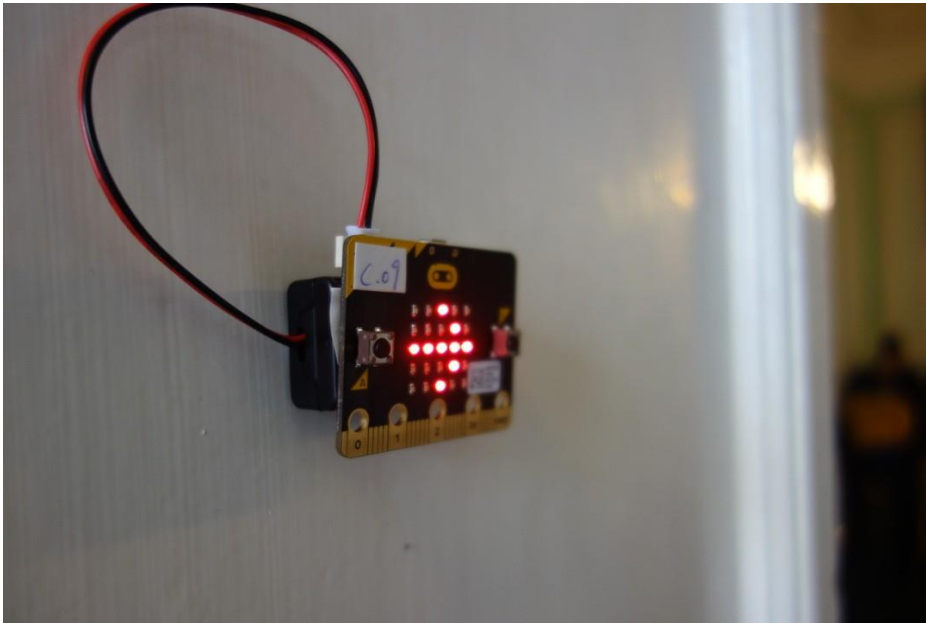# GET TO KNOW PROGRAM
EXPLORING MICRO:BIT

The goal of this lesson is to get acquainted with the BBC micro:bit – what it is, what built-in sensors it contains and for what we use it.

Material requirements:
BBC micro:bit, USB cable, battery for micro:bit, computer with an access to Internet

We will load the **get to know program** on the micro:bit from this website:

https://support.microbit.org/helpdesk/attachments/19033089764

INTRUDACTION TO MICROPROCESSORS

You know the classic processor – it is the "brain" of every computer, as all calculations take place in it. It is also connected to memory, display, keyboard, etc.

The microprocessor is remarkably similar to a classic processor, except for one difference –the microprocessor is much smaller. Therefore, it is not so powerful, which usually does not bother us. For example:

- in the washing machine the microprocessor controls the pumping of water and motor.

- in the elevator, the microprocessor looks into which buttons we have pressed, and accordingly to that sends the elevator to the right floor, where it also opens and closes doors.

- in a smart watch, the microprocessor shows individual apps on the display; in the security system, the microprocessor uses motion sensors to detect if there is any movement in the house, and then triggers an alarm and sends an SMS message.

Microprocessors usually interact with the environment. This interaction could be simply divided into **inputs** and **outputs** from the microprocessor.

Example of microprocessor inputs:

- switches
- light sensors
- motion sensors
- thermometer
- humidity sensor

Example of microprocessor outputs:

- controlling of lights
- controlling of motor
- triggering an alarm
- showing results on display

We will use such various inputs and outputs to create hardware programs.

GET TO KNOW PROGRAM

If you have a brand new micro:bit, it probably has a special get to know program loaded on it, thanks to which you can try out what the micro:bit can do. You will find out that after connecting the micro: bit to the computer using a classic USB micro cable, the letter A will appear on the micro:bit screen together with the arrow on the left.

But if you do not have this program on micro:bit, do not despair, we can download it very easily. From the link above, download a file called OutOfBoxExperience-v2.hex. Then connect your micro:bit to the computer – if you notice carefully, the computer let you know that a USB storage called MICROBIT has connected to it, Now everything you have to do is to copy the downloaded OutOfBoxExperience-v2.hex program to the MICROBIT storage. During downloading, the small yellow LED on the back of the micro:bit should flash for a moment and then the letter A is displayed in the micro:bit display together with the arrow on the left.

If you already have the program on the micro:bit running, try to go through it without the help of this manual (individual mini-tasks are quite intuitive). If you need help, here is manual:

- First, press the A button on the micro:bit (the button must be pressed properly)
- Then press button B
- Shake the micro:bit (the more you shake it, the brighter the LED will become)
- A game starts in which you tilt the micro:bit in order to "chase" a flashing dot
- When you successfully complete the game, the micro:bit will show you a heart animation. But if you now press both buttons at the same time, you start a hidden game – a snake.

To start the game from the beginning, press the RESET button on the back of the board.

