

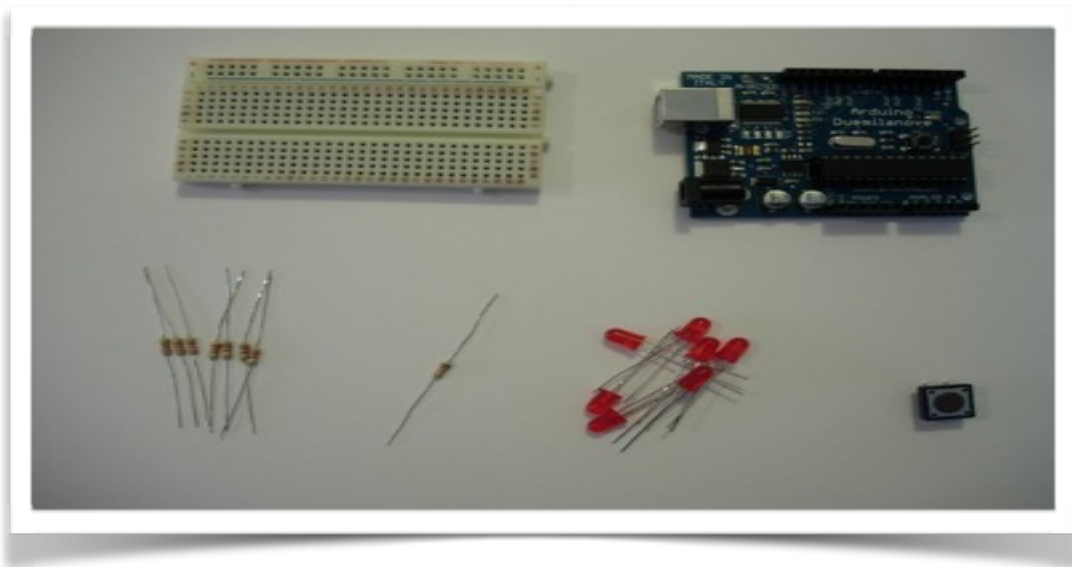


Dalkey Dojo

Advanced Project - The Arduino Electronic Dice

An Arduino based circuit to simulate a dice using LEDs. Push the button to throw the dice!

Step #1 - Check required parts and tools to complete this project:



This is what you need for this simple project:

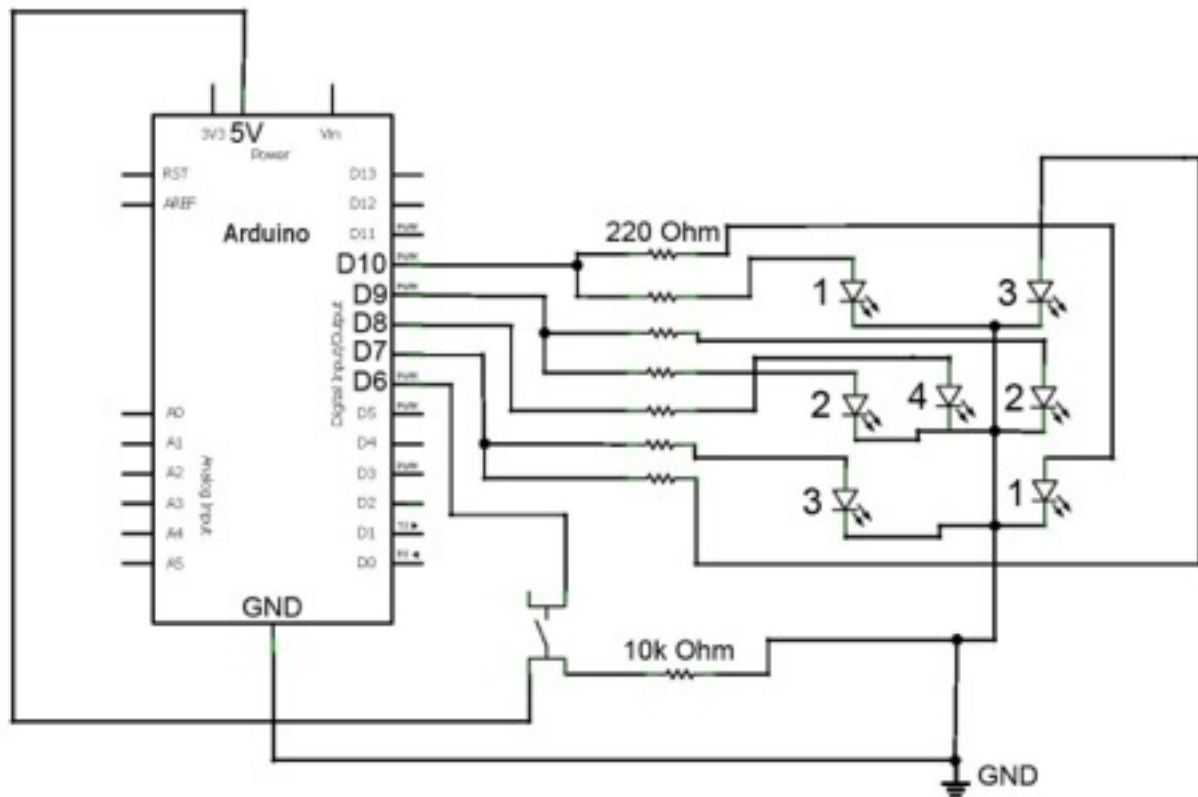
Parts:

