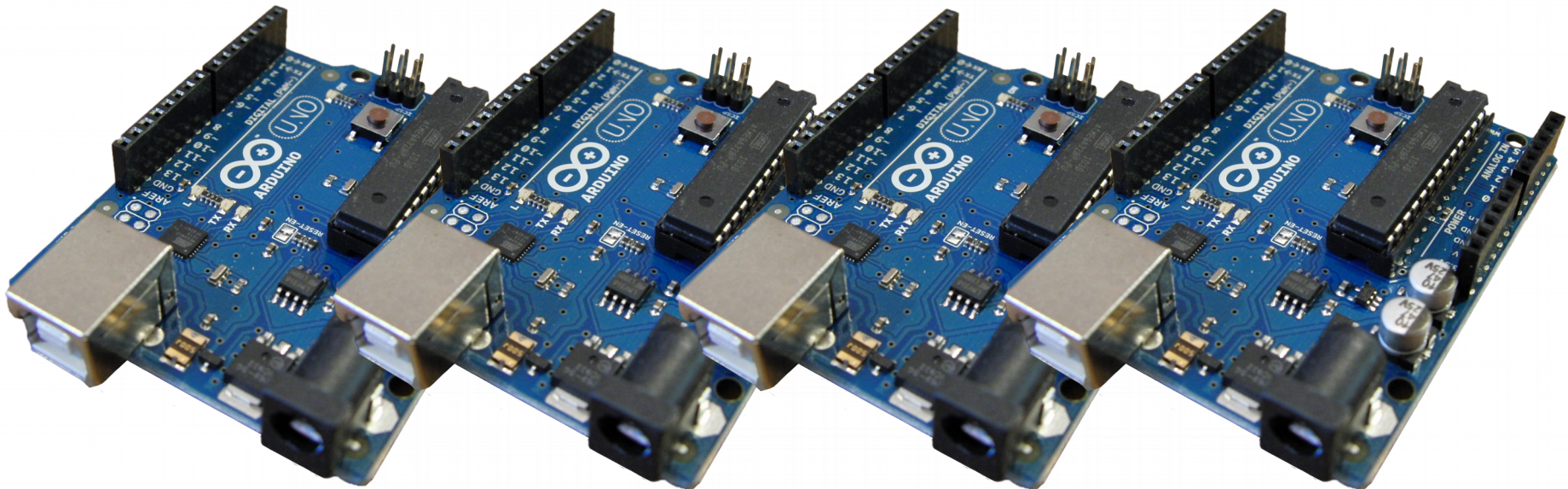


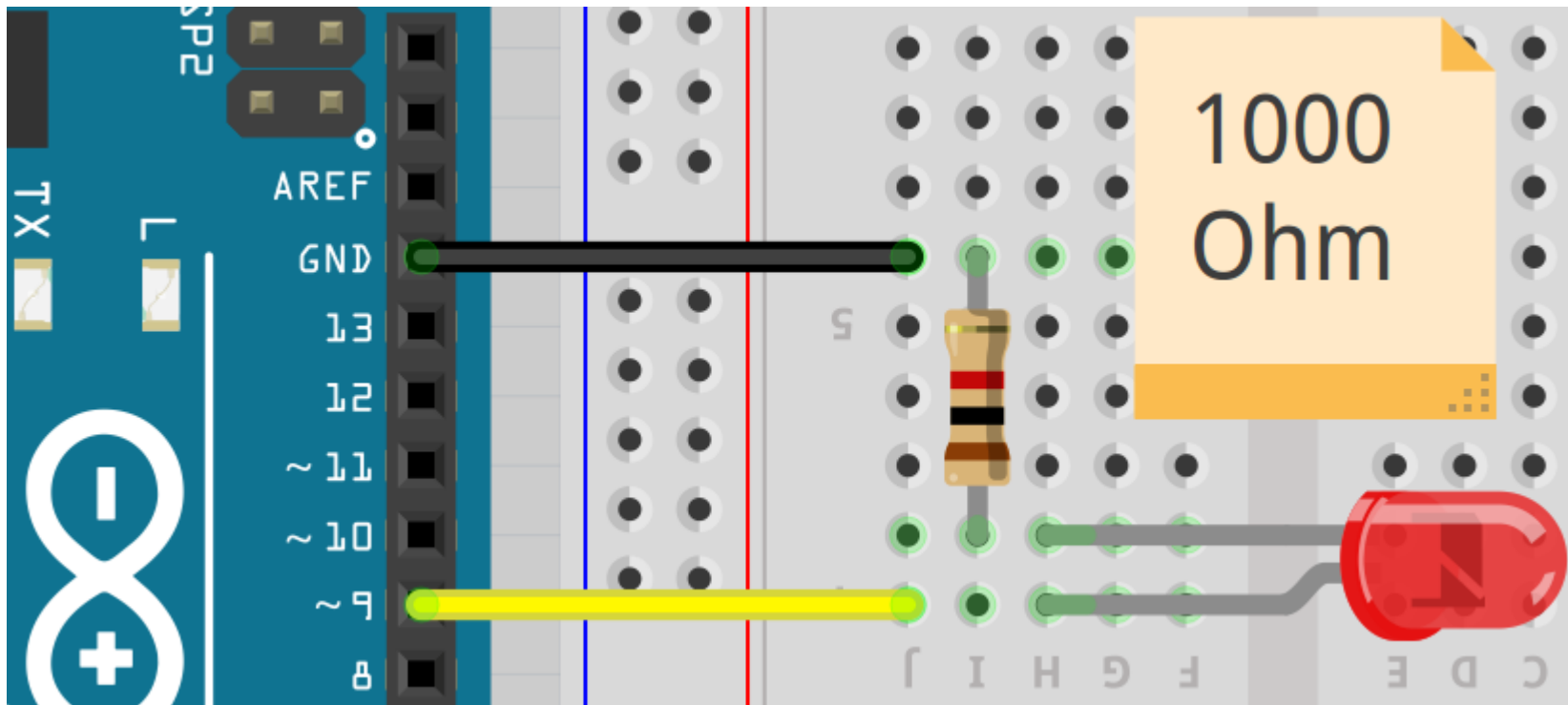
# For

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# Probleem

- Je wilt een LED rustig aan laten gaan



# Onhandige oplossing

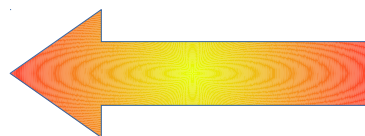
```
void setup() { pinMode(9,OUTPUT); }
```

```
void loop() {  
    analogWrite(9,0);  
    analogWrite(9,1);  
    analogWrite(9,2);  
    ///...  
    analogWrite(9,253);  
    analogWrite(9,254);  
    analogWrite(9,255);  
}
```

# Onhandige oplossing

```
void setup() { pinMode(9,OUTPUT); }
```

```
void loop() {  
    analogWrite(9,0);  
    analogWrite(9,1);  
    analogWrite(9,2);  
    ///...  
    analogWrite(9,253);  
    analogWrite(9,254);  
    analogWrite(9,255);  
}
```



Alleen het  
laatste getal  
verandert

# Nadenken

```
analogWrite(9, 0);
```

```
analogWrite(9, 1);
```

```
analogWrite(9, 2);
```

```
//...
```

```
analogWrite(9, 253);
```

```
analogWrite(9, 254);
```

```
analogWrite(9, 255);
```

Beginnt op 0

Wordt steeds  
1 hoger

Zolang de  
waarde niet  
256 is

i

- i is vaak de naam van een tellertje
- i is vaak een int
- Wij gaan nu i laten lopen van 0 tot 256 in stapjes van 1