EXPLORING MICRO:BIT

We tried few sensors, such as buttons and tilt / shake sensor, thanks to the get to know program, but what other components does micro:bit contain? The micro:bit itself will also tell us in part – try to find as many sensors as possible that are listed on the picture.
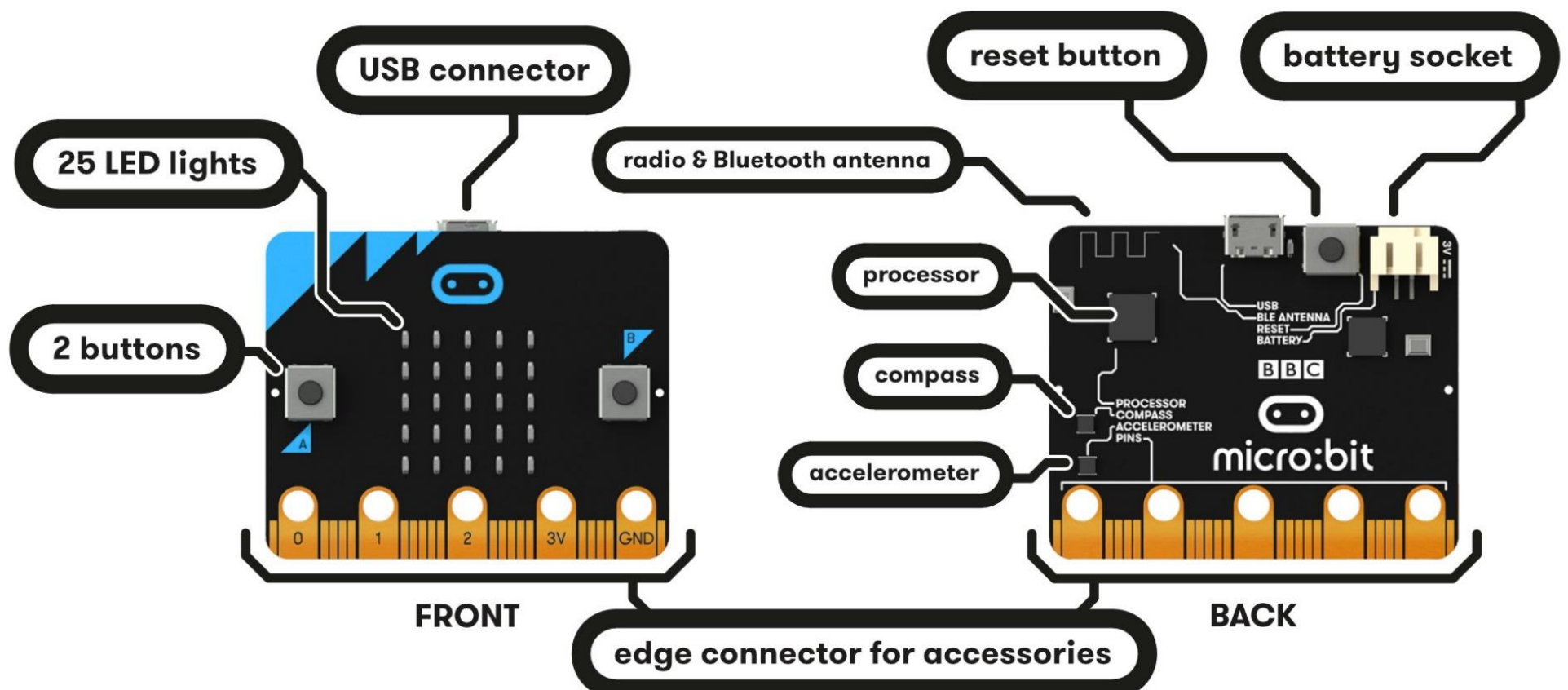
Front side

- **2 buttons** – micro:bit has 2 buttons on the front, which you can program to start running some part of the code :-) The buttons are marked with buttons A and B.
- **5x5 LED display** – 25 red LEDs can be used to display images, text and numbers. But at the same time they serve as a sensor – you can use them to measure the intensity of light that falls on the micro:bit.

Back side

- **Antenna** – micro:bit can communicate in 2 ways – either with other micro:bits via radio communication or with other devices via Bluetooth. But you cannot tune the classic radio on it :-(
- **Processor** – the brain of the whole micro:bit is the microprocessor, which executes the code that we load on it. It also contains a built-in thermometer, which does not measure the ambient temperature, but the processor temperature.
- **RESET button** –this button restarts the micro:bit and starts the recorded program from the beginning.
- **Micro USB connector** – used for recording programs to the micro:bit and also for power supply, so that we do not have to spend batteries.
- **One yellow LED** – indicates micro:bit is connected to the computer via a USB cable and flashes when uploading a program.
- **Battery connector** –instead of a USB cable, we can also use two AAA batteries to power the micro:bit, which we connect to the micro:bit using a special connector – so you can take your micro:bit out of the house.
- **Compass** –a magnetic sensor measures the strength of a magnetic field, and in addition to the sides of the world, you can use it to determine if there is a magnet nearby.
- **Accelerometer** – detects the tilt and movement of the micro:bit.

INPUT/OUTPUT PINs

At the bottom are small metal surfaces, some marked, other not. They are used to connect the micro:bit to other sensors and actors – such as motorcycles or soil moisture sensors. Almost anything can be connected to them. In English they are called pin, which is usually translated into Slovak as kolíky. Nevertheless, the term kolík is often used in Slovak.

Some of the pins are marked:
0, 1 and 2 – these pins are programmable, and you can use them to read data from connected sensors or control connected actuators.
GND – abbreviation from GROUND, in Slovak: Zem – we connect external sensors to it to ground them.
3V – this pin has 3 vols applied and is used to power external sensors.

LESSON SUMMARY

In this lesson, we became familiar with the micro:bit and went through all of its components. In the next lesson, we will create the first micro:bit program in the MakeCode environment – a digital label that will display our name.