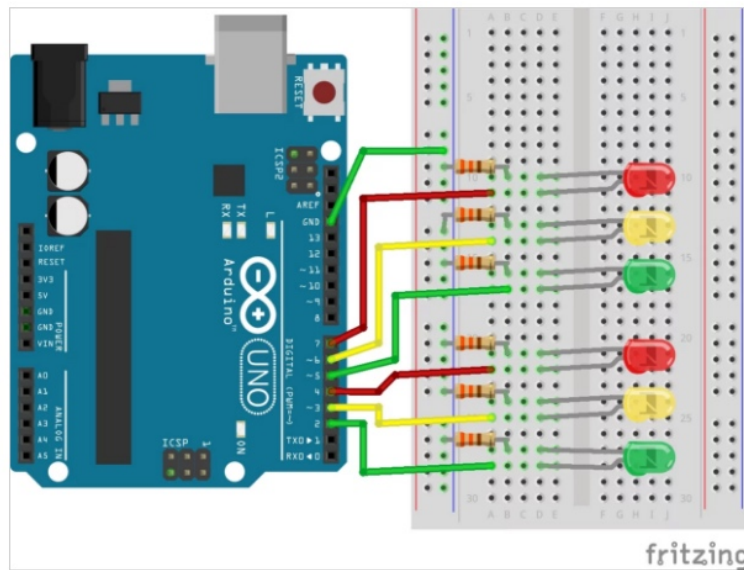


# SYSTÈMES DE CONTRÔLE ACCÈS DISPOSITIF DE SIGNALISATION



Ce système va vous apprendre à gérer des séquences et le contrôle du temps à l'aide d'un micro-contrôleur. Il simule les deux feux rouges situés à une intersection.

- 1 Quel courant faut-il dans chaque LED ?

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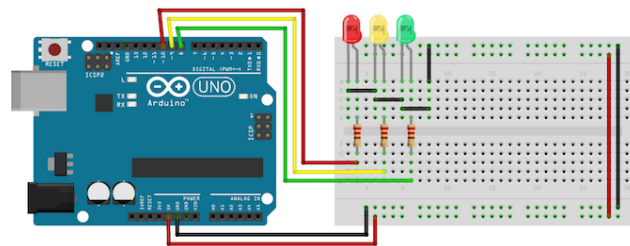
- 2 Quel tension chute aux bornes des LED ?

---

- 3 En déduire la valeur de chaque résistance en série avec les LED ?

---

- 4 En déduire la valeur de chaque résistance en série avec les LED ?  
Constatation par le professeur :
- 5 Programmer un simple feu rouge.



```
int red = 10;
int yellow = 9;
int green = 8;

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

```
    pinMode(yellow, OUTPUT);
    pinMode(green, OUTPUT);
}

void loop(){
    changeLights();
    delay(15000);
}

void changeLights(){
    // green off, yellow on for 3 seconds
    digitalWrite(green, LOW);
    digitalWrite(yellow, HIGH);
    delay(3000);

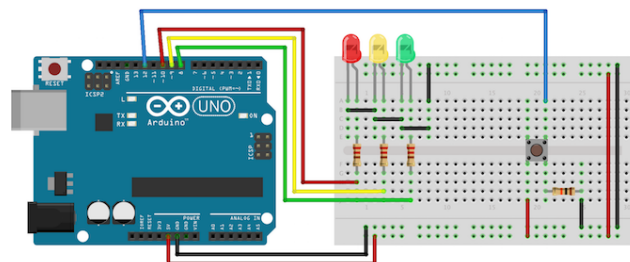
    // turn off yellow, then turn red on for 5 seconds
    digitalWrite(yellow, LOW);
    digitalWrite(red, HIGH);
    delay(5000);

    // red and yellow on for 2 seconds (red is already on though)
    digitalWrite(yellow, HIGH);
    delay(2000);

