



Universitatea POLITEHNICA din București  
Facultatea de Inginerie Industrială și Robotică

---



# ROBOTICĂ 1 – LABORATOR 3

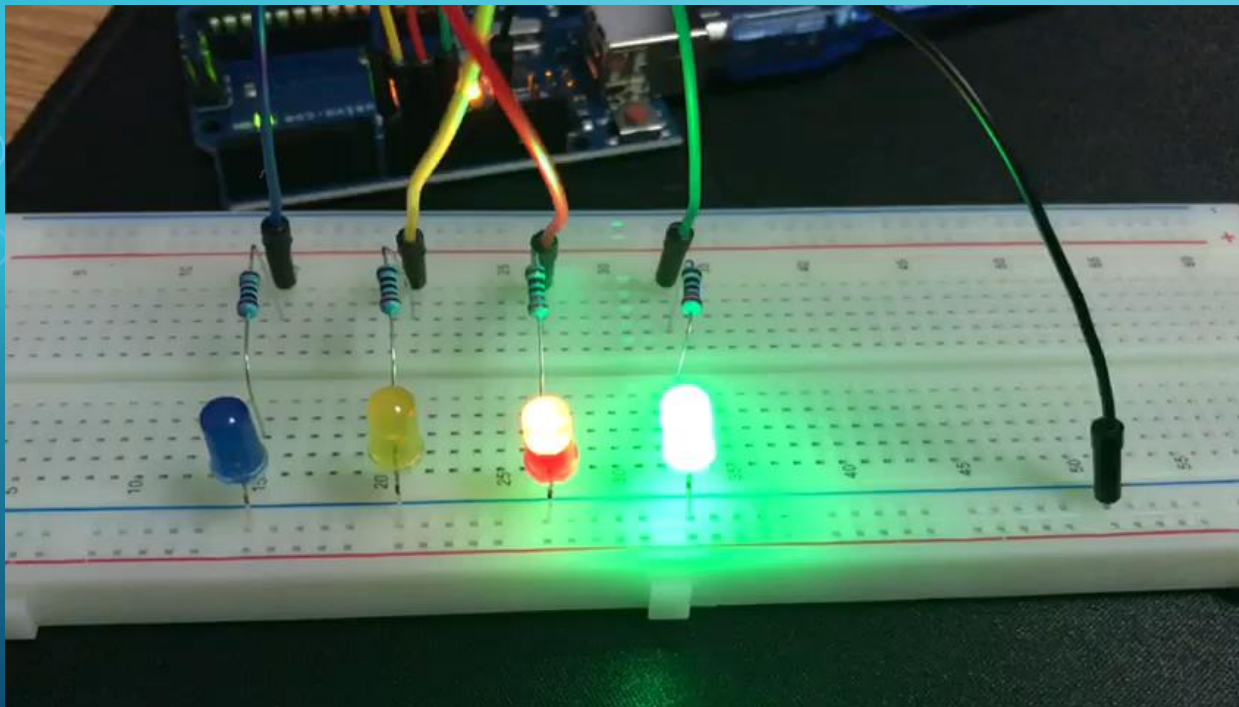
**Student:** BUZDUGAN Andrei

**Coordonator:** Ileana DUGĂEȘESCU

# APLICAȚIA 1

## Aprinderea aleatoare a 4 leduri.

Aici am legat 4 leduri in paralel cu cate 4 rezistoare de 220 ohm legate la anode-urile becurilor(+), dupa aceea minusurile le-am legat o singura data la placuta Arduino, dupa ce am conectat in serie cathode-rile(-) becurilor. Iar dupa programarea codului afisat in dreapta, rezultatul il aveti mai jos in videoclip.