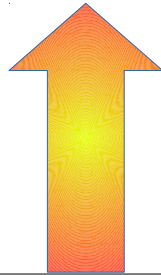
I ♥ i

# For loop

```
for (int i=0; i!=256; ++i) { /* */ }
```

# For loop

```
for (int i=0; i!=256; ++i) { /* */ }
```

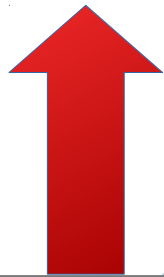


De teller  
heet i



# For loop

```
for (int i=0; i!=256; ++i) { /* */ }
```



Begin at 0

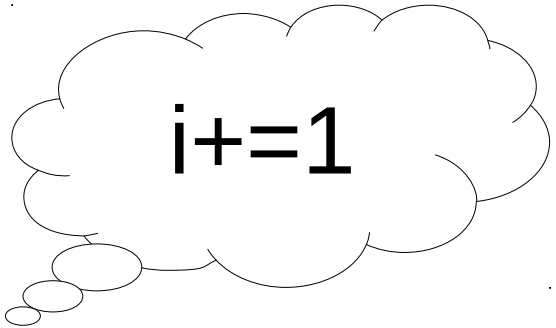
# For loop

```
for (int i=0; i!=256; ++i) { /* */ }
```




Zolang de  
waarde niet  
256 is

# For loop



$i+=1$

```
for (int i=0; i!=256; ++i) { /* */ }
```



Wordt steeds  
1 hoger

# For loop

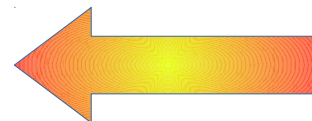
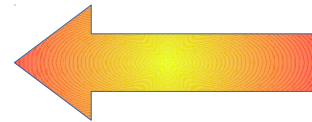
Begint op 0	Zolang de waarde niet 256 is	Wordt steeds 1 hoger
-------------	------------------------------	----------------------



```
for(int i=0; i!=256; ++i)
{
    Serial.println(i);
    analogWrite(9,i);
}
```

