PYTHON

BASIC COURSE

ELECTRONICS

BASIC COURSE

Teachers

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KACPER KOTLEWSKI

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Python : programming language

Python is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Electronics: Raspberry Pi Pico CircuitPython

Raspberry Pi Pico is a tiny, fast, and versatile board built using RP2040, a brand new microcontroller chip designed by Raspberry Pi in the UK.
CircuitPython is a programming language designed to simplify experimenting and learning to code on low-cost microcontroller boards.

CIRCUITPYTHON

RaspberryPi

python™

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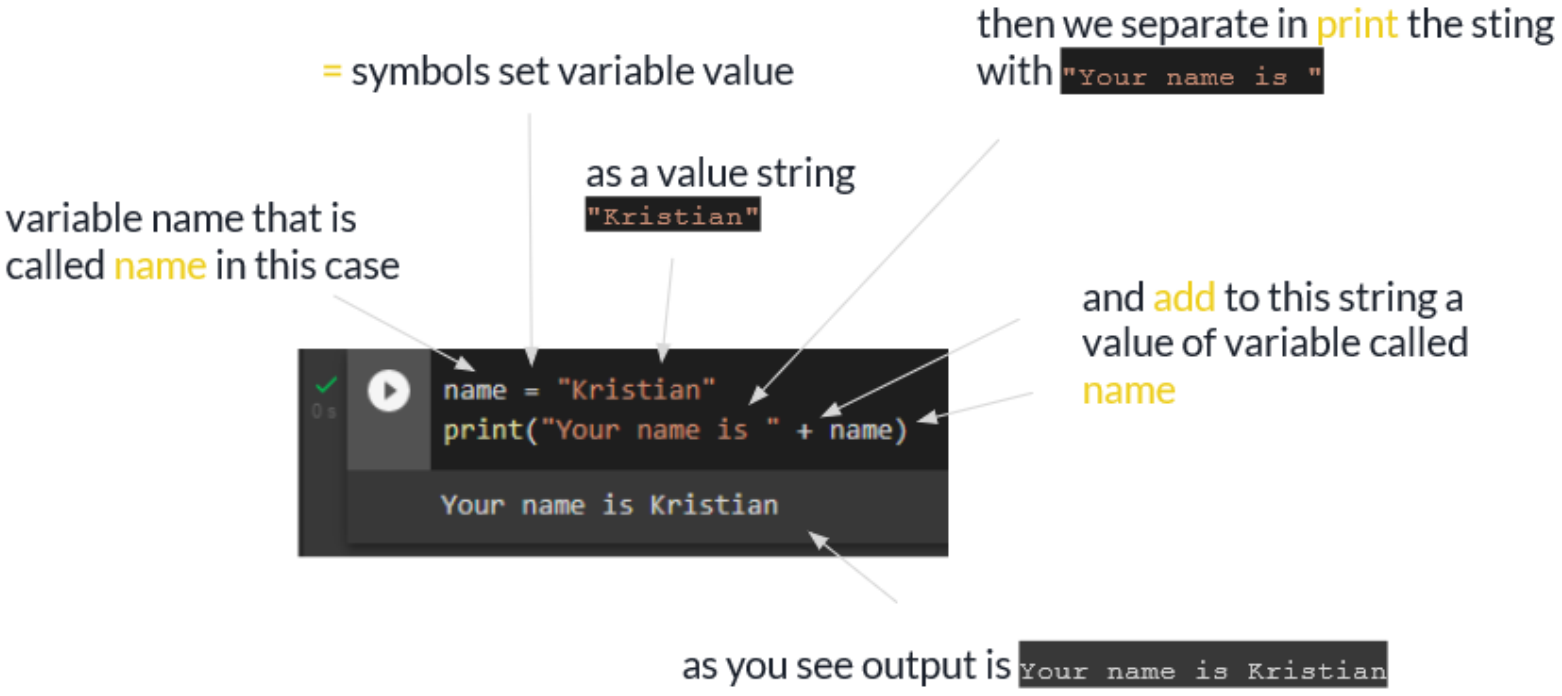
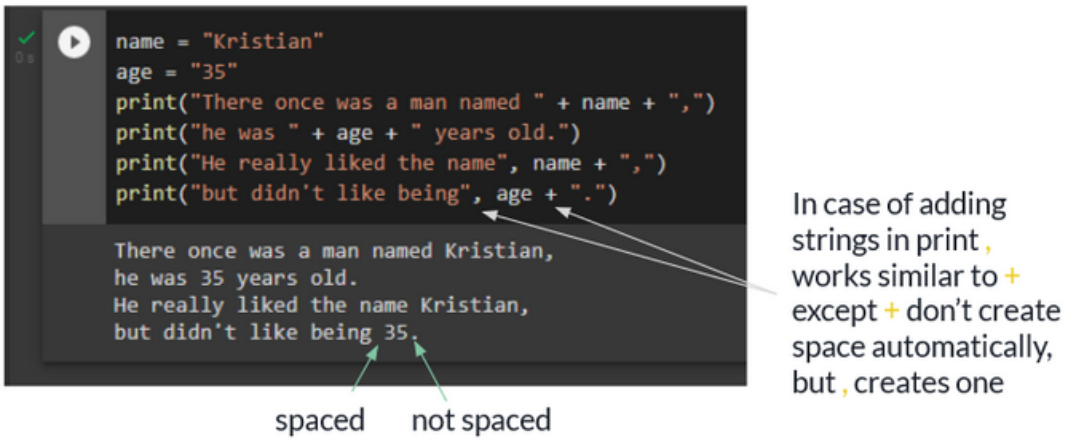
Python code