## CODUL

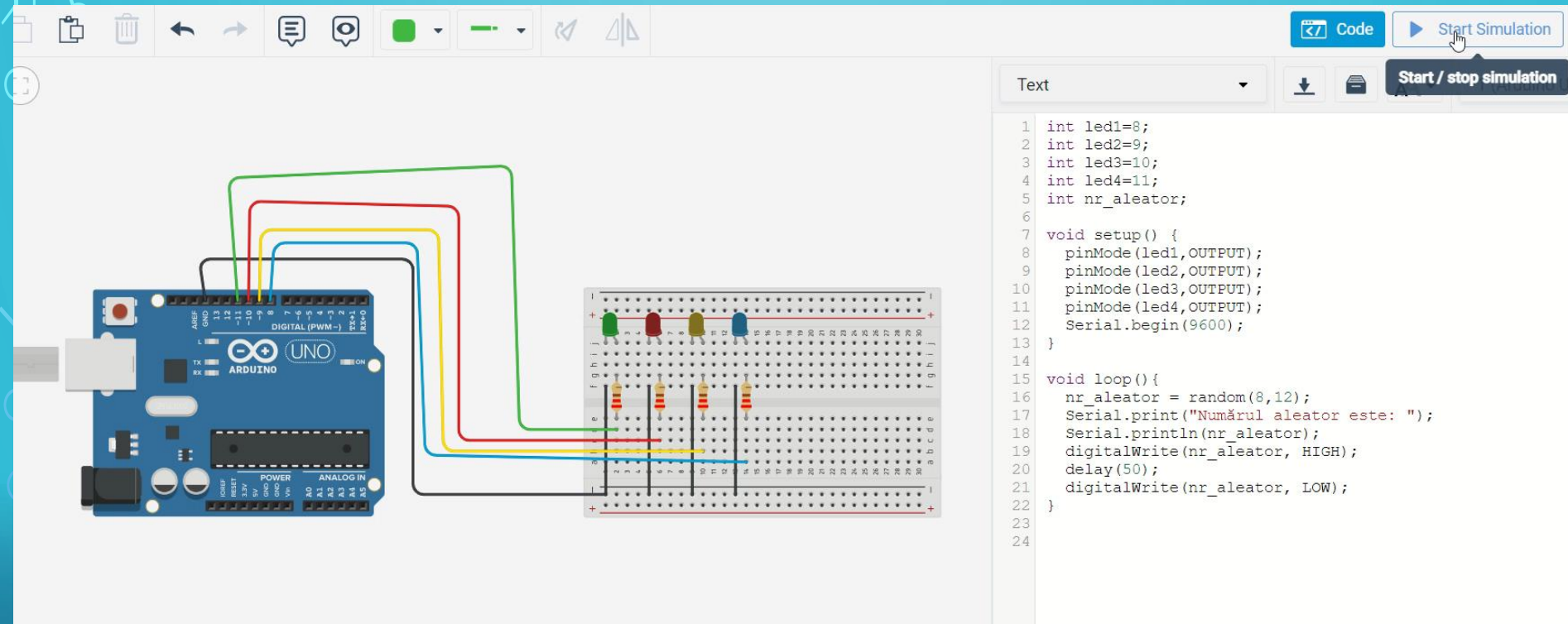
```
int led1=8;
int led2=9;
int led3=10;
int led4=11;
int nr_aleator;

void setup() {
  pinMode(led1,OUTPUT);
  pinMode(led2,OUTPUT);
  pinMode(led3,OUTPUT);
  pinMode(led4,OUTPUT);
  Serial.begin(9600);
}

void loop(){
  nr_aleator = random(8,12);
  Serial.print("Numărul aleator este: ");
  Serial.println(nr_aleator);
  digitalWrite(nr_aleator, HIGH);
  delay(50);
  digitalWrite(nr_aleator, LOW);
}
```

# APLICAȚIA 1

## Aprinderea aleatoare a 4 leduri în TINKERCAD.



The screenshot displays the Tinkercad software interface. On the left, an Arduino Uno is connected to a breadboard. Four LEDs (green, red, yellow, and blue) are connected to the breadboard. The code editor on the right contains the following C++ code:

```
1 int led1=8;
2 int led2=9;
3 int led3=10;
4 int led4=11;
5 int nr_aleator;
6
7 void setup() {
8   pinMode(led1,OUTPUT);
9   pinMode(led2,OUTPUT);
10  pinMode(led3,OUTPUT);
11  pinMode(led4,OUTPUT);
12  Serial.begin(9600);
13 }
14
15 void loop(){
16   nr_aleator = random(8,12);
17   Serial.print("Numărul aleator este: ");
18   Serial.println(nr_aleator);
19   digitalWrite(nr_aleator, HIGH);
20   delay(50);
21   digitalWrite(nr_aleator, LOW);
22 }
23
24
```