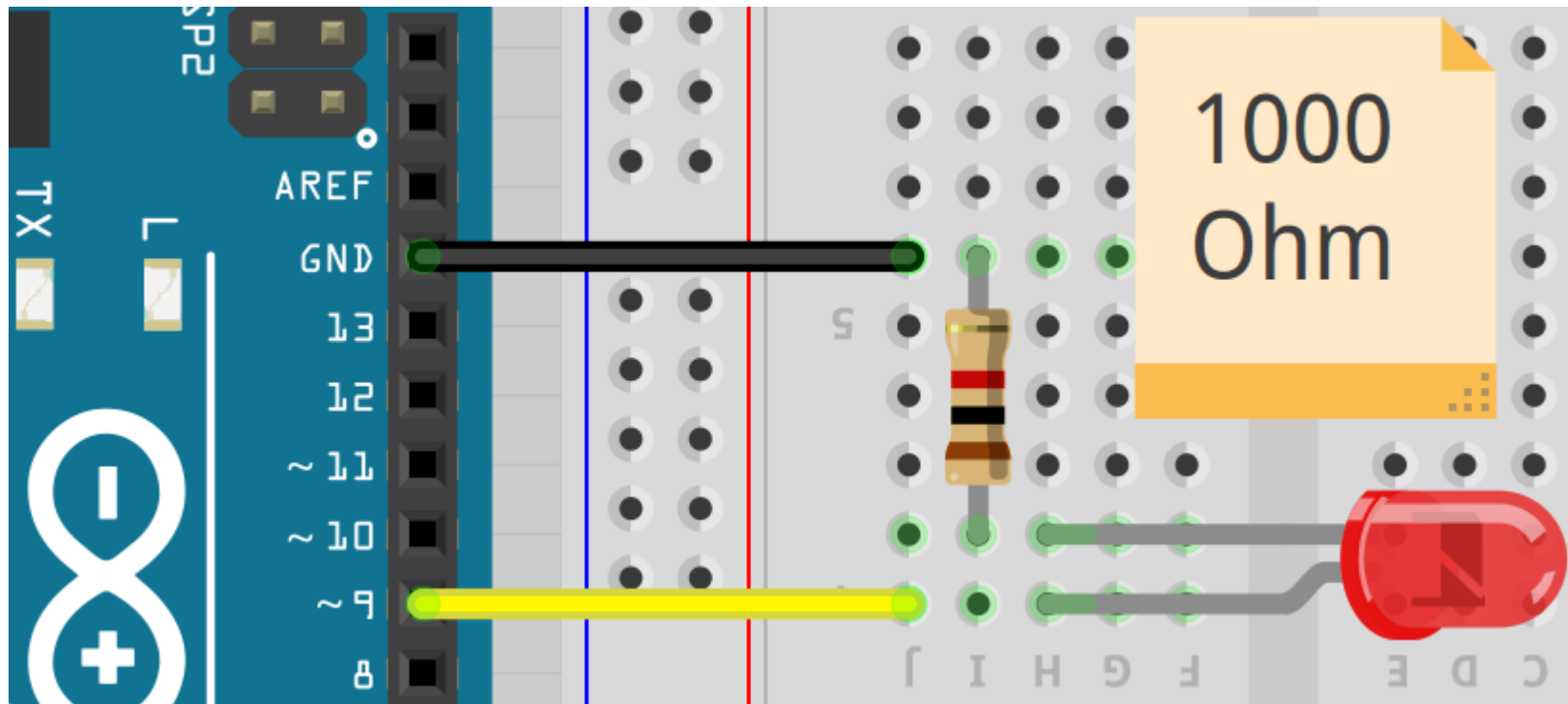
Laat zien in  
Serial Monitor

Laat LEDje  
branden

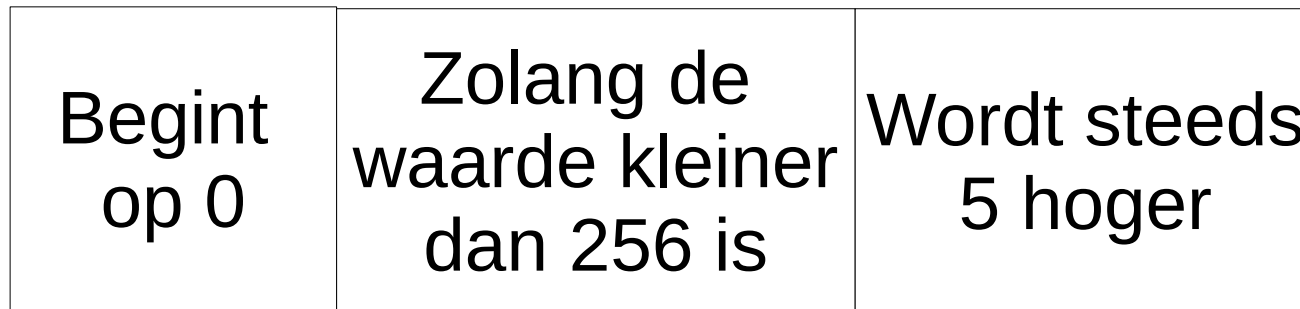


# Probleem

- Je wilt een LED snel aan laten gaan in stapjes van 5



# For loop



```
for(int i=0; i<256; i+=5)
```

```
{
```

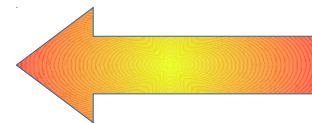
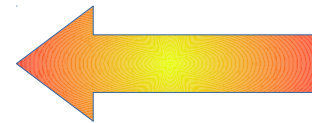
```
    Serial.println(i);
```

```
    analogWrite(9,i);
```

```
}
```