    // turn off red and yellow, then turn on green
    digitalWrite(yellow, LOW);
    digitalWrite(red, LOW);
    digitalWrite(green, HIGH);
    delay(3000);
}
```

Constatation par le professeur :

6 Programmer un simple feu rouge avec un bouton.



On ajoute une nouvelle variable au début du programme

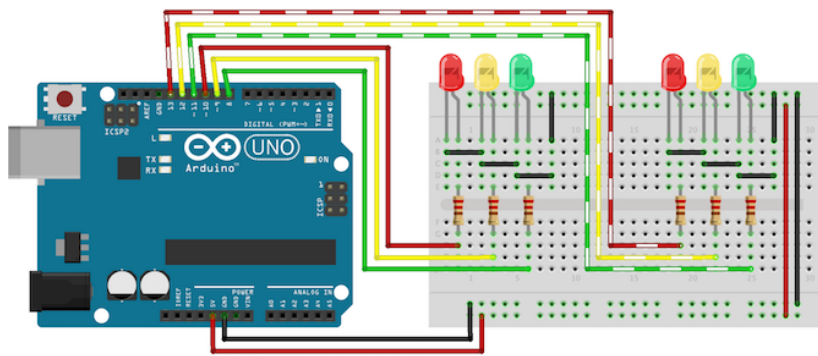
```
int button = 12; // switch is on pin 12
```

On ajoute au setup()

```
pinMode(button, INPUT);
digitalWrite(green, HIGH);
```

On change complètement la boucle loop()

```
void loop() {
  if (digitalRead(button) == HIGH){
    delay(15); // software debounce
    if (digitalRead(button) == HIGH) {
      // if the switch is HIGH, ie. pushed down - change the lights!
      changeLights();
      delay(15000); // wait for 15 seconds
    }
  }
}
```



7 Préparons nous à programmer les deux feux rouges à une intersection. Lire le document [lienmini.fr/e119-test](http://lienmini.fr/e119-test) et décrire un algorithme implémentant ce principe de fonctionnement ?

Timeline (seconds)	Busy Bunny Lane Cycle	Lazy Tortoise Ave Cycle	Comments
0	GREEN	RED	Busy Bunny Lane has its traffic flowing. Lazy Tortoise Ave has its traffic waiting for its turn.
1	GREEN	RED	
2	GREEN	RED	
3	GREEN	RED	
4	GREEN	RED	
5	GREEN	RED	
6	GREEN	RED	
7	GREEN	RED	
8	GREEN	RED	
9	GREEN	RED	
10	GREEN	RED	
11	GREEN	RED	
12	AMBER	RED	Busy Bunny Lane is about to stop its traffic. Lazy Tortoise Ave still waits for its turn.
13	AMBER	RED	
14	AMBER	RED	
15	RED	RED	Dead period for both streets (prevents accidents).
16	RED	RED	
17	RED	GREEN	Lazy Tortoise Ave has its traffic flowing. Busy Bunny Lane Ave has its traffic waiting for its turn.
18	RED	GREEN	
19	RED	GREEN	
20	RED	GREEN	
21	RED	AMBER	Lazy Tortoise Ave is about to stop its traffic. Busy Bunny Lane still waits for its turn.
22	RED	AMBER	
23	RED	AMBER	
24	RED	RED	Dead period for both streets (prevents accidents).
25	RED	RED	

8 Implémenter ce code

```
int red1 = 10;
int yellow1 = 9;
int green1 = 8;
int red2 = 13;
int yellow2 = 12;
```

```
int green2 = 11;

void setup(){
  // light one
  pinMode(red1, OUTPUT);
  pinMode(yellow1, OUTPUT);
  pinMode(green1, OUTPUT);

  // light two
  pinMode(red2, OUTPUT);
  pinMode(yellow2, OUTPUT);
  pinMode(green2, OUTPUT);
}

void loop(){
  changeLights();
  delay(15000);
}

void changeLights(){
  // turn both yellows on
  digitalWrite(green1, LOW);
  digitalWrite(yellow1, HIGH);
  digitalWrite(yellow2, HIGH);
  delay(5000);

  // turn both yellows off, and opposite green and red
  digitalWrite(yellow1, LOW);
  digitalWrite(red1, HIGH);
  digitalWrite(yellow2, LOW);
  digitalWrite(red2, LOW);
  digitalWrite(green2, HIGH);
  delay(5000);

  // both yellows on again
  digitalWrite(yellow1, HIGH);
  digitalWrite(yellow2, HIGH);
  digitalWrite(green2, LOW);
  delay(3000);

  // turn both yellows off, and opposite green and red
  digitalWrite(green1, HIGH);
  digitalWrite(yellow1, LOW);
  digitalWrite(red1, LOW);
  digitalWrite(yellow2, LOW);
  digitalWrite(red2, HIGH);
  delay(5000);
}
```

Constatation par le professeur :