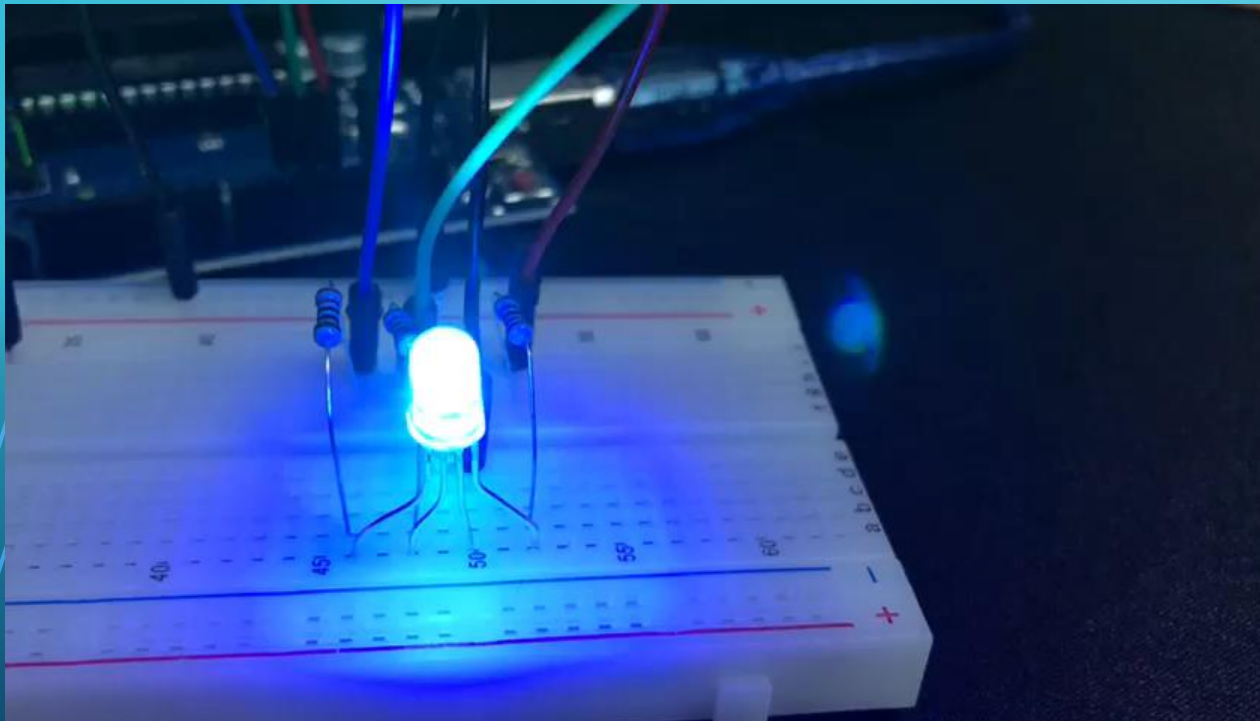
The code defines four LEDs (led1=8, led2=9, led3=10, led4=11) and a random number variable (nr\_aleator). The setup function initializes the LEDs as outputs and starts the serial communication. The loop function generates a random number between 8 and 12, prints it, and turns on the corresponding LED (HIGH) for 50 milliseconds before turning it off (LOW).

# APLICAȚIA 2

## Realizarea și programarea unui circuit cu led RGB.

Aici am legat un led de tip RGB in serie cu cate 3 rezistoare de 220 ohm legate la piciorusele becului Red(R),(-),Green(G) si Blue(B), dupa aceea minusul l-am legat la placuta Arduino, piciorul aferent minusului este putin mai lung si se afla intre red si green,blue. Iar dupa programarea codului afisat in dreapta, rezultatul il aveti mai jos in videoclip.

**OBS:** Iar pentru restul aplicatiilor de mai jos, partea practica este la fel, diferenta o face numai codul.



### CODUL

```
int red=12;
int green=11;
int blue=10;

void setup() {
  pinMode(red,OUTPUT);
  pinMode(green,OUTPUT);
  pinMode(blue,OUTPUT);
}

void loop() {
  digitalWrite(red, HIGH);
  digitalWrite(green, LOW);
  digitalWrite(blue, LOW);
  delay(500);

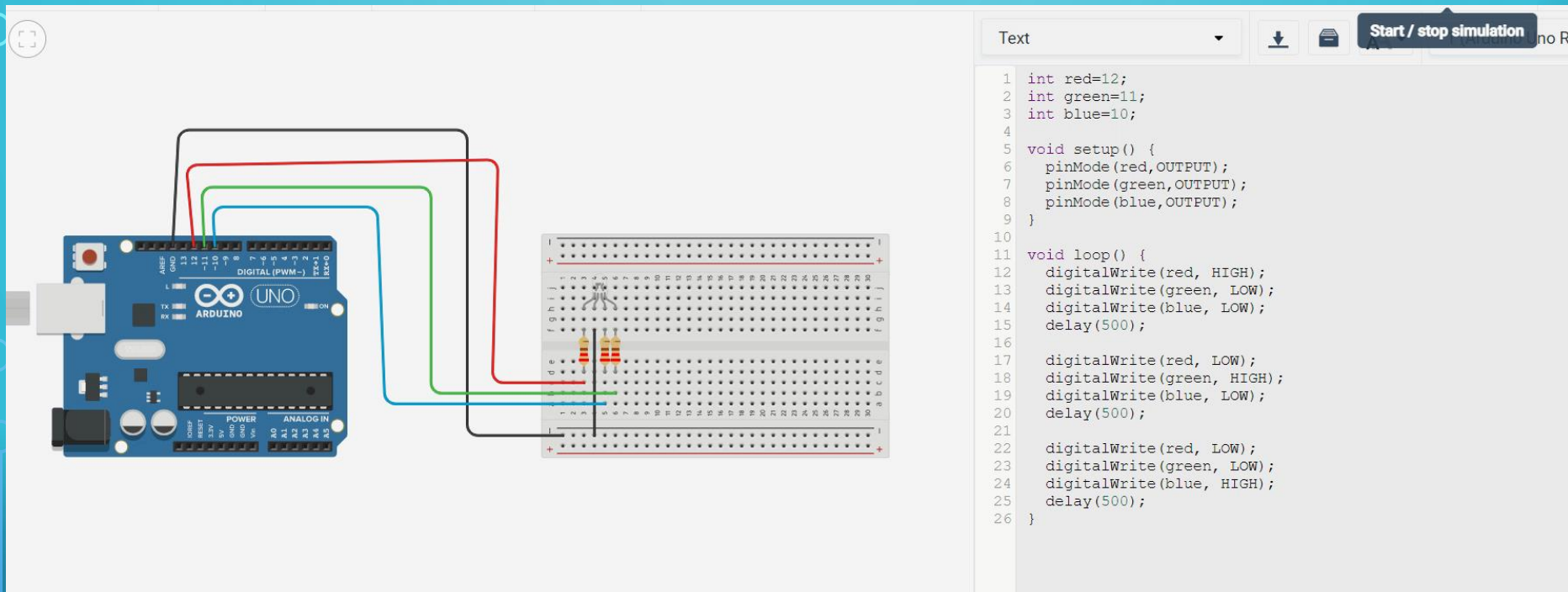
  digitalWrite(red, LOW);
  digitalWrite(green, HIGH);
  digitalWrite(blue, LOW);
  delay(500);

  digitalWrite(red, LOW);
  digitalWrite(green, LOW);
  digitalWrite(blue, HIGH);
  delay(500);
}
```