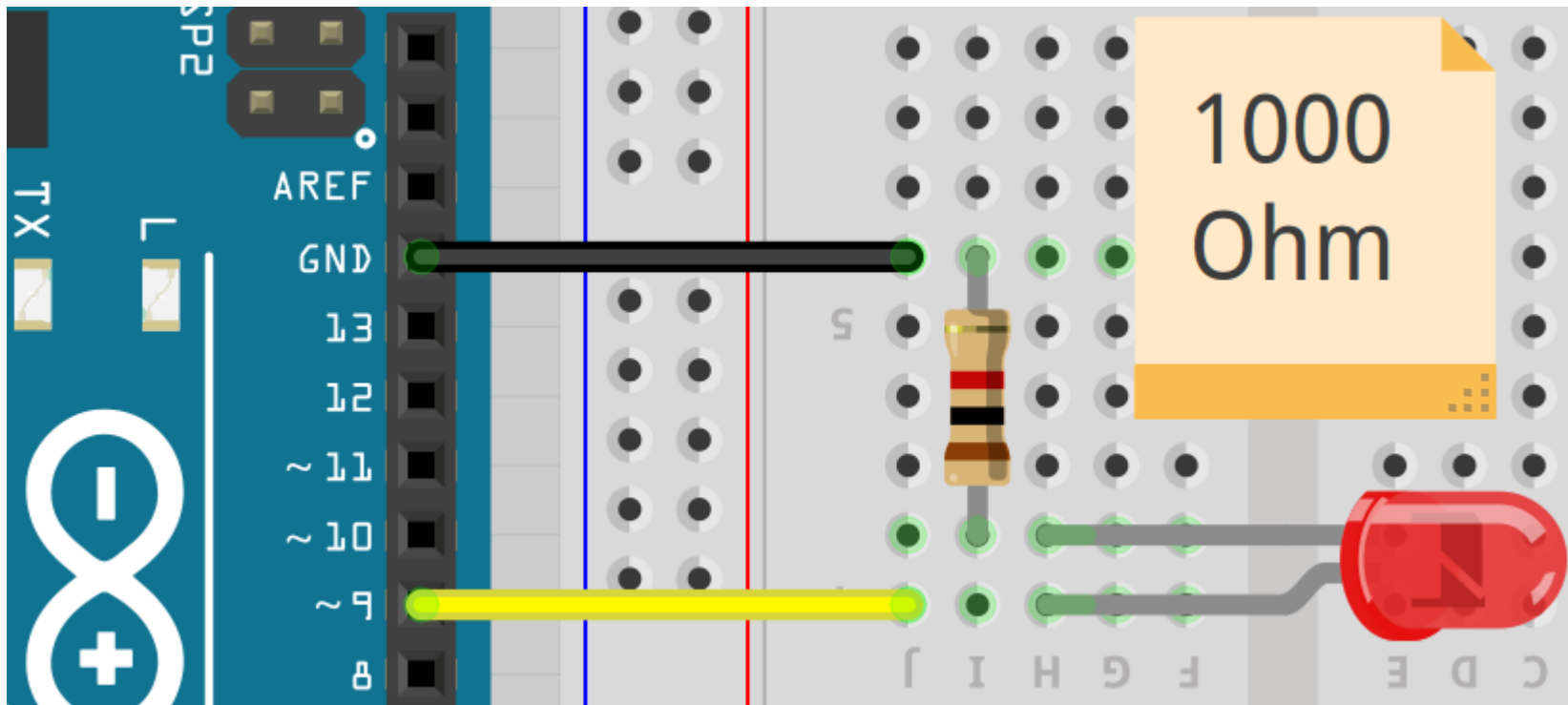
Laat zien in  
Serial Monitor

Laat LEDje  
branden

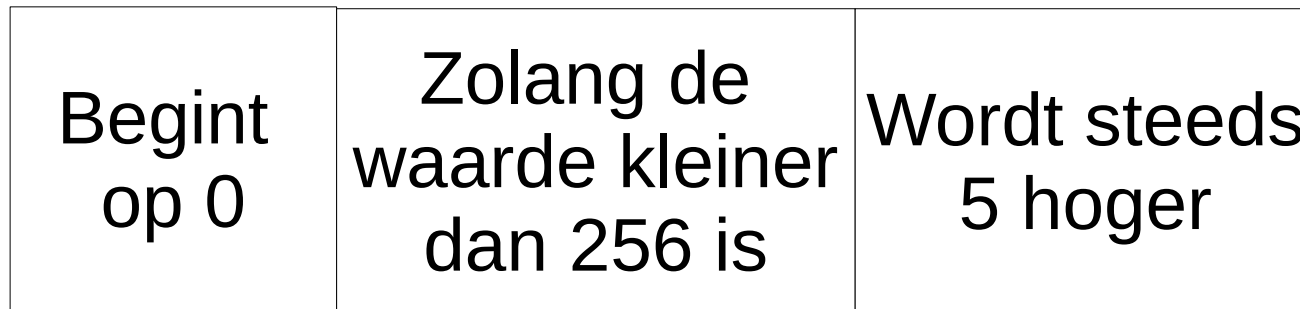


# Problem

- Je wilt een LED snel aan laten gaan in stapjes van 5



# For loop



```
for(int i=0; i<256; i+=5)
```

```
{
```

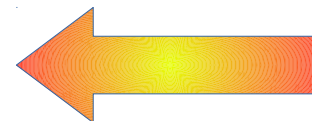
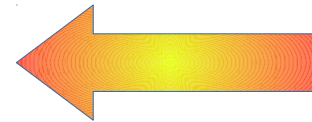
```
  Serial.println(i);
```

```
  analogWrite(9,i);
```

```
}
```

