CamJam EduKit Worksheet Three

Project Making LEDs blink with Python.

Description In this project, you will learn how to make LEDs blink.
This worksheet uses the same LED circuit that was built in Worksheet Two.

Equipment Required

The circuit built in CamJam EduKit Worksheet Two.

Code – Blink Twice

Plug the small end of the micro-USB cable into the Pico and connect the other end to your computer. Restart Thonny and create a new file. Type in the following code:

```
# CamJam EduKit 1 - Basic
# Worksheet 3 - Blinking LED

# Import Libraries
import time  # A collection of time related commands
from picozero import LED  # The LED function from picozero

# Set pins 15, 14 and 13 to be LEDs
red = LED(15)
yellow = LED(14)
green = LED(13)

# Turn LEDs on
red.on()
yellow.on()
green.on()

time.sleep(1)  # Pause for 1 second

# Turn LEDs off
red.off()
yellow.off()
green.off()

time.sleep(1)  # Pause for 1 second

# Turn LEDs on
red.on()
yellow.on()
green.on()

time.sleep(1)  # Pause for 1 second

# Turn LEDs off
red.off()
yellow.off()
green.off()
```

Once complete, save the file as `3-blink.py` on the Pico.

Running the Code

Click the green Run icon on the top menu bar. You will see the three LEDs turn on and off twice, with one second in between each change.

Code – Blink Forever

Our next piece of code will flash the lights on and off forever (or until you press "Ctrl-C").

Create the new file and type in the following code:

```
# CamJam EduKit 1 - Basics
# Worksheet 3 - Blink LED Forever

# Import Libraries
import time  # A collection of time related commands
from picozero import LED  # The LED functions from picozero

# Set pins 15, 14 and 13 to be LEDs
red = LED(15)
yellow = LED(14)
green = LED(13)

# Loop forever (as true is always true)
while True:
    # Turn LEDs on
    red.on()
    yellow.on()
    green.on()

    # Wait for one second
    time.sleep(1)

    # Turn LEDs off
    red.off()
    yellow.off()
    green.off()

    # Wait for one second
    time.sleep(1)
```

Save the file as `3-blink-forever.py` on the Pico.

Explanation of the Code

```
while True:
```

Indentation is Python's way of grouping multiple lines of code together as a block. The whole block is treated as if they are one single line of code.

'while' is followed by a 'test condition' and the ':' sign. The 'test condition' can return a value of either 'True' or 'False'.

- If 'True' is returned, the Pico will execute code in the following line or block after the ':' sign.
- If 'False' is returned, execution continues after the block. That is, the next line at the same indentation as the while statement.

Since we put a permanent 'True' value as the test condition, the program will repeatedly execute the indented block forever, or until the user presses Ctrl-C, or presses the 'stop' button in Thonny.

`while True:` therefore, is used to create a 'forever' loop.

Running the Code

Click the green Run icon on the top menu bar. You will see the three LEDs turn on and off forever, or until you press 'Ctrl-C'.

If there is an error in the code, edit the code and resave it. Re-run the code to check that you have corrected the error.

Note: Do not disassemble this circuit as it will be used in the following worksheets.