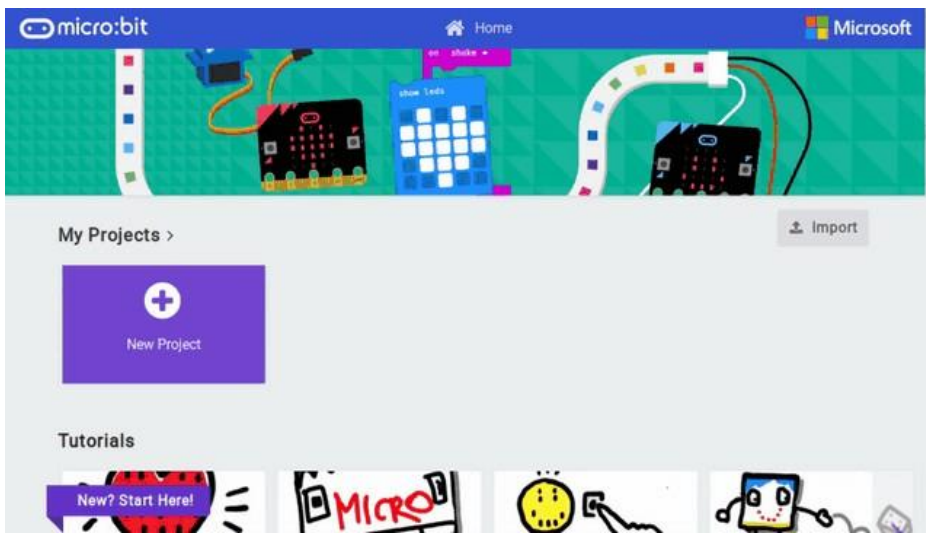


# DIGITAL LABEL

## PROGRAMMING OF DISPLAY



In this lesson, we will learn how to create a program in the MakeCode environment and upload it on micro:bit – our first program will be the creation of a digital label that will display your name. Then we will add pictures to the program.

### Material requirements:

BBC micro:bit, USB cable, micro:bit battery, computer connected to the Internet

We will work in the online environment on this website:

<https://makecode.microbit.org>

## WRITING TEXT ON THE DISPLAY

We are trying to make our first program in the online environment [makecode.microbit.org](https://makecode.microbit.org). In it, we will create a digital “label” that will display your name and some images. All we need is a BBC micro:bit and a micro USB cable.

Connect a Micro:bit to a computer with ordinary micro USB cable (the same cable is also used to power phones).



### Manual for programming in MakeCode:

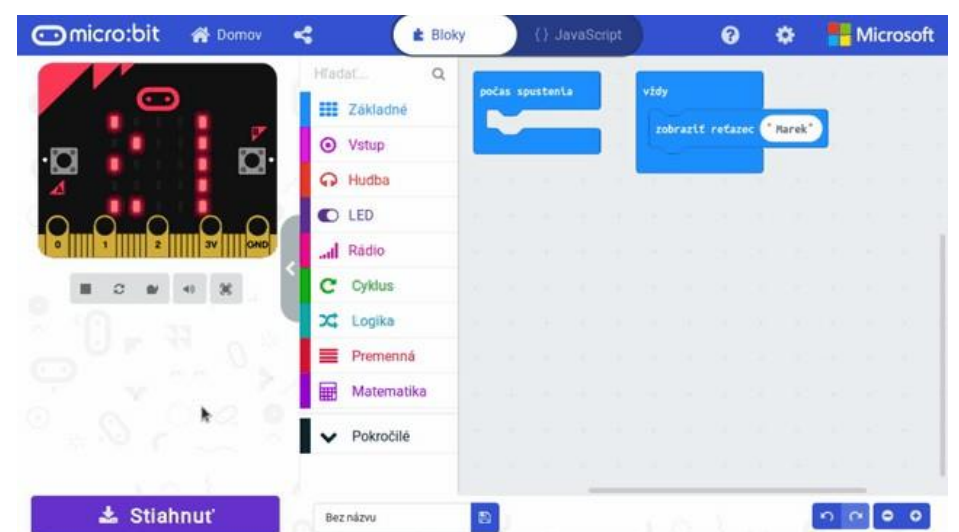
- creating a new project programming
- a program
- verification in the simulator (in the left part of the MakeCode environment)
- Download program to BBC micro:bit

In the MakeCode environment, click on **Nový projekt** (New project). If the environment opens in English, you can switch it by clicking on the gear wheel at the top right and select *Slovenčinu* (Slovak - or other language).

