
int ledPin2 = 10;
int ledPin3 = 11;
void setup()
{
  pinMode(ledPin1, OUTPUT);
  pinMode(ledPin2, OUTPUT);
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}
void loop()
{
  analogWrite(ledPin1, random(120)+135);
  analogWrite(ledPin2, random(120)+135);
  analogWrite(ledPin3, random(120)+135);
  delay(random(100));
}
```

So let's take a look at the code for this project. First we declare and initialise some integer variables that will hold the values for the Digital Pins we are going to connect our LED's to.

```
int ledPin1 = 9;
int ledPin2 = 10;
int ledPin3 = 11;
```

We then set them up to be outputs.

```
pinMode(ledPin1, OUTPUT);
pinMode(ledPin2, OUTPUT);
pinMode(ledPin3, OUTPUT);
```

The main program loop then sends out a random value between 0 and 120, and then add 135 to it to get full LED brightness, to the PWM pins 9, 10 and 11.

```
analogWrite(ledPin1, random(120)+135);
analogWrite(ledPin2, random(120)+135);
analogWrite(ledPin3, random(120)+135);
```

Then finally we have a random delay between on and 100ms.

```
delay(random(100));
```

The main loop then starts again causing the flicker light effect you can see.

Bounce the light off a white card or a mirror onto your wall and you will see a very realistic flame effect.

## Exercises

1. Using a blue LED or two, see if you can recreate the effect of the flashes of light from an arc welder.
2. Using a Blue and Red LED recreate the effect of the lights on an emergency vehicle.

As the hardware is simple and we should understand it by now we will jump right into Project 10.

### **Exercises**

1. Using a blue LED or two, see if you can recreate the effect of the flashes of light from an arc welder.
2. Using a Blue and Red LED recreate the effect of the lights on an emergency vehicle.