# APLICAȚIA 2

Realizarea și programarea unui circuit cu led RGB în TINKERCAD.



The screenshot displays the Tinkercad workspace with an Arduino Uno microcontroller board connected to an RGB LED module on a breadboard. The wiring is as follows: a red wire connects the LED's red pin to Arduino digital pin 12; a green wire connects the LED's green pin to Arduino digital pin 11; a blue wire connects the LED's blue pin to Arduino digital pin 10; and a black wire connects the LED's common ground pin to the GND pin on the Arduino.

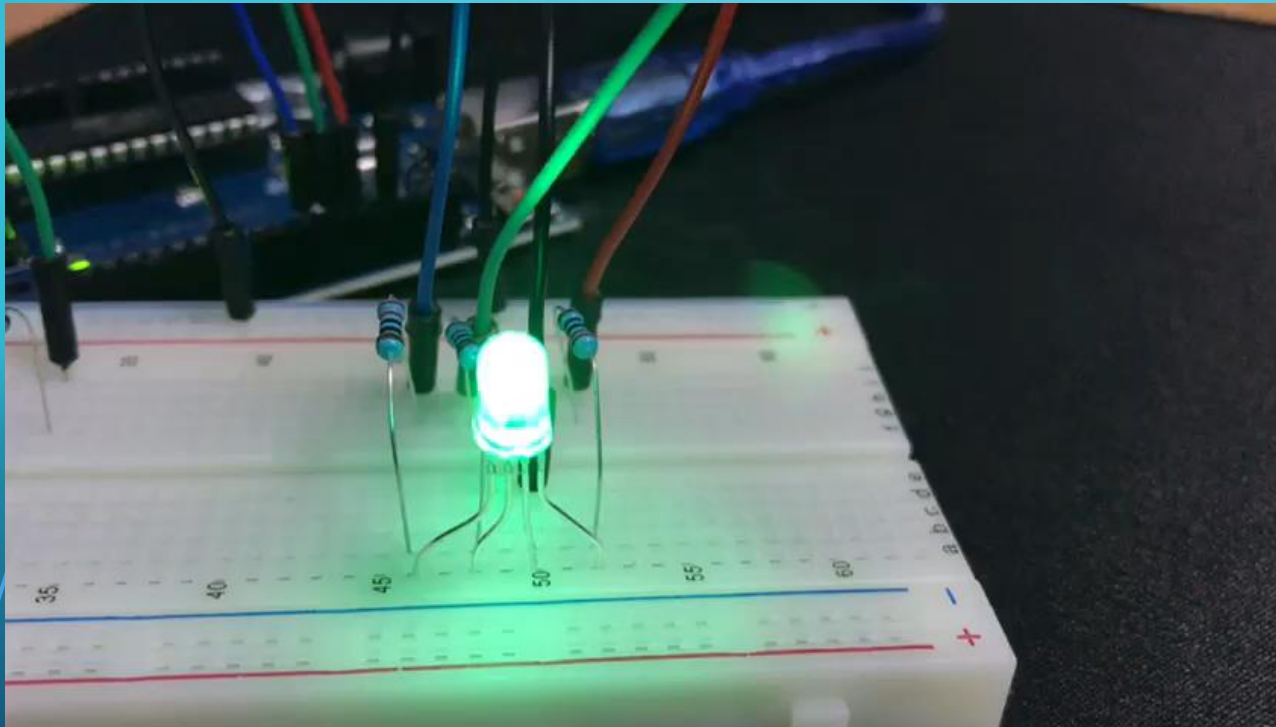
The code editor on the right contains the following C++ code:

```
1 int red=12;
2 int green=11;
3 int blue=10;
4
5 void setup() {
6   pinMode(red,OUTPUT);
7   pinMode(green,OUTPUT);
8   pinMode(blue,OUTPUT);
9 }
10
11 void loop() {
12   digitalWrite(red, HIGH);
13   digitalWrite(green, LOW);
14   digitalWrite(blue, LOW);
15   delay(500);
16
17   digitalWrite(red, LOW);
18   digitalWrite(green, HIGH);
19   digitalWrite(blue, LOW);
20   delay(500);
21
22   digitalWrite(red, LOW);
23   digitalWrite(green, LOW);
24   digitalWrite(blue, HIGH);
25   delay(500);
26 }
```

# APLICAȚIA 3

## Realizarea și programarea unui circuit cu led RGB. Variația intensității luminii.

Aici am legat fix același bec RGB ca la aplicația 2, iar prin cod am modificat variația intensității luminii.



