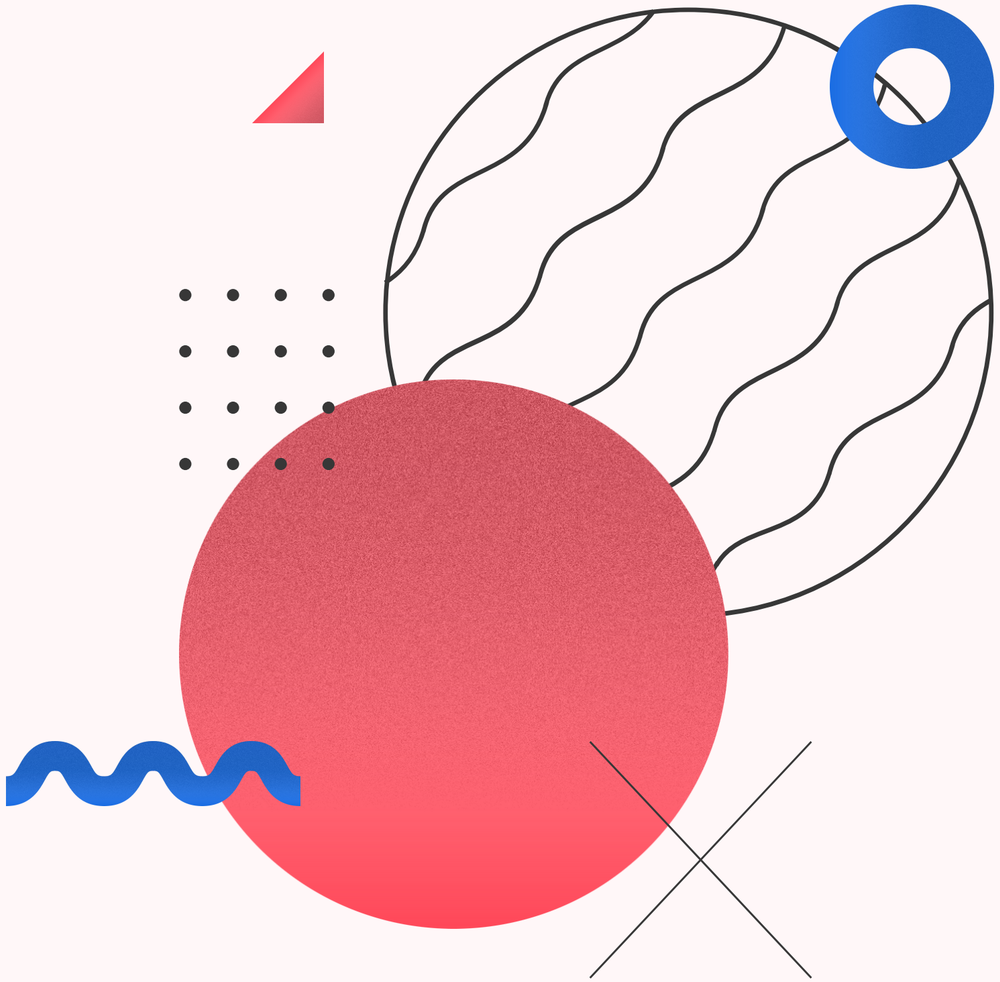
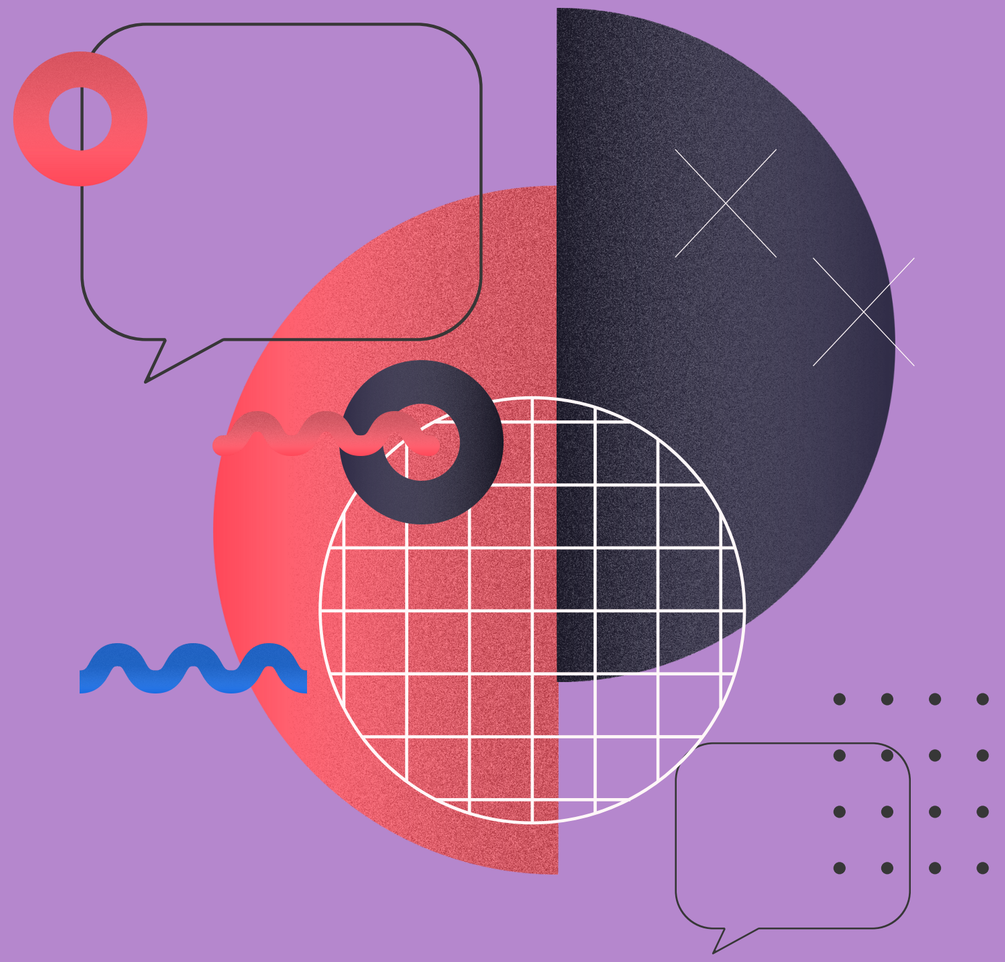
Operon SIMP