- Arduino
- 7x Leds of any kind (I use 5mm Red Leds)
- A 10k Resistor (brown black orange)
- 7x 220 or 330 Resistor (red red brown or orange orange brown)
- A little Push Button
- Breadboard
- Some wires for the breadboard

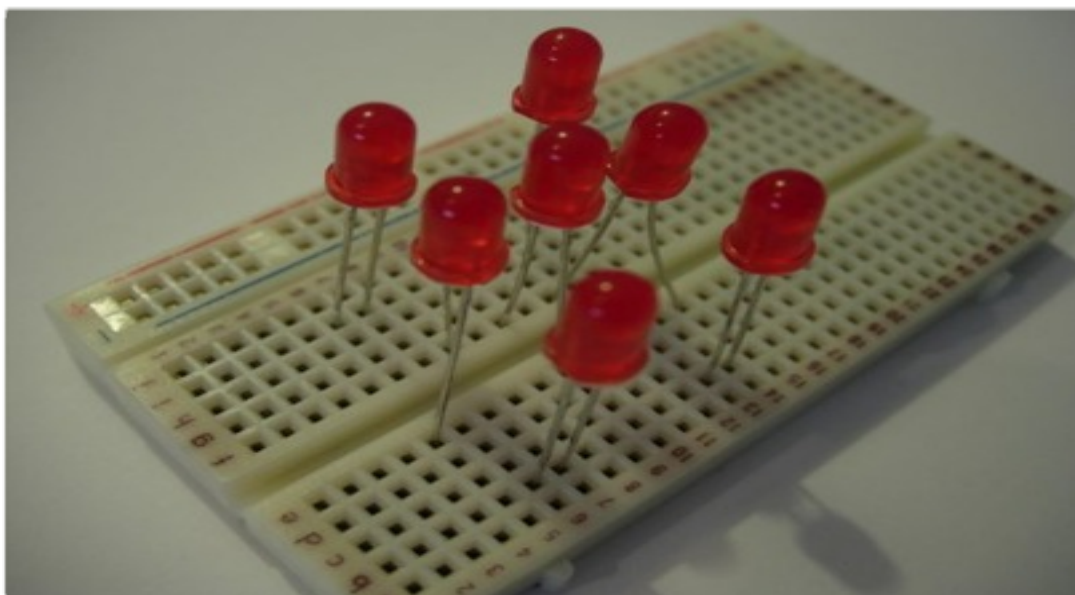
Tools:

- A laptop PC
- The Arduino programmer software (free download)
- USB Cable (to connect your laptop to the Arduino)

Step #2 - Build the LED dice on your breadboard using this circuit diagram:



Notes: To create all the six faces of a dice, you need 7 LEDs, placed in the shape of an "H" as follows:



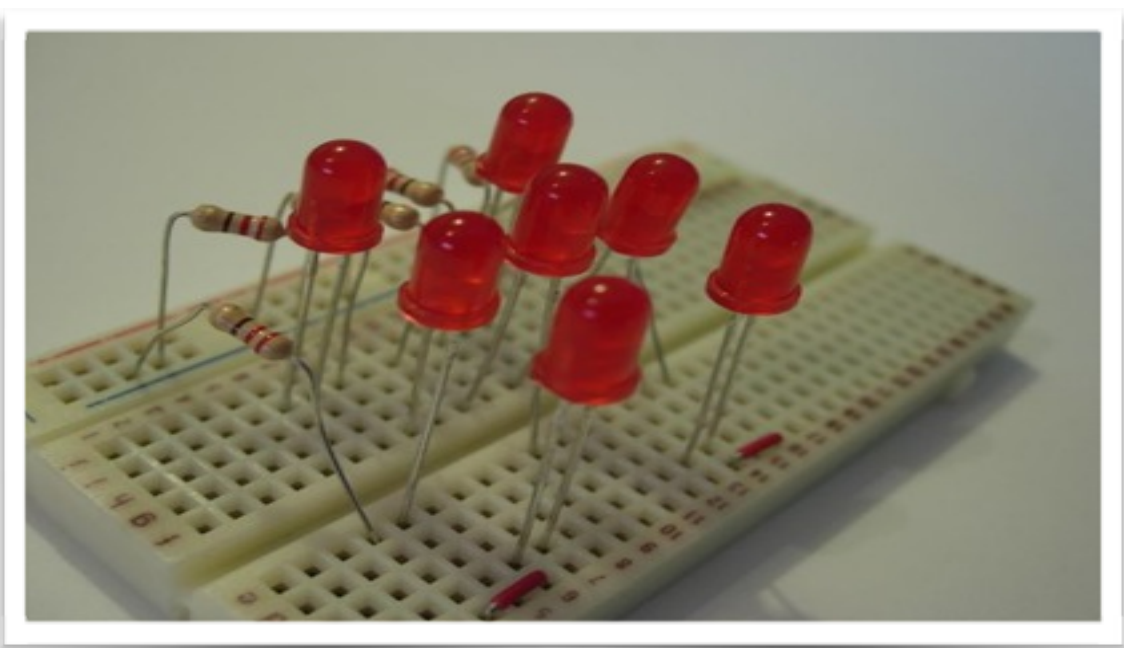
As you can see from the above schematic diagram, the LED's are not linked each to their own individual pin on the Arduino. Most are connected in pairs - can you guess why?

Well... the opposite corners of the dice are always on at the same time, therefore we can design a circuit where opposite corners are wired into a single pin on the Arduino. So instead of using seven pins, we can use just 4 (one for the middle, two for the corners, and one for the remaining two LEDs).

So to create all the faces of the dice, you must follow these rules:

1. For the number 1 of the dice: lights up the led 4
2. For the number 2 of the dice: lights up the group 1
3. For the number 3 of the dice: lights up the groups 3 and 4
4. For the number 4 of the dice: lights up the groups 1 and 3
5. For the number 5 of the dice: lights up the groups 1, 3 and 4
6. For the number 6 of the dice: lights up the groups 1, 2 and 3

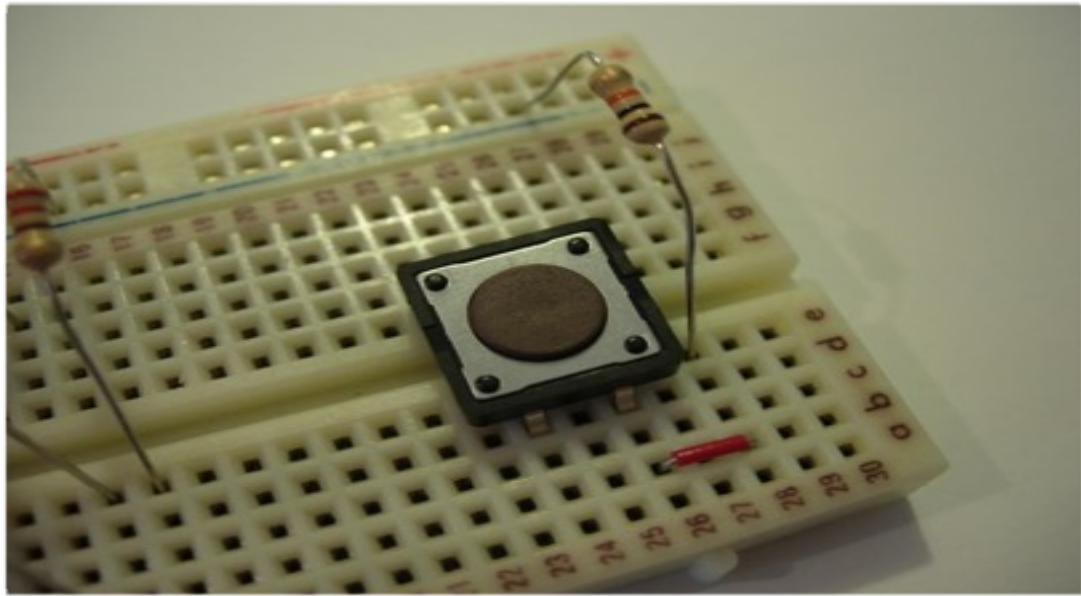
Now when building your LEDs onto the breadboard it should start to look like this:



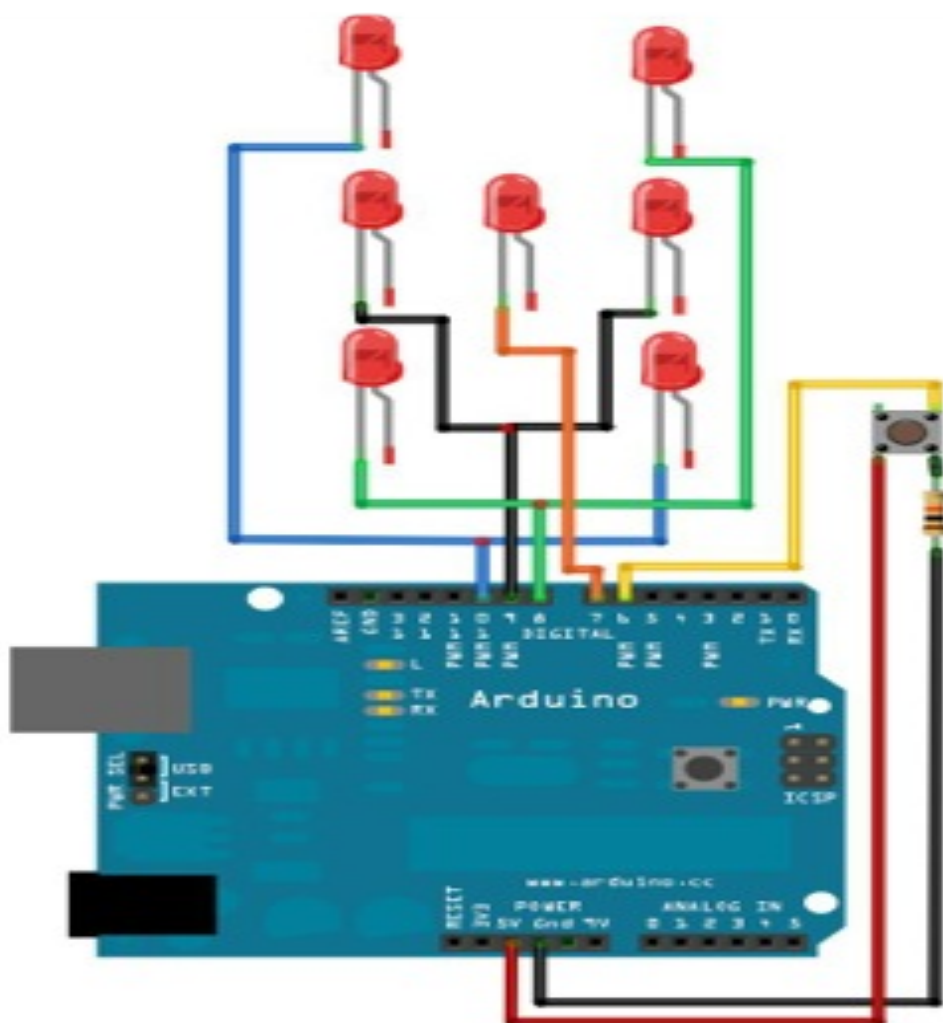
Remember - First, place the LEDs in the shape of an "H". It may be a little difficult to find the right configuration for the LED pairs, but refer back to the above circuit diagram to help get it right...

After that, connect all the cathodes of the LEDs (the shorter tail) to ground via the 220 or 330 ohm resistors (red red brown or orange orange brown).

Finally, insert the pushbutton on the breadboard and connect it to ground with the 10k ohm resistor (brown black orange). See picture below:



Step #3 - Connect your components to the Arduino using this schematic:

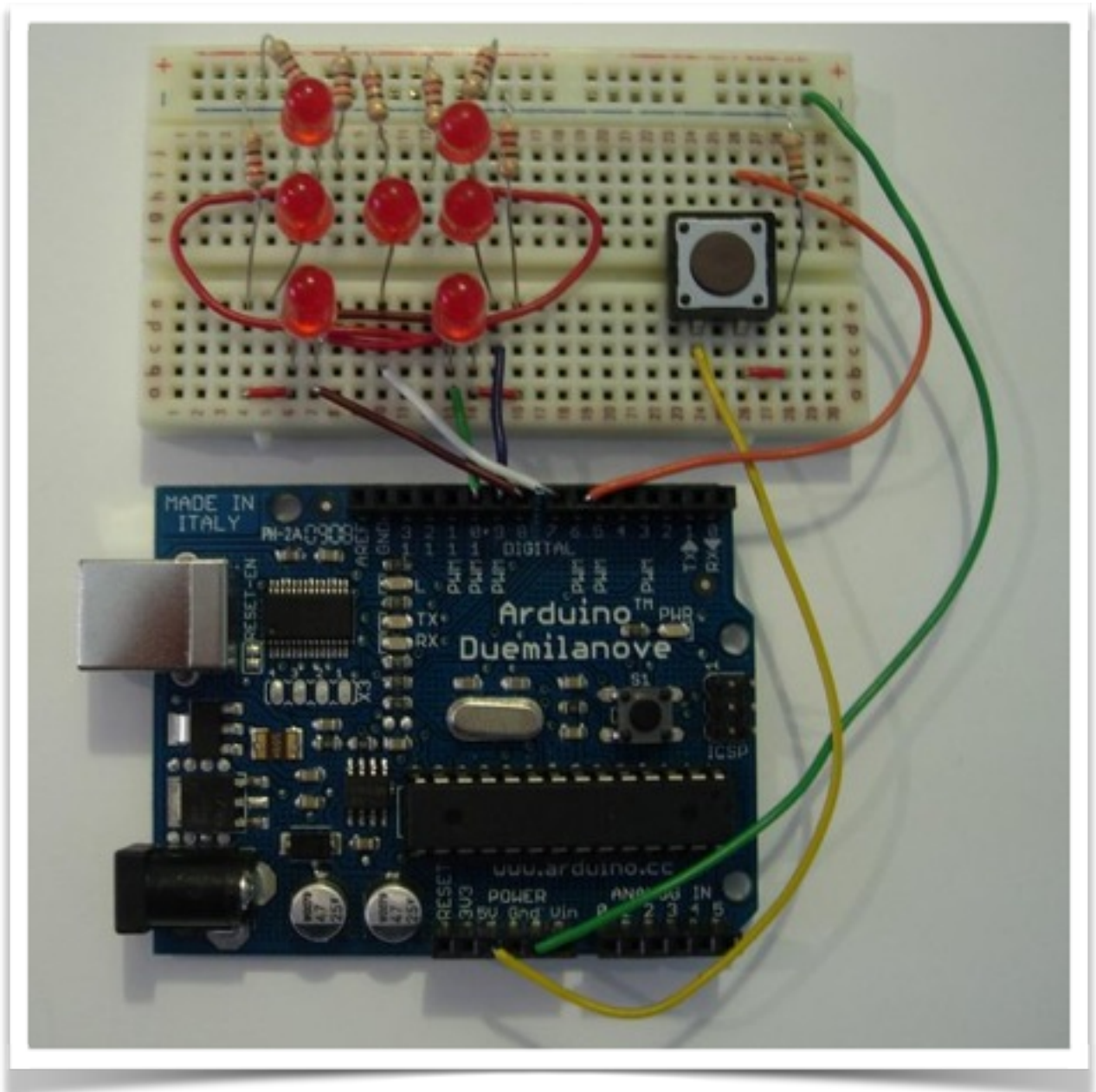


Now....let's take Arduino!

First, attach the Arduino ground with the ground line you have chosen on your breadboard

Then, connect the LED pairs to the Arduino pins as identified above... this part can be a bit difficult so please refer to the schematic.

Finally, connect the +5v of the Arduino with the pushbutton, and also connect the button with pin 6 of the Arduino...be careful also in this part and refer to the picture below for help.



Hey...you're done with the physical LED Dice build!

Now to write the Arduino software to control it...

Step #4 - Program the Arduino Code:

Here is the complete code without the comments:

```
int pinLeds1 = 10;
int pinLeds2 = 9;
int pinLeds3 = 7;
int pinLed4 = 8;
int buttonPin = 6;
int buttonState;
long ran;
int time = 2000;

void setup ()
{
  pinMode (pinLeds1, OUTPUT);
  pinMode (pinLeds2, OUTPUT);
  pinMode (pinLeds3, OUTPUT);
  pinMode (pinLed4, OUTPUT);
  pinMode (buttonPin, INPUT);
  randomSeed(analogRead(0));
}

void loop()
{
  buttonState = digitalRead(buttonPin);
  if (buttonState == HIGH){
    ran = random(1, 7);
    if (ran == 1){
      digitalWrite (pinLed4, HIGH);
      delay (time);
    }
    if (ran == 2){
      digitalWrite (pinLeds1, HIGH);
      delay (time);
    }
    if (ran == 3){
      digitalWrite (pinLeds3, HIGH);
      digitalWrite (pinLed4, HIGH);
      delay (time);
    }
    if (ran == 4){
      digitalWrite (pinLeds1, HIGH);
      digitalWrite (pinLeds3, HIGH);
      delay (time);
    }
  }
```

```

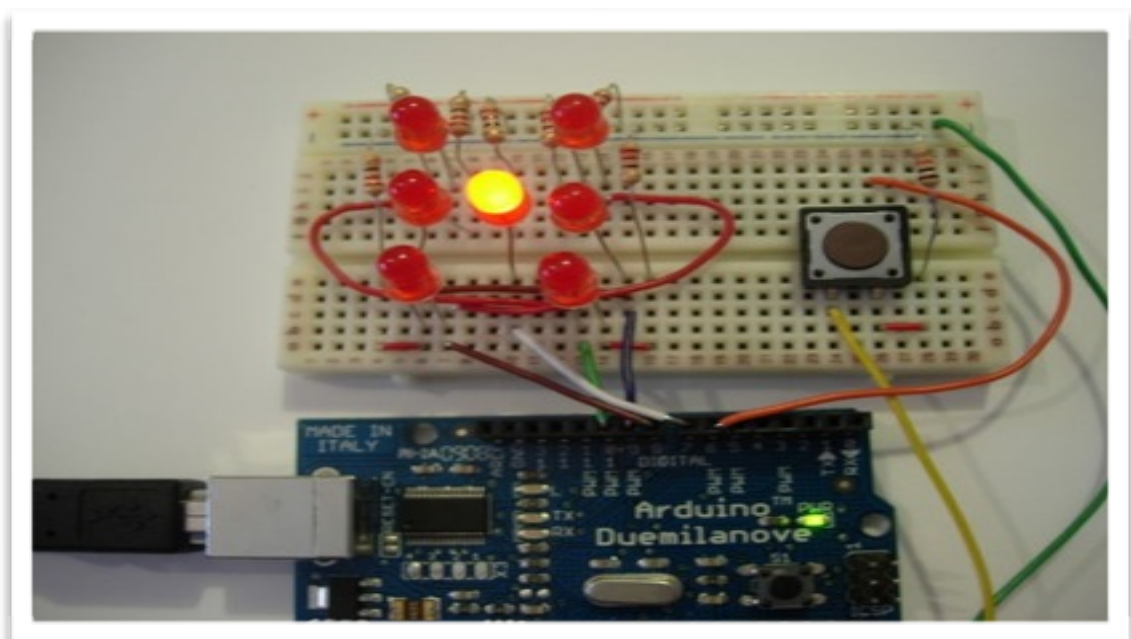
if (ran == 5){
  digitalWrite (pinLeds1, HIGH);
  digitalWrite (pinLeds3, HIGH);
  digitalWrite (pinLeds4, HIGH);
  delay (time);
}
if (ran == 6){
  digitalWrite (pinLeds1, HIGH);
  digitalWrite (pinLeds2, HIGH);
  digitalWrite (pinLeds3, HIGH);
  delay (time);
}
}
digitalWrite (pinLeds1, LOW);
digitalWrite (pinLeds2, LOW);
digitalWrite (pinLeds3, LOW);
digitalWrite (pinLeds4, LOW);
}