### CODUL

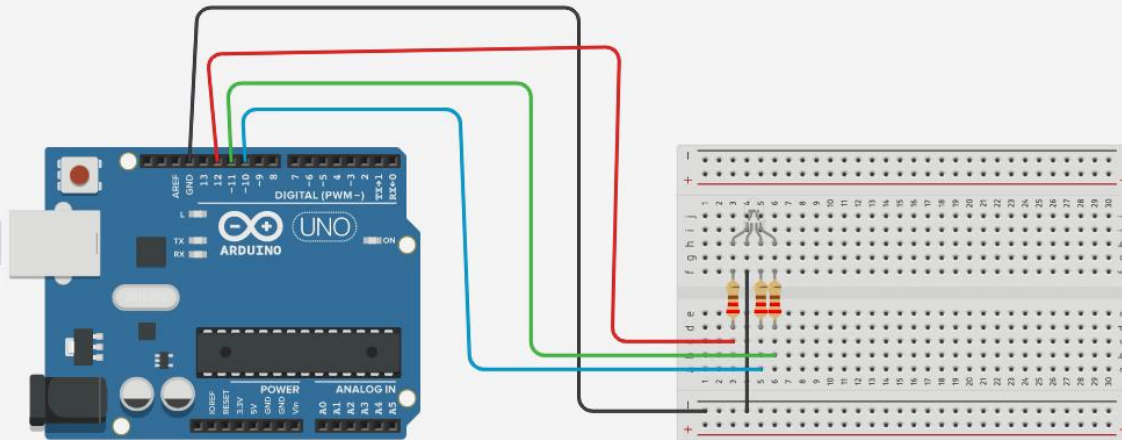
```
int red=12;
int green=11;
int blue=10;
int i;

void setup() {
  pinMode(red,OUTPUT);
  pinMode(green,OUTPUT);
  pinMode(blue,OUTPUT);
}

void loop() {
  for(i=0; i<256; i++){
    analogWrite(red,i);
    delay(5);
  }
  for(i=256; i>0; i--){
    analogWrite(red,i);
    delay(5);
  }
  for(i=0; i<256; i++){
    analogWrite(green,i);
    delay(5);
  }
  for(i=256; i>0; i--){
    analogWrite(green,i);
    delay(5);
  }
  for(i=0; i<256; i++){
    analogWrite(blue,i);
    delay(5);
  }
  for(i=256; i>0; i--){
    analogWrite(blue,i);
    delay(5);
  }
}
```

# APLICAȚIA 3

**Realizarea și programarea unui circuit cu led RGB.  
Variația intensității luminii în TINKERCAD.**



Text

```
4 int i;
5
6 void setup() {
7   pinMode(red,OUTPUT);
8   pinMode(green,OUTPUT);
9   pinMode(blue,OUTPUT);
10 }
11
12 void loop() {
13   for(i=0; i<256; i++){
14     analogWrite(red,i);
15     delay(5);
16   }
17   for(i=256; i>0; i--){
18     analogWrite(red,i);
19     delay(5);
20   }
21   for(i=0; i<256; i++){
22     analogWrite(green,i);
23     delay(5);
24   }
25   for(i=256; i>0; i--){
26     analogWrite(green,i);
27     delay(5);
28   }
29   for(i=0; i<256; i++){
30     analogWrite(blue,i);
31     delay(5);
32   }
33   for(i=256; i>0; i--){
34     analogWrite(blue,i);
35     delay(5);
36   }
37 }
```