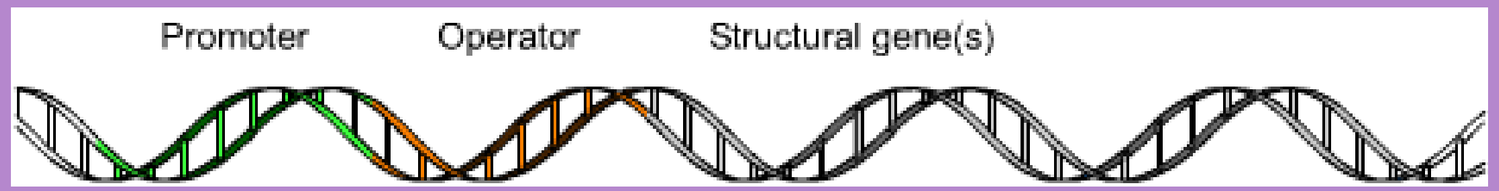
Interactive model of gene expression





What is an operon?

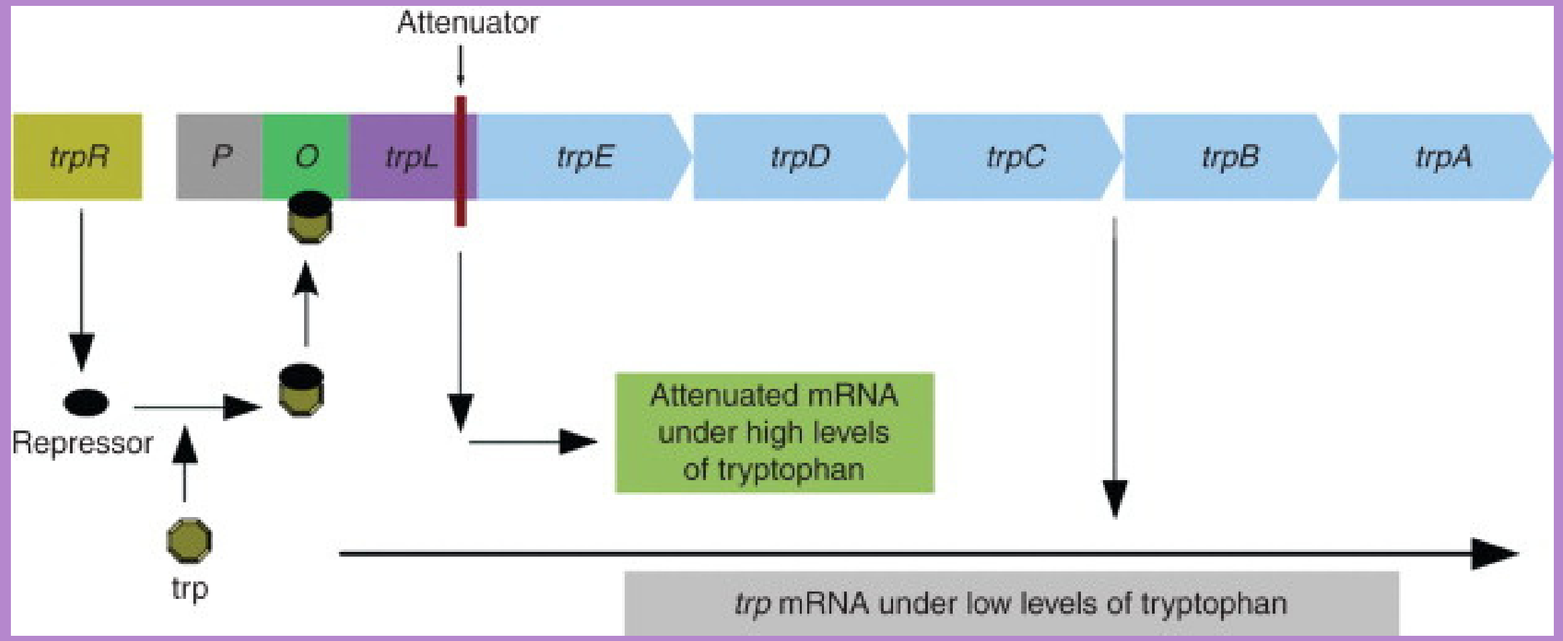
Typical operon



Regulation of gene expression:

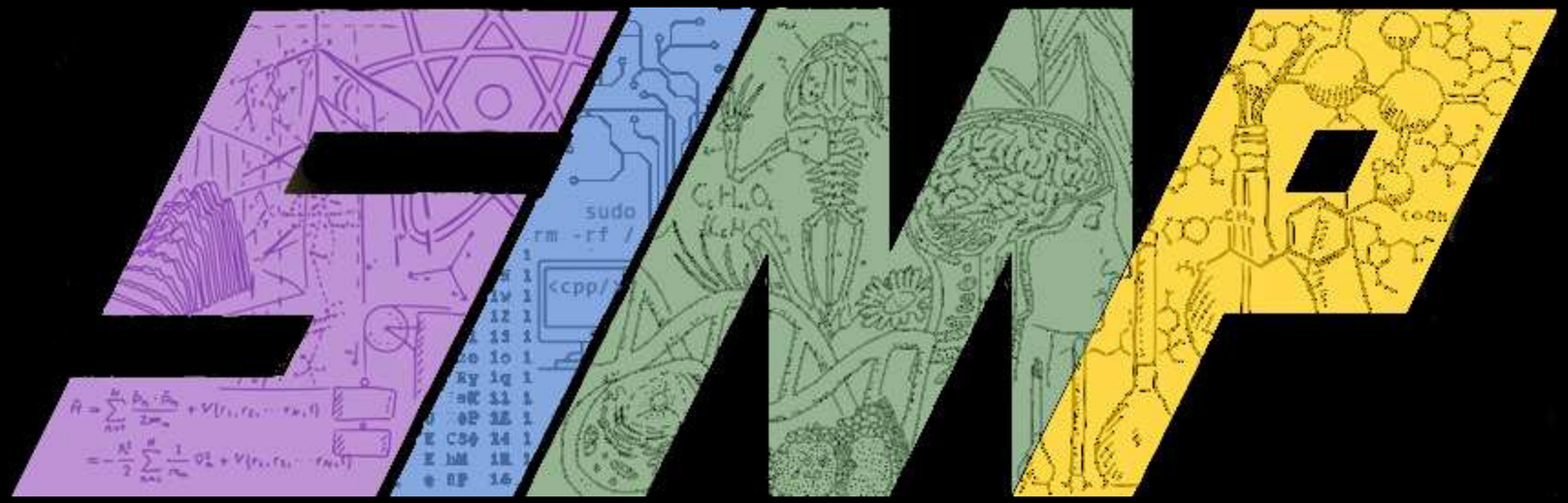
- positive control
- negative control

Example

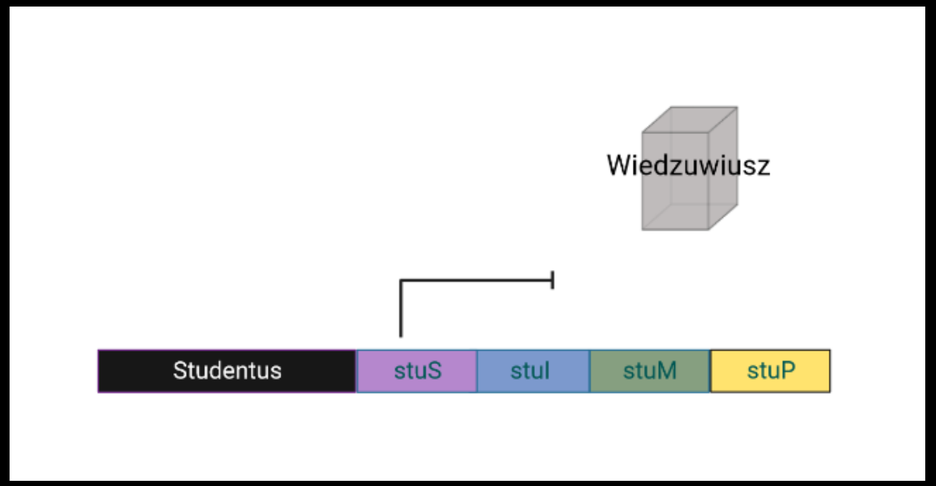


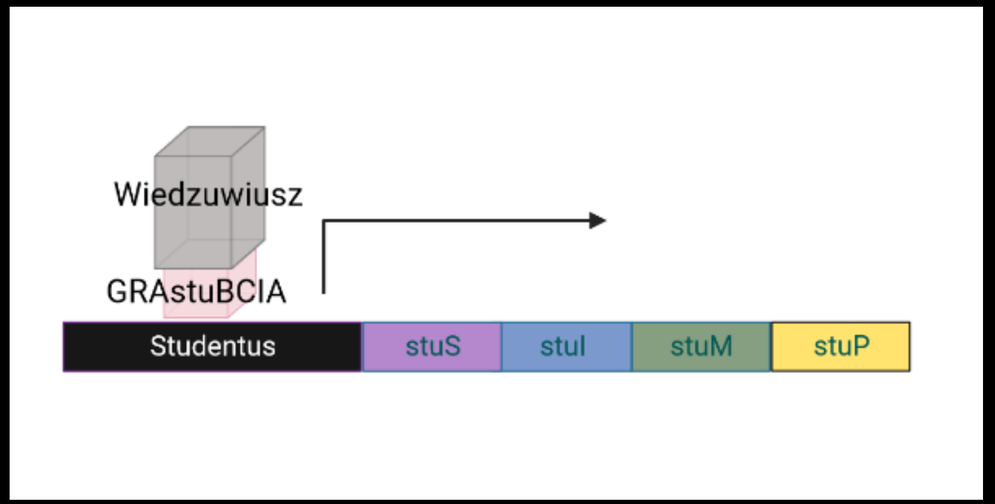
The tryptophan operon in *E.coli*

Why SIMP?