Laat zien in  
Serial Monitor

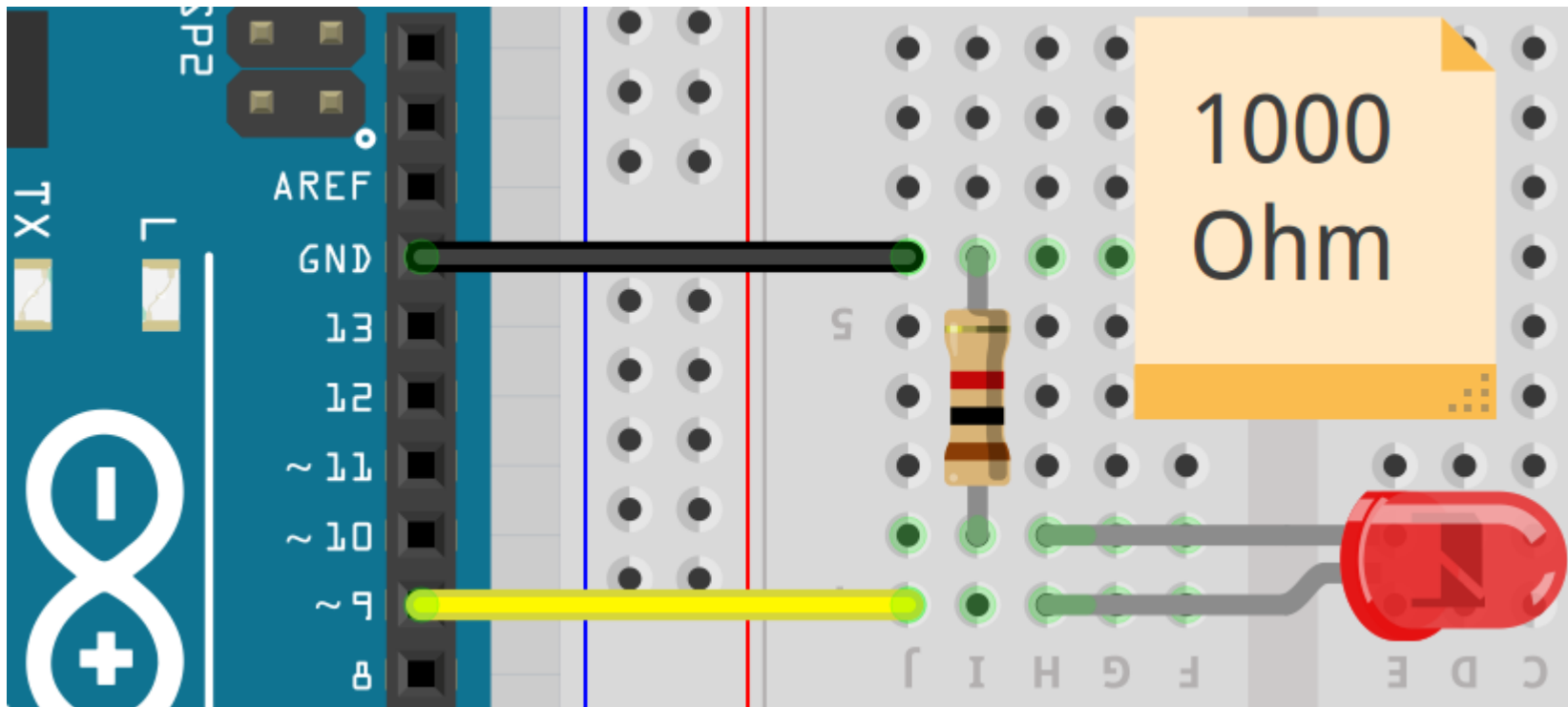
Laat LEDje  
branden





# Probleem

- Je wilt een LED uit laten gaan in stapjes van 5



# For loop

Beginnt  
op 255

Zolang de  
waarde groter  
is dan -1

Wordt steeds  
5 lager



```
for(int i=255; i>-1; i-=5)
```

```
{
```

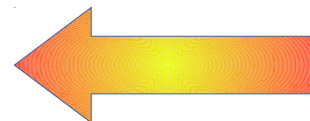
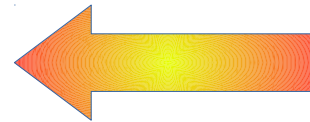
```
  Serial.println(i);
```

```
  analogWrite(9,i);
```

```
}
```