Serial Monitor

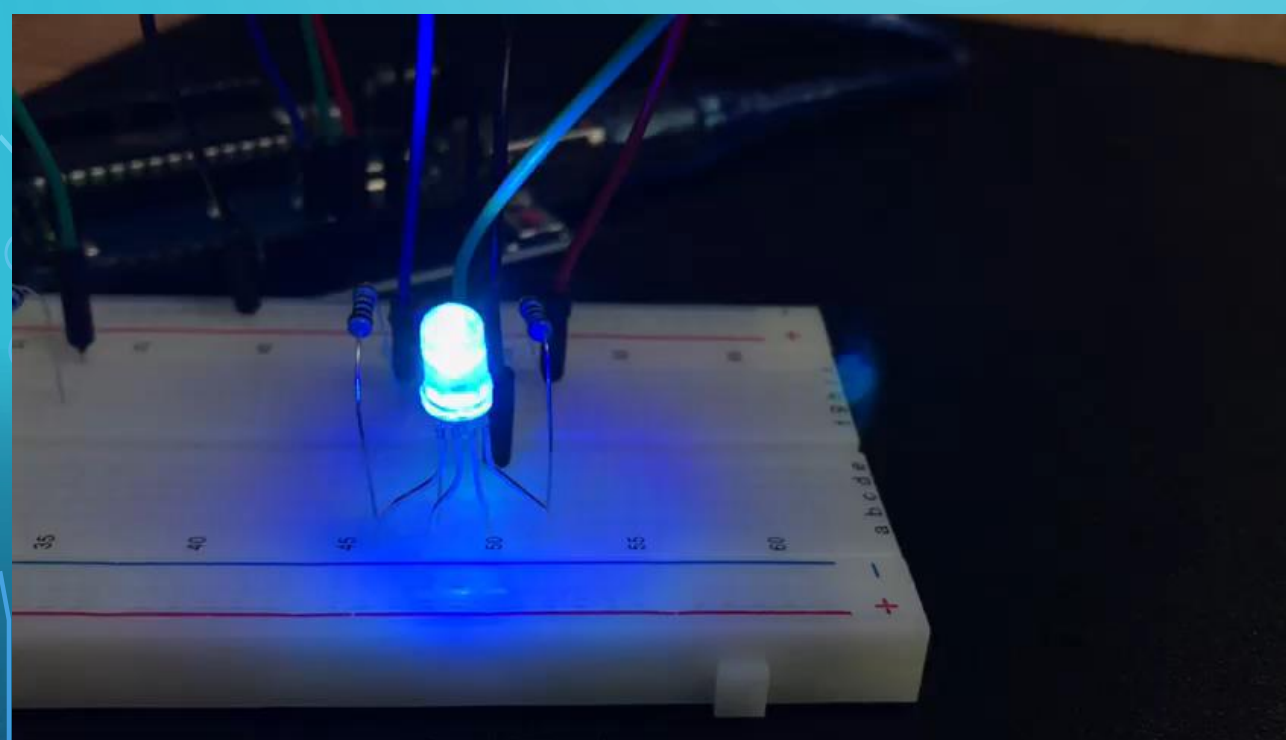
## APLICAȚIA 4

**Realizarea și programarea unui circuit cu led RGB.  
Aprinderea aleatoare a culorilor la ledul RGB.**

Aici am legat fix același bec RGB ca la aplicația 2,  
iar prin cod am modificat variația intensității luminii.

### CODUL

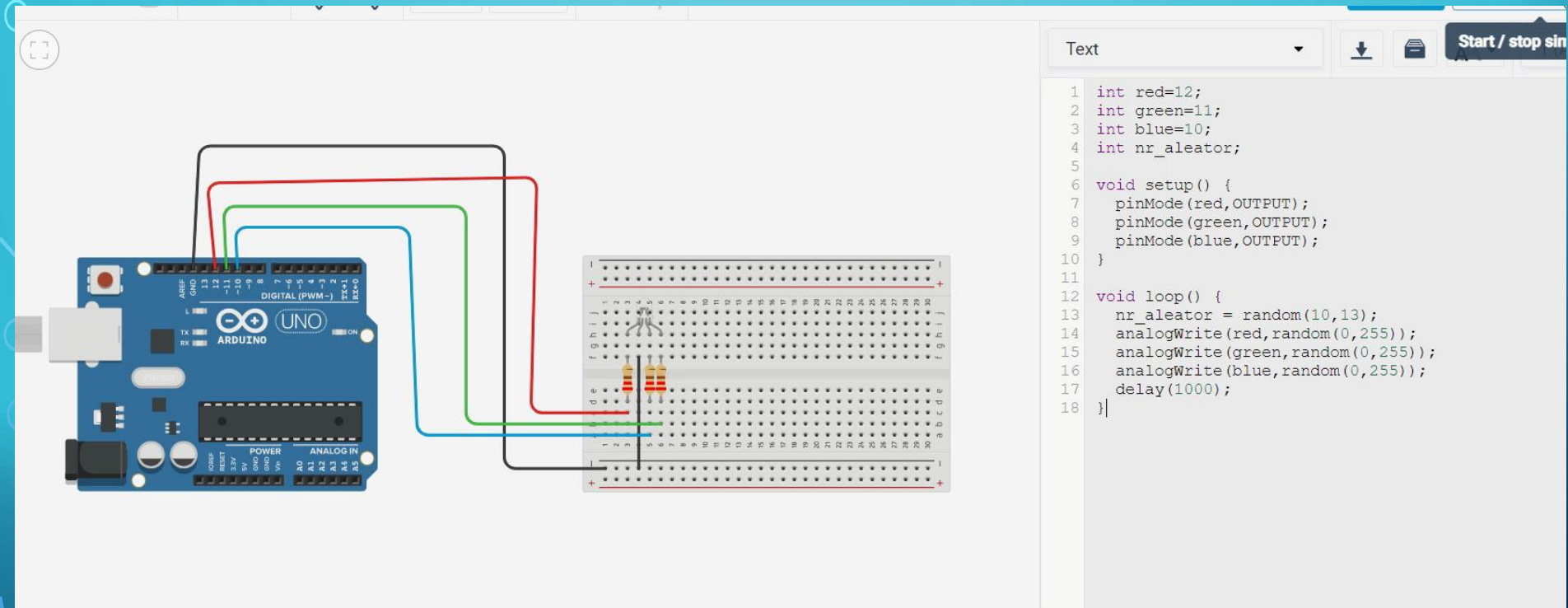
```
int red=12;  
int green=11;  
int blue=10;  
int nr_aleator;  
  
void setup() {  
  pinMode(red,OUTPUT);  
  pinMode(green,OUTPUT);  
  pinMode(blue,OUTPUT);  
}  
  
void loop() {  
  nr_aleator = random(10,13);  
  analogWrite(red,random(0,255));  
  analogWrite(green,random(0,255));  
  analogWrite(blue,random(0,255));  
  delay(1000);  
}
```