In our environment we have three parts:

- on the right is the place to create our program
- in the middle is a library of commands to use
- on the left is a simulator

To create a label, you have to write your name. To do this, use the command **zobrazí reťazec** (show string) from the category **Základné** (Basic), in which you insert **vždy** (forever). Then write your name in it, which you want to appear on the simulator.



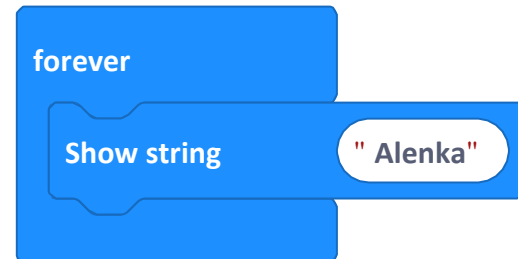
## STRING

A text string is a sequence of characters (letters, spaces, numbers, etc.). We use it in programming when we want to work with text (in this activity, that text is your name).

The simulator is a very practical tool that saves a lot of time – always check your program in it before uploading to the micro:bit itself.

When you are satisfied with your program, you can click on the **Stiahnúť (Download)** button, which will download the program with the .hex extension to your computer.

The last step we have left is to upload the newly created program to the micro:bit itself. You can connect it to a computer using a classic micro-USB cable, which is commonly used for mobile phones. You will then see on your computer that the micro:bit has connected as a USB device, as if it were a classic USB storage device. All you have to do is to copy the downloaded program with the .hex extension. Do not open or run the downloaded file on your computer. The micro:bit indicator LED should flash for a while and after a while the micro:bit will start showing your name. However, if you look back at the MICROBIT USB storage, you will not see the file with .hex extension there, even if it has already been uploaded to the micro:bit.



Edit and download: <http://makecode.microbit.org/X85Cks9pj4Ra>

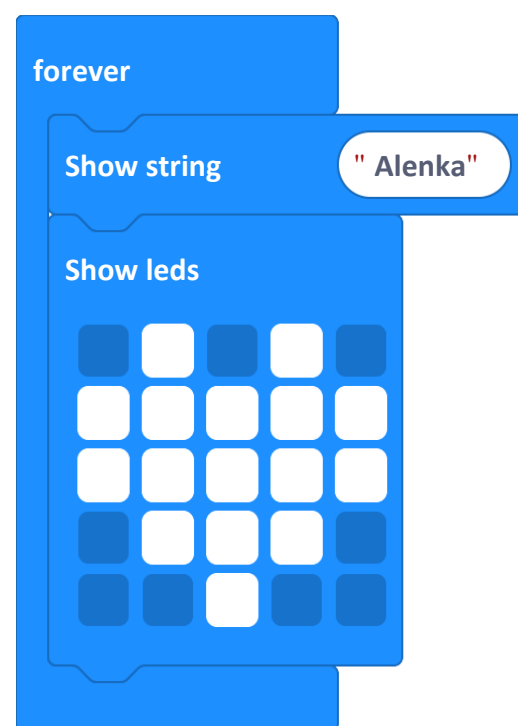
## WHY DOES THE LABEL NOT WORK?

- First of all, it is necessary to check the USB cable, or disconnect and reconnect the USB cable and try uploading again.
- Does the user have the right to access the USB ports on the computer? This is a problem especially company owned computers – then it is necessary to contact the administrator.
- The generated .hex file is usually downloaded (according to the web browser settings) to the “Downloads” directory. If the directory is filled with other unnecessary files, we recommend deleting unnecessary files so that you do not have to laboriously search for downloaded programs.