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Python code

```
[ ]  a=2
     b=5
     if a>b:
       print("a is greater than b")
     else:
       print("not true")
```

```
not true
```

```
[ ]  a=3
     b=9
     if a>b:
       print("a is greater than b")
     elif a == b:
       print("a and b are equal")
     else:
       print("hello word")
```

```
hello word
```

Python supports the usual logical conditions from mathematics:

- Equals: `a == b`
- Not Equals: `a != b`
- Less than: `a < b`
- Less than or equal to: `a <= b`
- Greater than: `a > b`
- Greater than or equal to: `a >= b`

These conditions can be used in several ways, most commonly in "if statements" and loops.

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In Python, Using a for loop with range(), we can repeat an action a specific number of times. For example, let's see how to use the range() function of Python 3 to produce the first five numbers

```
for i in range(5):
    print(i)
```

```
0
1
2
3
4
```

Error in Python

```
for i in range("HaLO"):
    print(i)
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-9-1a3d3a55b9dc> in <module>()
----> 1 for i in range("HaLO"):
      2     print(i)

TypeError: 'str' object cannot be interpreted as an integer
```

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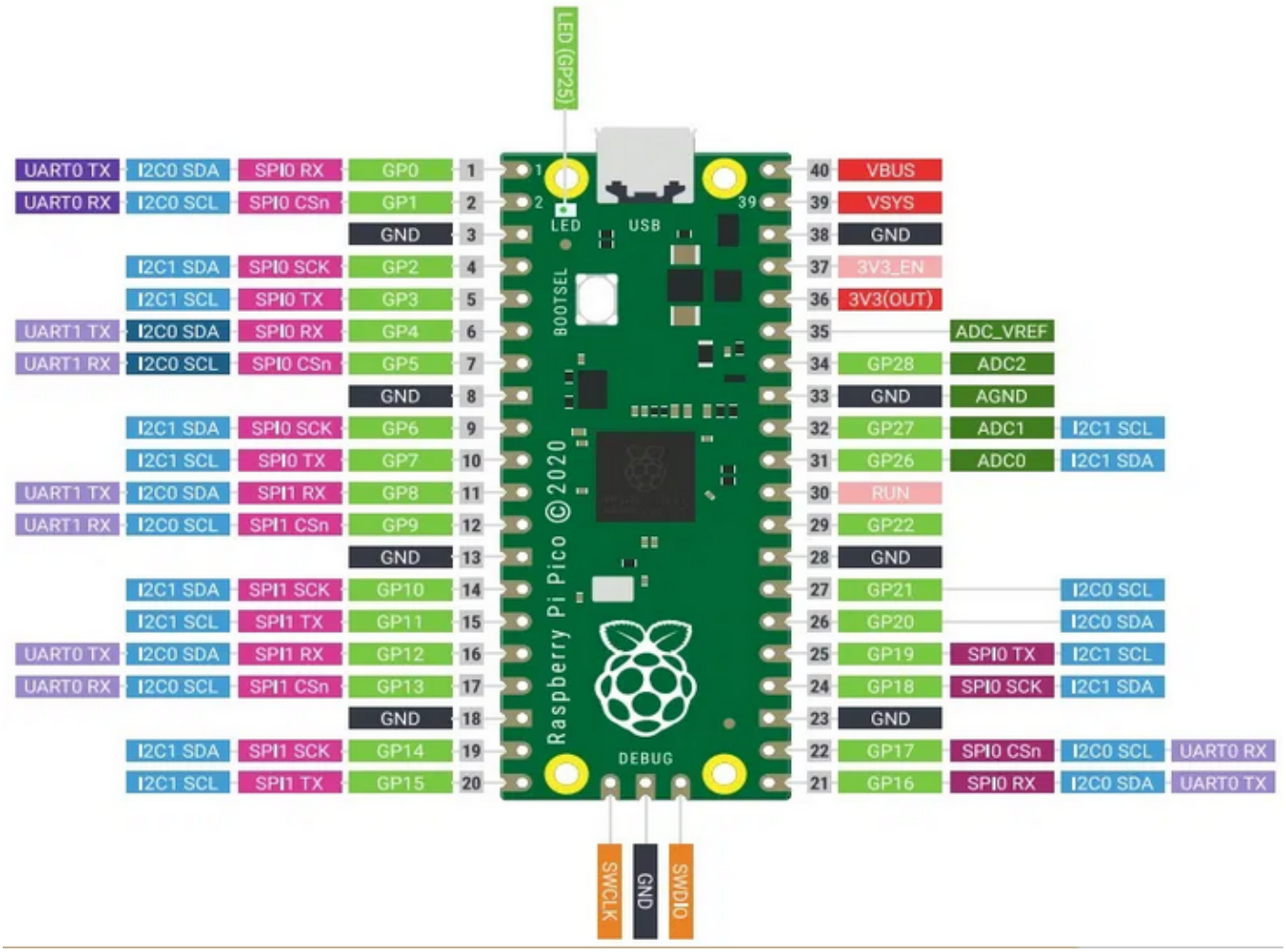
Raspberry Pi Pico