Why SIMP?


Wiedzuwiusz
Studentus
stuS
stuI
stuM
stuP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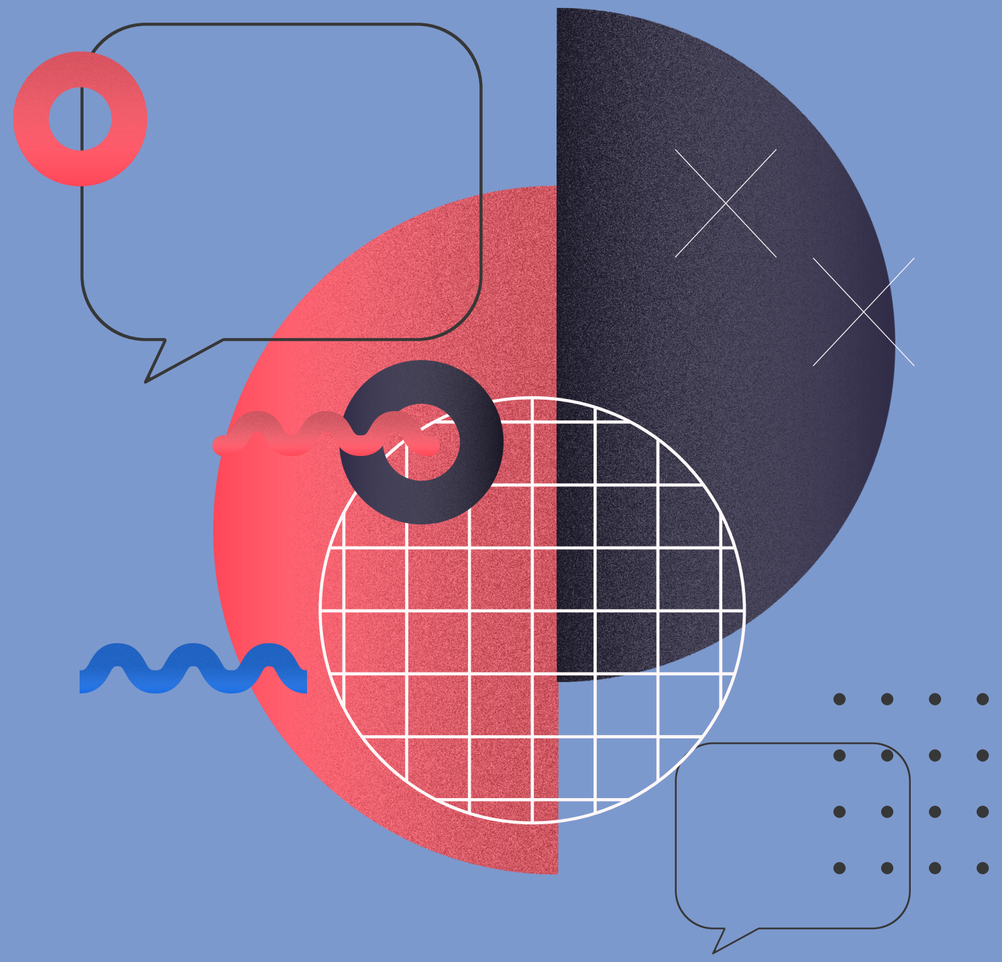