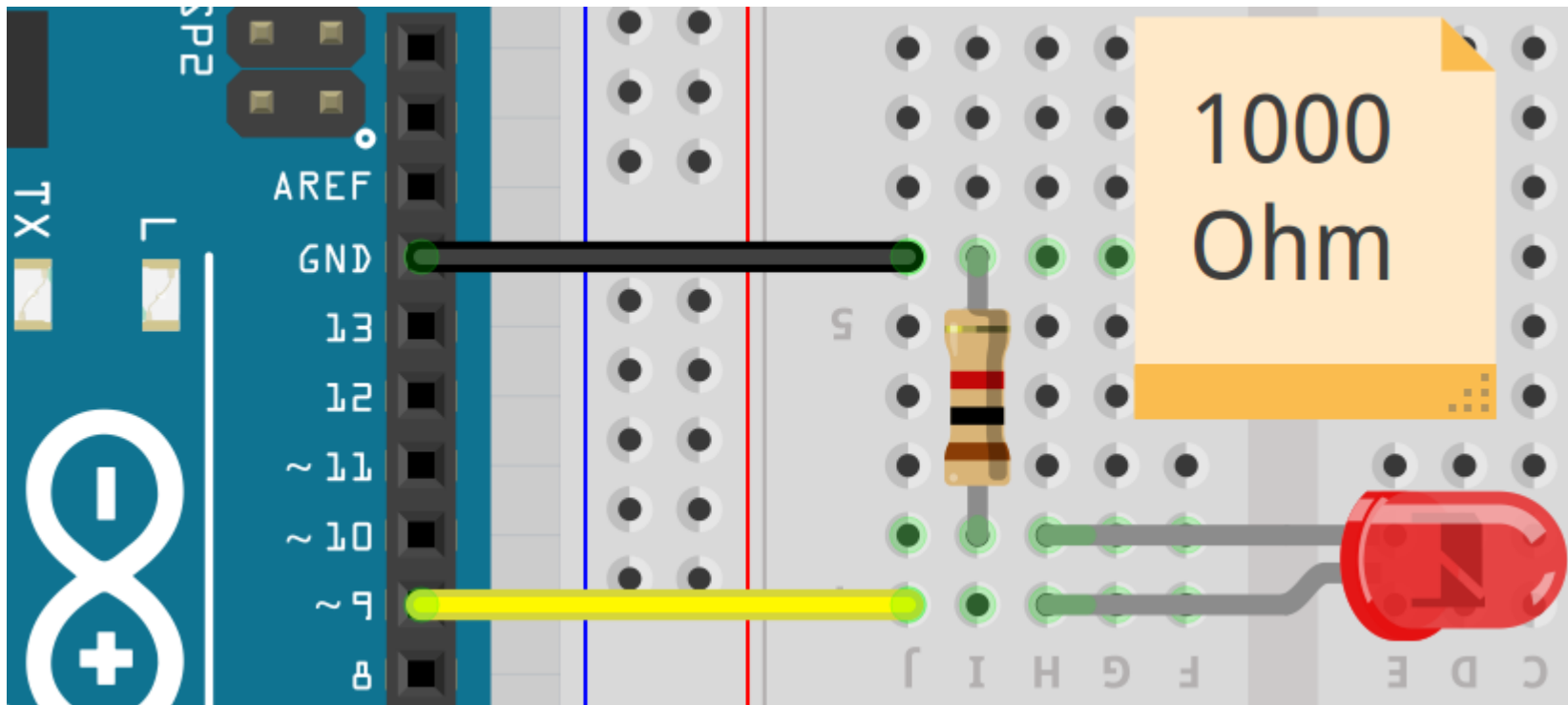
Laat zien in  
Serial Monitor

Laat LEDje  
branden



# Probleem

- Je wilt een LED rustig uit laten gaan



# For loop

Begint  
op 255

Zolang de  
waarde niet  
-1 is

Wordt steeds  
1 lager

$i -= 1$

```
for (int i=255; i != -1; --i)
```

```
{
```

```
  Serial.println(i);
```

```
  analogWrite(9,i);
```

```
}
```

Laat zien in  
Serial Monitor

Laat LEDje  
branden

# Ook

- Je kunt for-loops na elkaar doen
- Je kunt for-loops in for-loops doen
- Je kunt (per ongeluk) een lege loop maken
- Je kunt een oneindige loop maken

# For loops na elkaar

```
for (int i=0; i!=256; ++i)
{
    analogWrite(9,i);
}
```

```
for (int i=255; i!=-1; --i)
{
    analogWrite(9,i);
}
```

# For loops in elkaar

```
for (int i=0; i!=256; ++i)
{
    for (int j=i; j<255-i; --j)
    {
        analogWrite(9,j);
    }
}
```

# Lege for loop

```
for(int i=0; i!=256; ++i) {}
```



Deze for loop doet niks



# Oneindige for loop

```
for ( ; ; )  
{  
    // ...  
}
```



**Pas op: je programma  
kan hierdoor gaan hangen!**

# Tips

- For-loops zijn in het begin moeilijk
- Als je het moeilijk vindt:
  - Schrijf eerst de onhandige versie uit
  - Zoek het patroon
  - Zet het patroon in een for-loop
- Laat je code altijd mooi inspringen