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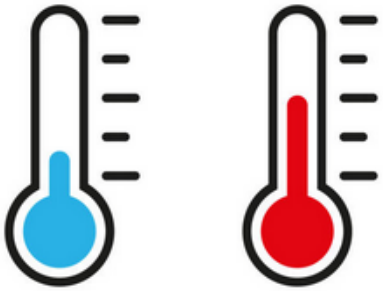
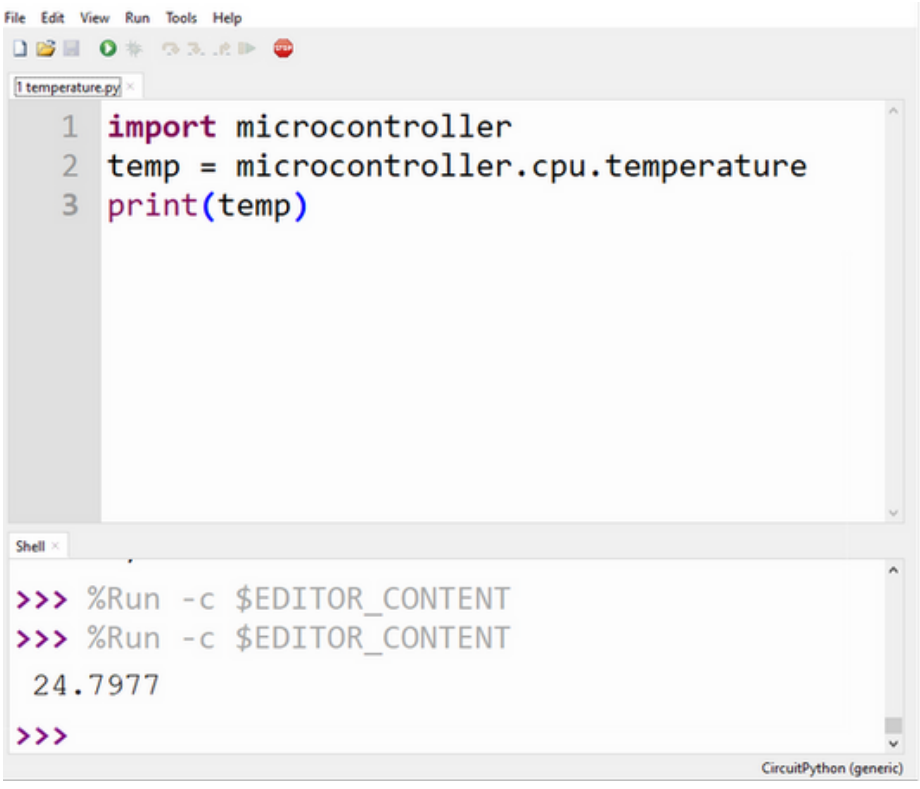
Electronics

Read temperature





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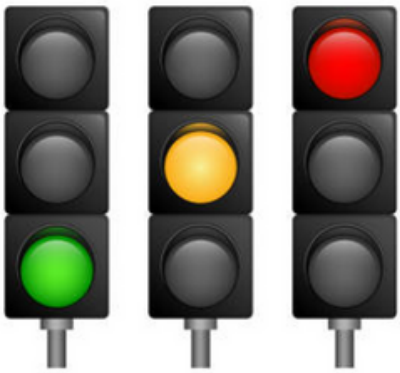
Trafic light



1_automated trafic lights.py

```
import board
import digitalio
import time

led_red = digitalio.DigitalInOut(board.GP13)
led_red.direction = digitalio.Direction.OUTPUT

led_yellow = digitalio.DigitalInOut(board.GP12)
led_yellow.direction = digitalio.Direction.OUTPUT

led_green = digitalio.DigitalInOut(board.GP11)
led_green.direction = digitalio.Direction.OUTPUT


led_red.value = False
led_yellow.value = False
led_green.value = False

while True:
    led_yellow.value = False
    led_red.value = True
    time.sleep(1)

    led_yellow.value = True
    time.sleep(0.3)

    led_red.value = False
    led_yellow.value = False
    led_green.value = True
    time.sleep(1)

```

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Button and LED

8 button and led.py *

```
1  import board
2  import digitalio
3
4  led = digitalio.DigitalInOut(board.GP15)
5  led.direction = digitalio.Direction.OUTPUT
6  button = digitalio.DigitalInOut(board.GP0)
7  button.switch_to_input(pull=digitalio.Pull.DOWN)
8
9  while True:
10     led.value = button.value
```

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Electronics

Blink external LED

5 blink led gpio15.py

```
1  import time
2  import board
3  import digitalio
4
5  led = digitalio.DigitalInOut(board.GP15)
6  led.direction = digitalio.Direction.OUTPUT
7
8  while True:
9      led.value = not led.value
10     time.sleep(0.5)
```

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```
print("  |--|  ")
print("   ..   ")
print("  \__/ ")
print("inbie.pl")
```

```
  |--|
   ..
  \__/
inbie.pl
```

Thank you for participating in the INBIE course

```
print("info@inbie.pl")
```

```
info@inbie.pl
```