```

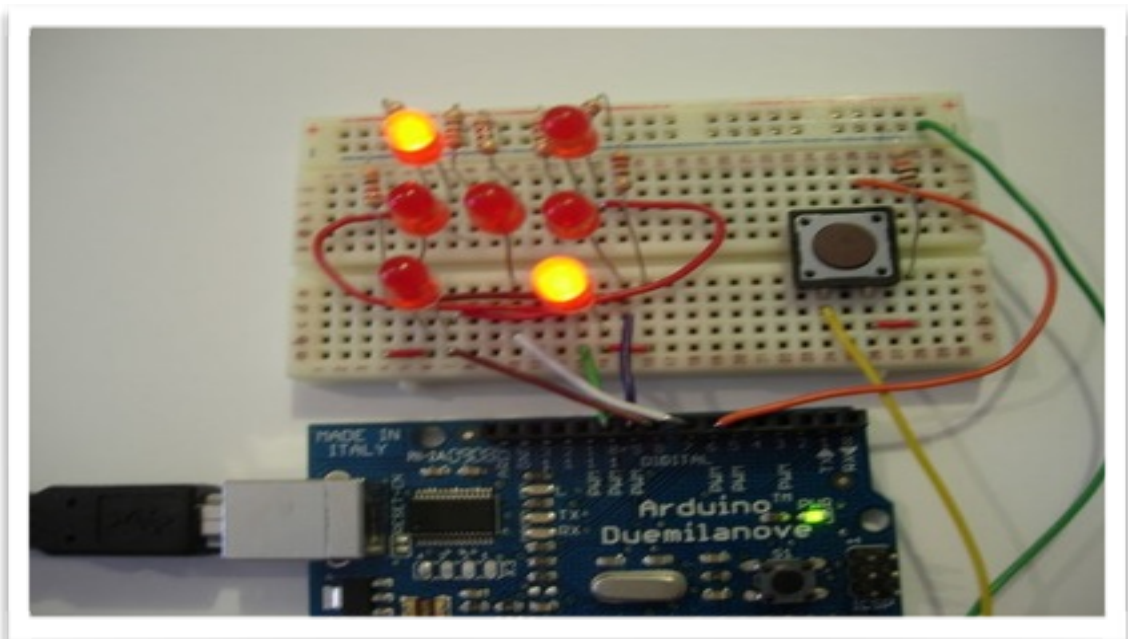
Step #5 - Test it - Roll your LED Dice:

Now the Arduino LED Dice is finished and you can try it...you just have to press the button to see the number!