# APLICAȚIA 4

**Realizarea și programarea unui circuit cu led RGB.  
Aprinderea aleatoare a culorilor la ledul RGB în TINKERCAD.**



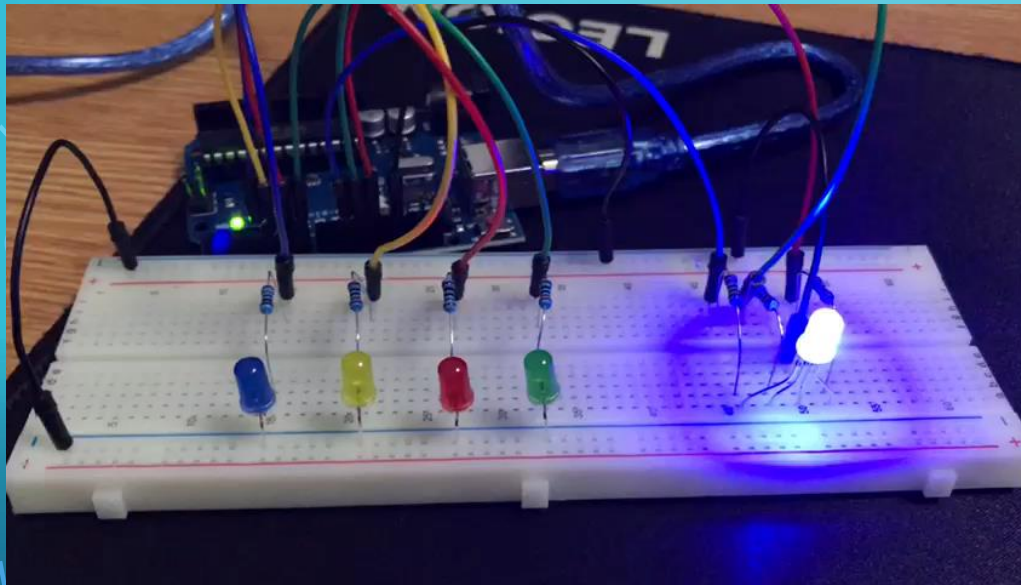
The image shows a Tinkercad workspace with an Arduino Uno connected to an RGB LED on a breadboard. The LED is connected to pins 12, 11, and 10. The code editor on the right shows a program that sets up pins 12, 11, and 10 as outputs and writes random values to them in the loop.

```
1 int red=12;
2 int green=11;
3 int blue=10;
4 int nr_aleator;
5
6 void setup() {
7   pinMode(red,OUTPUT);
8   pinMode(green,OUTPUT);
9   pinMode(blue,OUTPUT);
10 }
11
12 void loop() {
13   nr_aleator = random(10,13);
14   analogWrite(red,random(0,255));
15   analogWrite(green,random(0,255));
16   analogWrite(blue,random(0,255));
17   delay(1000);
18 }
```

# APLICAȚIA 5 (BONUS)

**Realizarea unui program la intamplare cu bec RGB plus inca 4 becuri simple.**

Aici am realizat un cod pe baza elementelor folosite la aplicatia 1 si 2, prin care becurile “danseaza” .



## CODUL

```
int red=12;  
int green=11;  
int blue=10;  
int led1=4;  
int led2=5;  
int led3=6;  
int led4=7;  
int i;
```

```
void setup() {  
  pinMode(red,OUTPUT);  
  pinMode(green,OUTPUT);  
  pinMode(blue,OUTPUT);
```

```
  pinMode(led1,OUTPUT);  
  pinMode(led2,OUTPUT);  
  pinMode(led3,OUTPUT);  
  pinMode(led4,OUTPUT);  
}
```

```
void loop() {  
  digitalWrite(red, HIGH);  
  digitalWrite(green, LOW);  
  digitalWrite(blue, LOW);  
  delay(200);
```

```
  digitalWrite(red, LOW);  
  digitalWrite(green, HIGH);  
  digitalWrite(blue, LOW);  
  delay(200);
```

```
  digitalWrite(red, LOW);  
  digitalWrite(green, LOW);  
  digitalWrite(blue, HIGH);  
  delay(200);
```

```
int red=12;  
int green=11;  
int blue=10;  
int led1=4;  
int led2=5;  
int led3=6;  
int led4=7;  
int i;
```

```
void setup() {  
  pinMode(red,OUTPUT);  
  pinMode(green,OUTPUT);  
  pinMode(blue,OUTPUT);
```

```
  pinMode(led1,OUTPUT);  
  pinMode(led2,OUTPUT);  
  pinMode(led3,OUTPUT);  
  pinMode(led4,OUTPUT);  
}
```