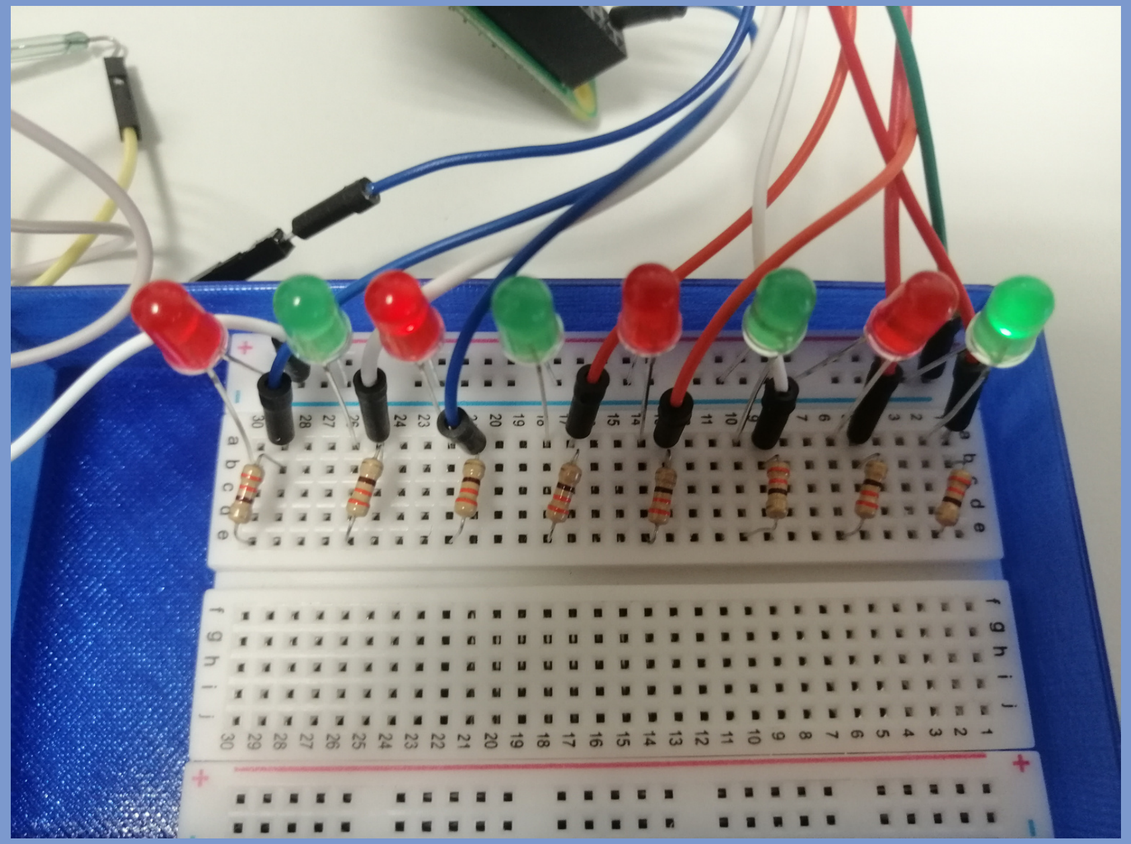
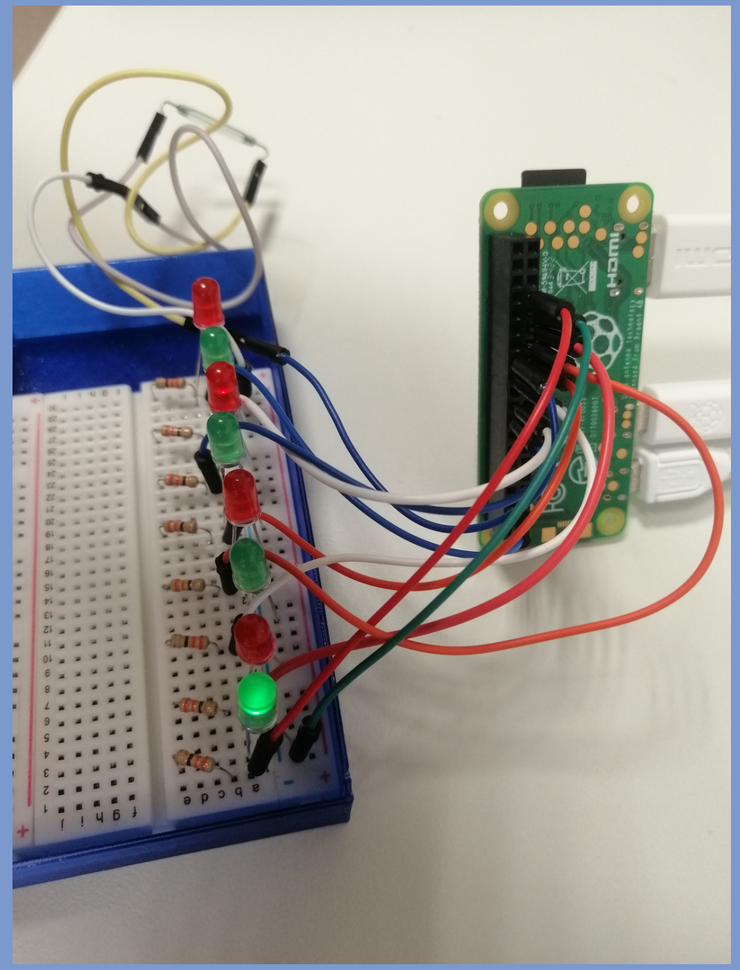
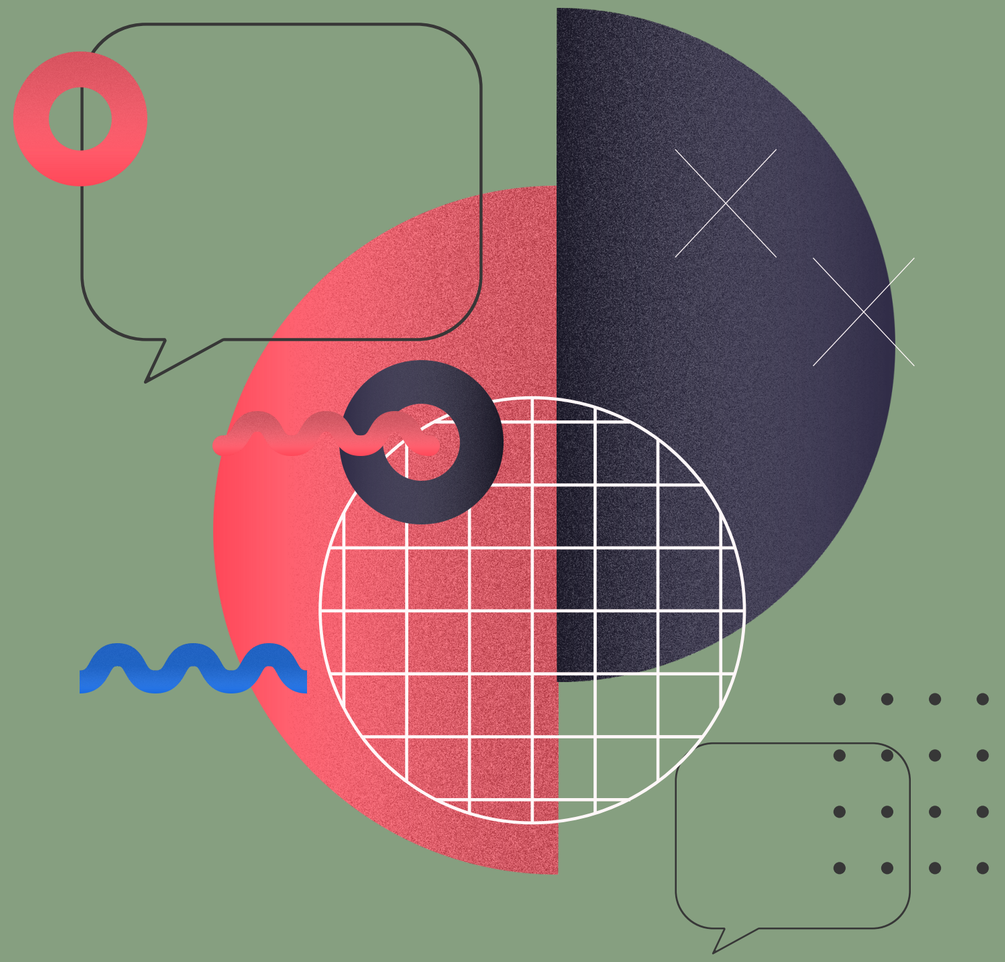