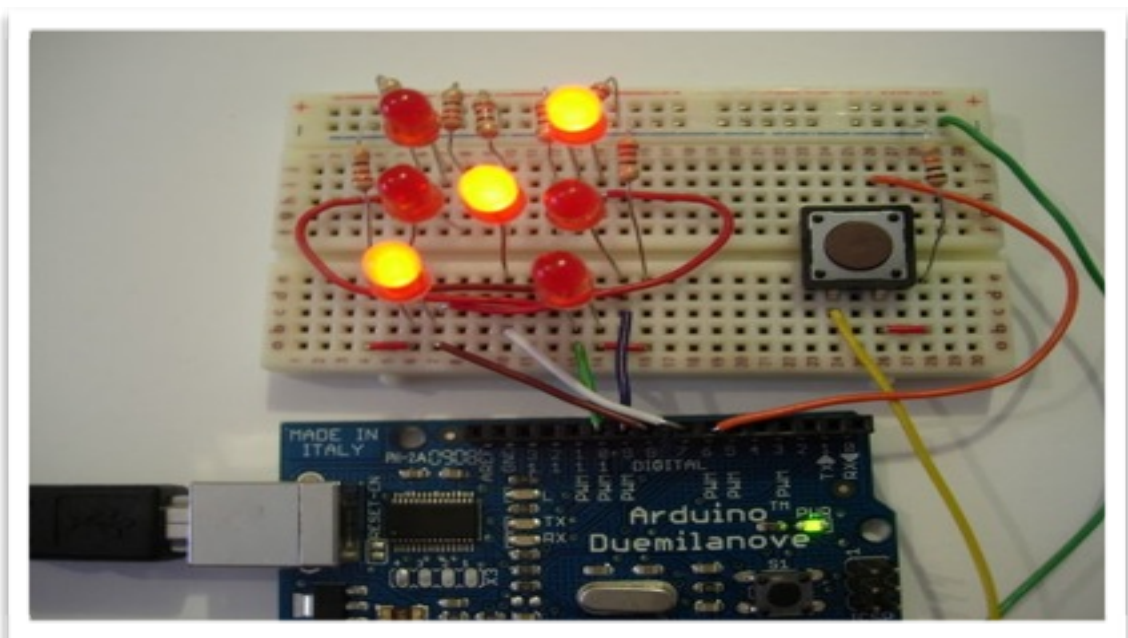
ONE



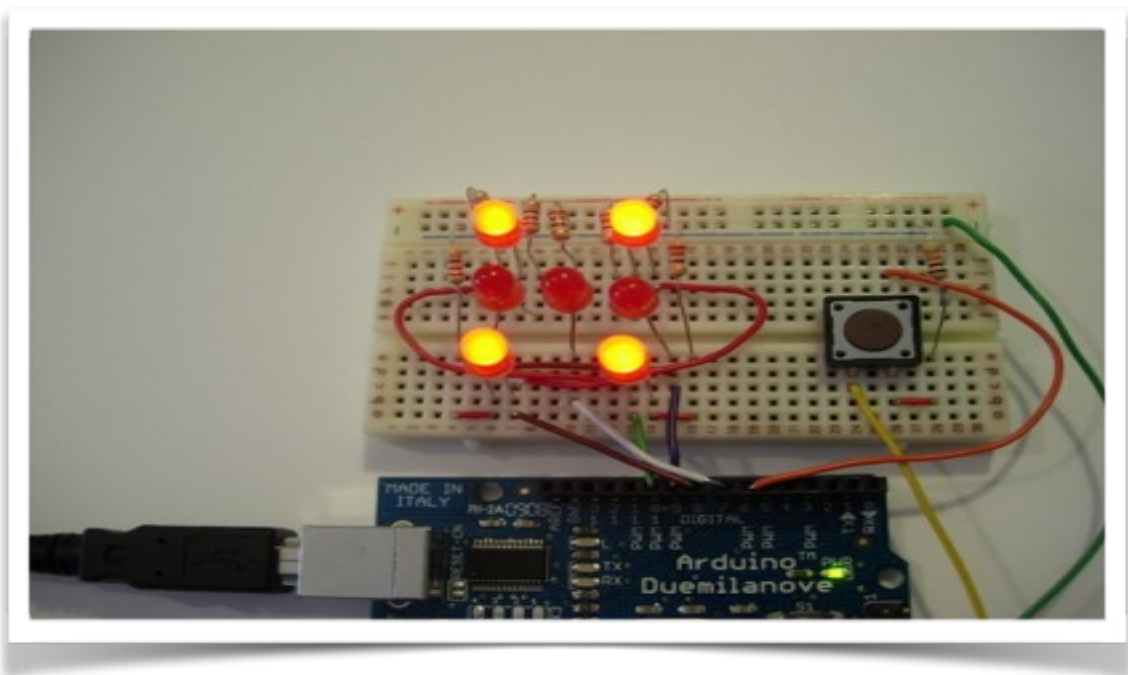
TWO



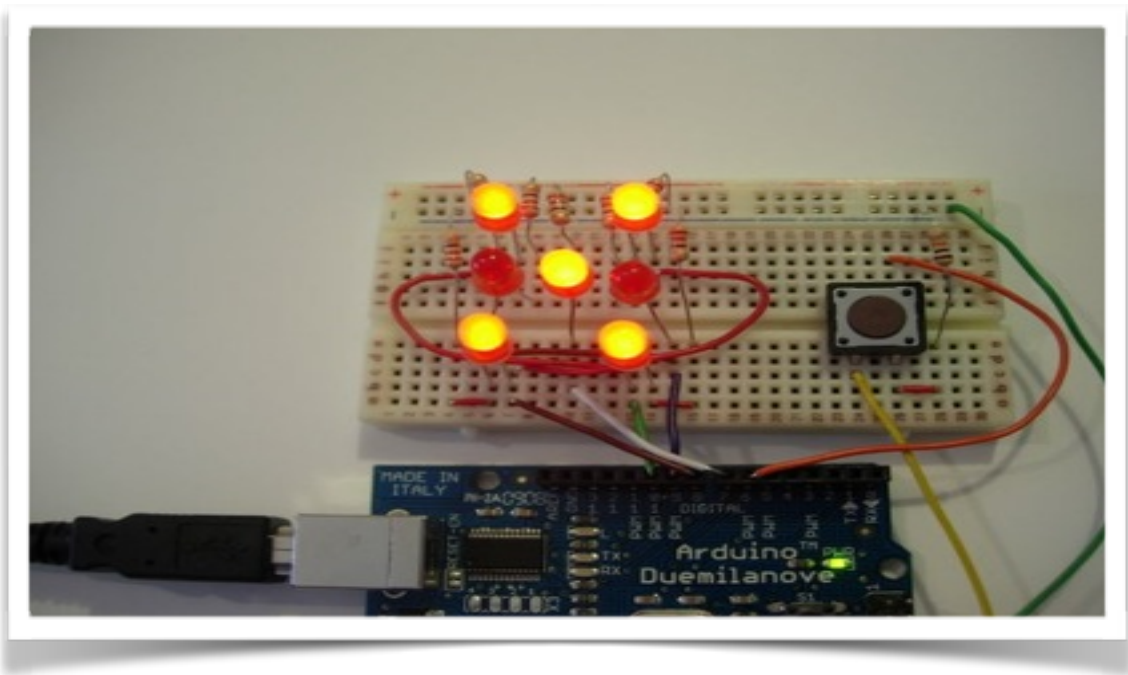
THREE



FOUR



FIVE



SIX