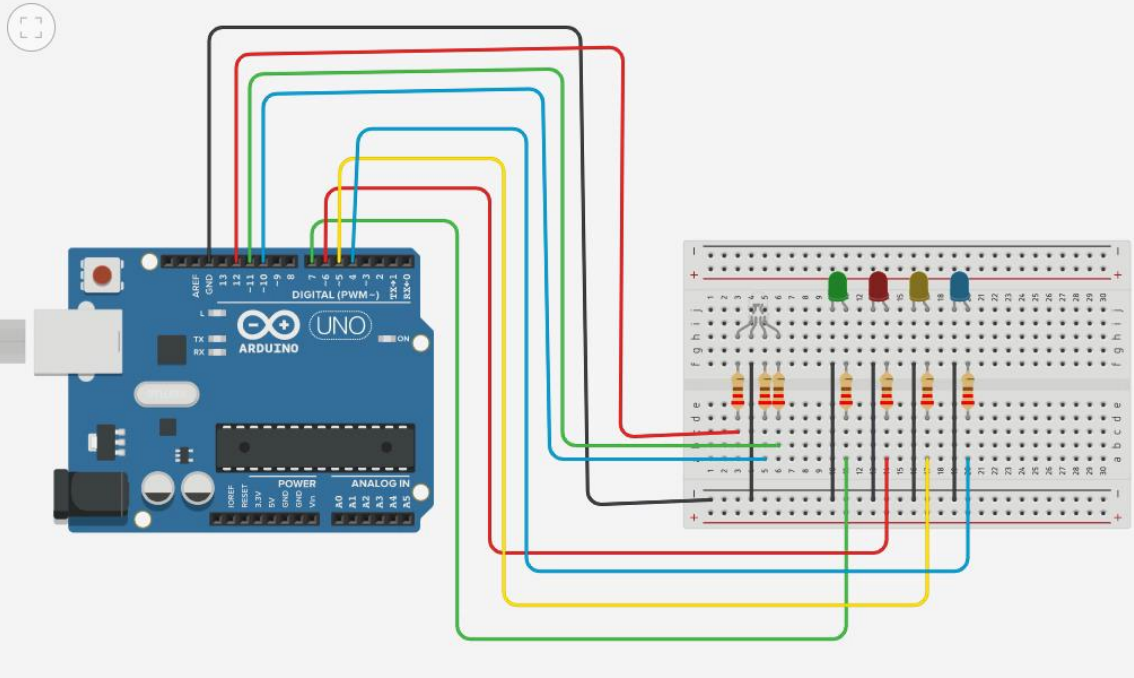
```
void loop() {  
  digitalWrite(red, HIGH);  
  digitalWrite(green, LOW);  
  digitalWrite(blue, LOW);  
  delay(200);
```

```
  digitalWrite(red, LOW);  
  digitalWrite(green, HIGH);  
  digitalWrite(blue, LOW);  
  delay(200);
```

```
  digitalWrite(red, LOW);  
  digitalWrite(green, LOW);  
  digitalWrite(blue, HIGH);  
  delay(200);
```

# APLICAȚIA 5 (BONUS)

**Realizarea unui program la intamplare cu bec RGB plus inca 4 becuri simple în TINKERCAD.**



The image shows a Tinkercad simulation of an Arduino Uno microcontroller board connected to a breadboard. The breadboard contains an RGB LED and four standard LEDs (red, green, blue, and yellow). The wiring connects the Arduino's digital pins to the LEDs. The code in the Serial Monitor window is as follows:

```
1  int red=12;
2  int green=11;
3  int blue=10;
4  int led1=4;
5  int led2=5;
6  int led3=6;
7  int led4=7;
8  int i;
9
10 void setup() {
11   pinMode(red,OUTPUT);
12   pinMode(green,OUTPUT);
13   pinMode(blue,OUTPUT);
14
15   pinMode(led1,OUTPUT);
16   pinMode(led2,OUTPUT);
17   pinMode(led3,OUTPUT);
18   pinMode(led4,OUTPUT);
19 }
20
21 void loop() {
22   digitalWrite(red, HIGH);
23   digitalWrite(green, LOW);
24   digitalWrite(blue, LOW);
25   delay(200);
26
27   digitalWrite(red, LOW);
28   digitalWrite(green, HIGH);
29   digitalWrite(blue, LOW);
30   delay(200);
31
32   digitalWrite(red, LOW);
33   digitalWrite(green, LOW);
34   digitalWrite(blue, HIGH);
```