The Circuit



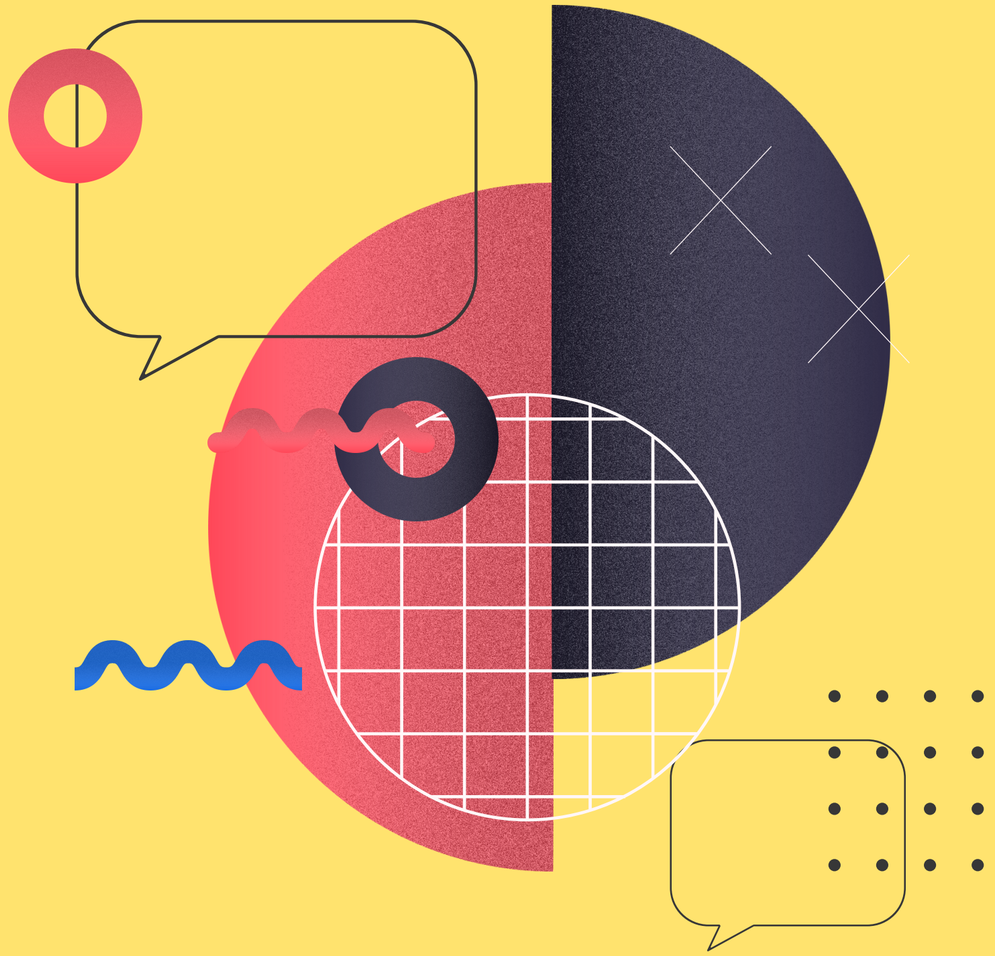




The software

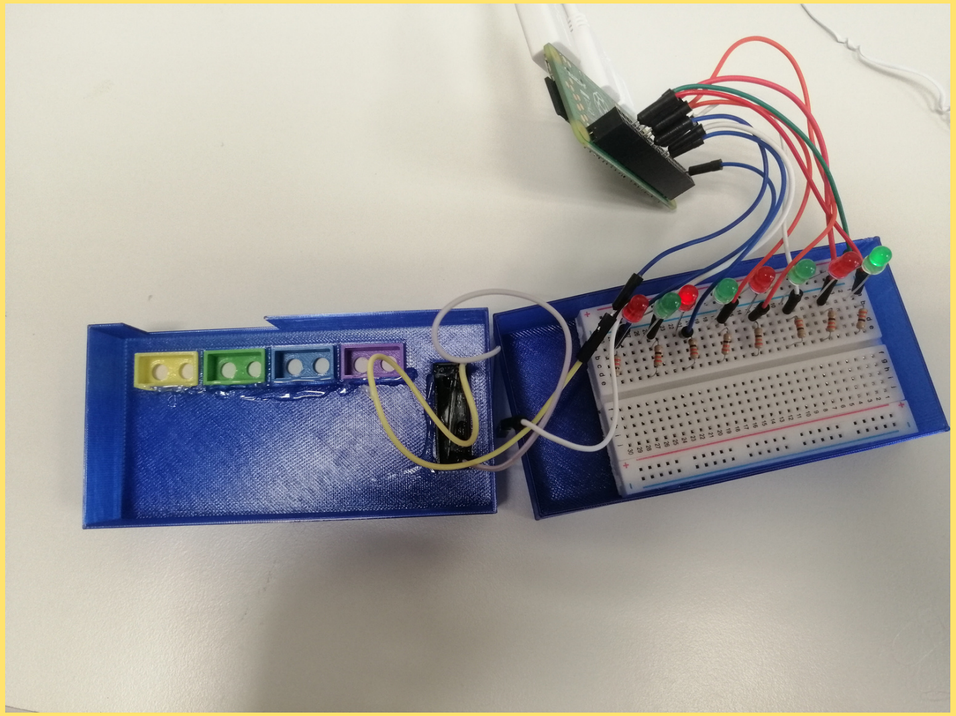
written in


```python
import RPi.GPIO as GPIO
import time
from gpiozero import LED

led1 = LED(4)
led2 = LED(17)
led3 = LED(24)
led4 = LED(27)
led5 = LED(22)
led6 = LED(8)
led7 = LED(25)
led8 = LED(26)
sensor = 23

GPIO.setmode(GPIO.BCM)
GPIO.setup(sensor, GPIO.IN, pull_up_down=GPIO.PUD_UP)

previous_state = False
current_state = False

while True:
    previous_state = current_state
    current_state = GPIO.input(sensor)
    if current_state != previous_state:
        if current_state:
            led1.off()
            led2.on()
            led3.off()
            led4.on()
            led5.off()
            led6.on()
            led7.off()
            led8.on()
        else:
            led1.on()
            led2.off()
            led3.on()
            led4.off()
            led5.on()
            led6.off()
            led7.on()
            led8.off()
```

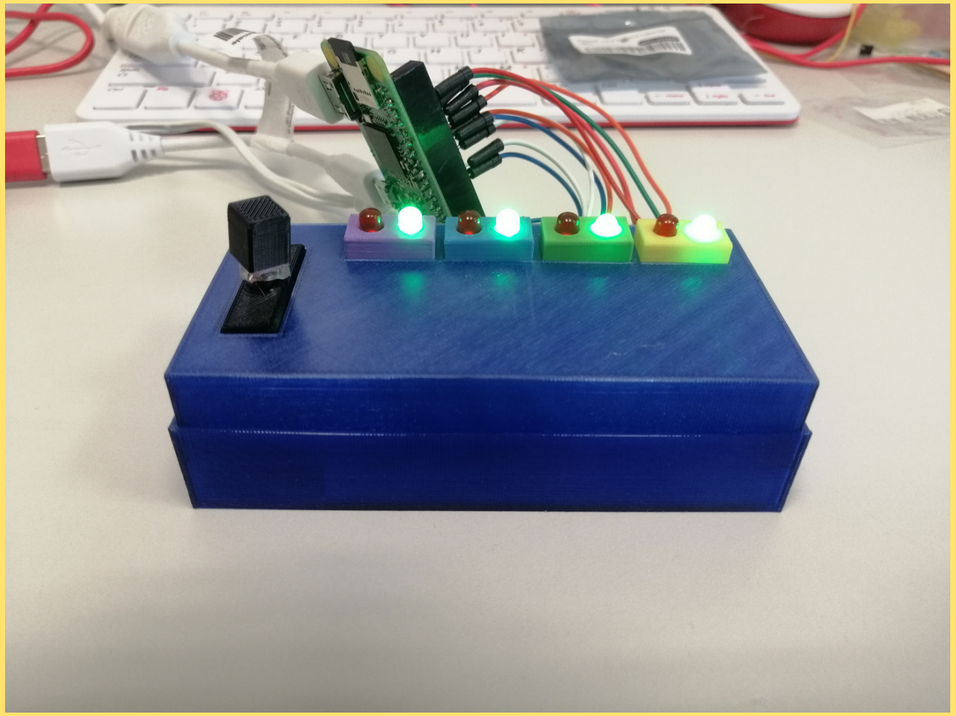


The box and other printed elements

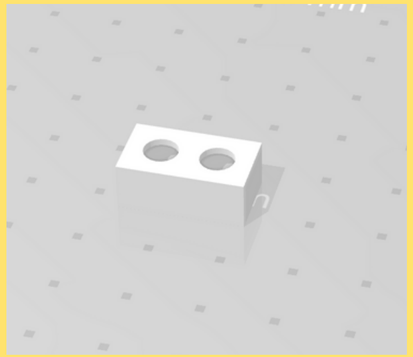
From the inside



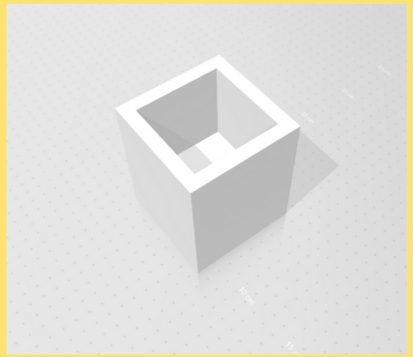
From the outside



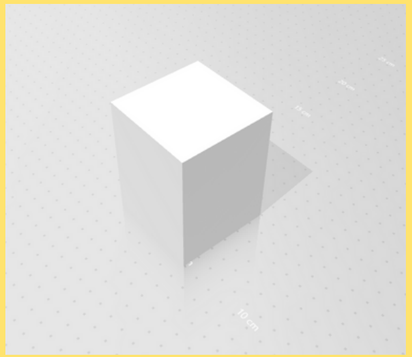
Elements of the model:



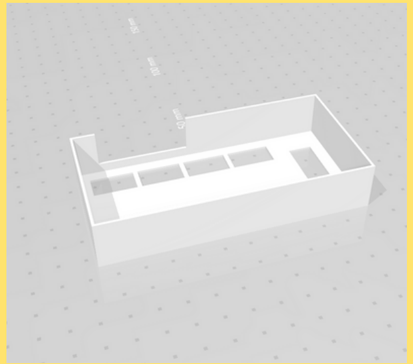
gene



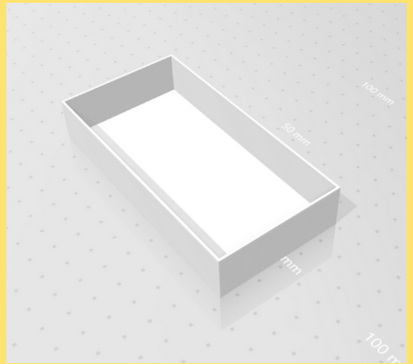
activator



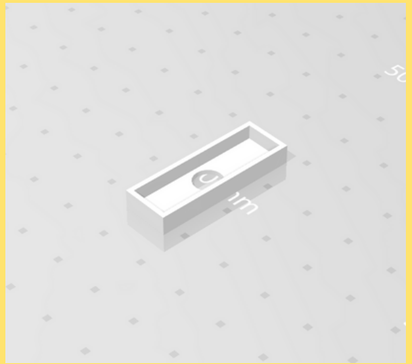
inducer



top of the box



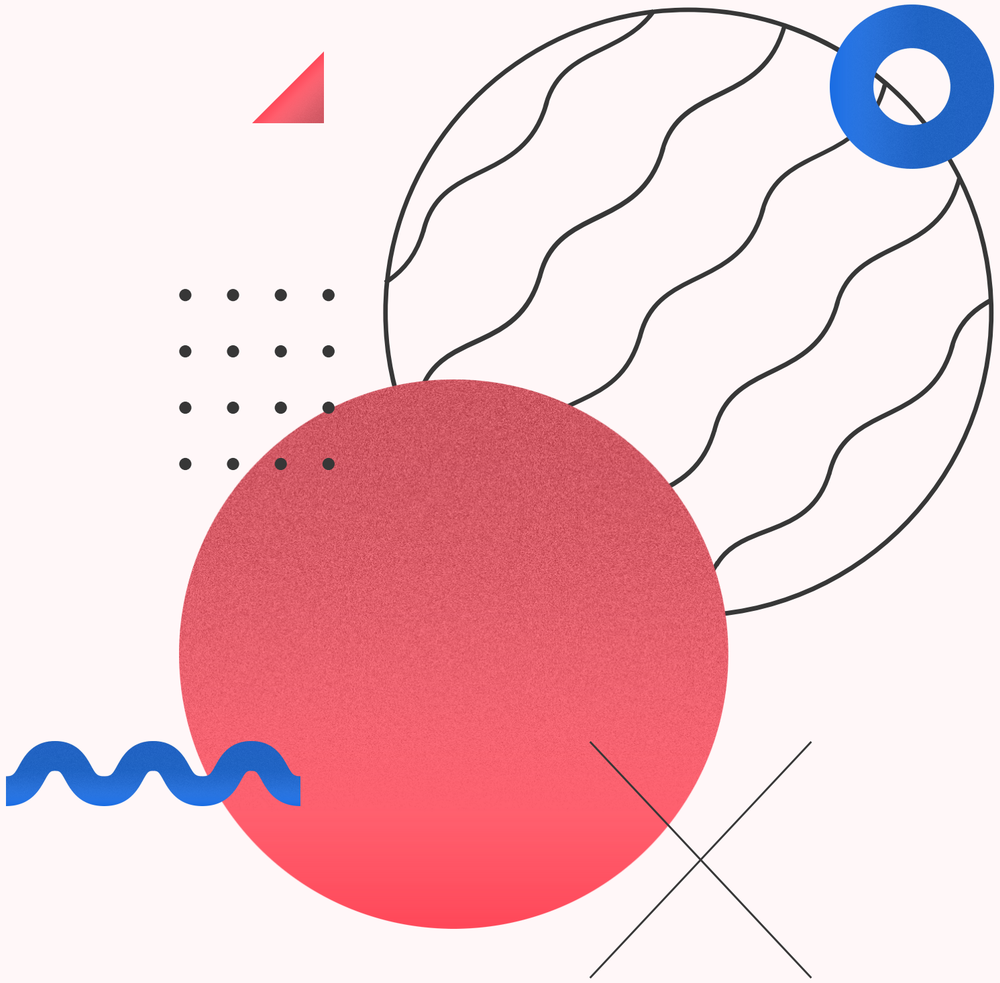
bottom of the box



promoter

Thank you!

Maria Rybak



Sources

- [Writing on GitHub] (https://docs.github.com/en/get-started/writing-on-github)
- Raspberry Pi Beginner's Guide
- Web app for 3D designs TINKERCAD (https://www.tinkercad.com)
- modelling slicing software Slicer 4.0. (https://3dgence.com/pl/oprogramowanie-dla-druku-3d/slicer-4-0/)
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2776167/
- https://ryansouthgate.com/raspberry-pi-door-sensor/
- BioRender