## DISPLAYING IMAGES

We want to add an image to our program using the command **zobrazíť LED (display LEDs)** from **Základné (Basic)** category. This command allows you to click on any image. Try clicking on the micro:bit heart image. We insert this command after the **zobrazíť reťazec (show string)** command.

We will check in the simulator whether the image is displayed correctly. Only then do we download the program to the micro:bit.

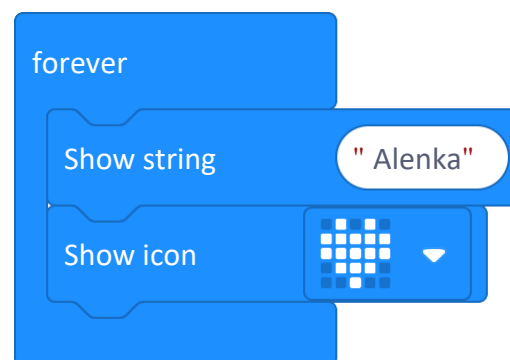


Edit and download: <http://makecode.microbit.org/f7jFu1UruaHK>

The second way we can add images to the micro:bit is the command **zobrazíť ikonu (show icon)** (category **Základné (Basic)**). This command already has predefined basic images.

## ADDITIONAL TASKS

- Add more pictures to the program, or alternative rotation of texts and pictures
- Use your own or pre-programmed images in the program



Edit and download:

<http://makecode.microbit.org/JwqbcRT8P0aD>

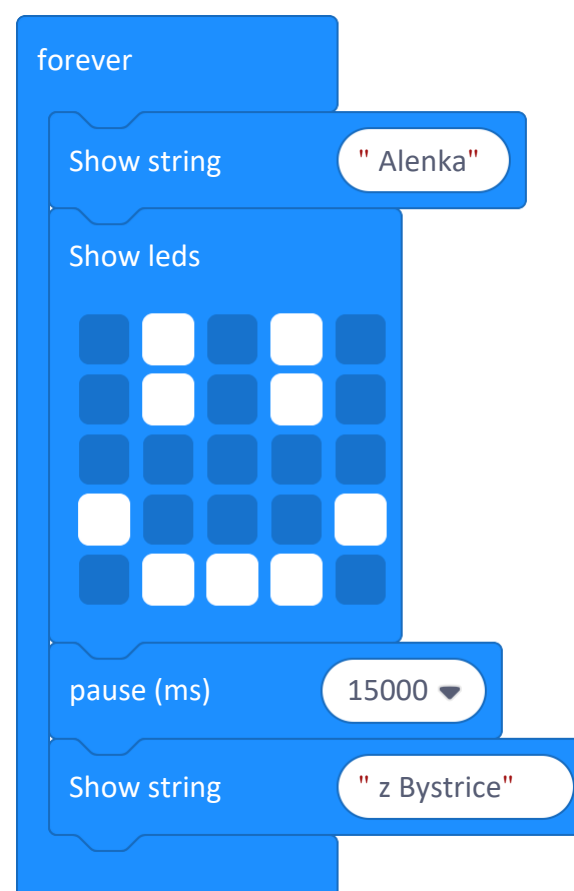
## PAUSES BETWEEN COMMANDS

Our digital label is currently displaying your name and some image. What should we do if we want the image to remain displayed on the micro:bit longer – for example 15 seconds? This can be done quite easily with the command **pause (ms)** from category **Basic**. This command pauses program execution for the set number of milliseconds.

## MILLISECONDS

A millisecond (abbreviation ms) is a unit of time – one millisecond is a thousandth of a second, so one second has a thousand milliseconds. Some examples:

- 500 ms = half a second
- 2000 ms = two seconds
- 10 000 ms = ten seconds



Edit and download: <http://makecode.microbit.org/qHx19V3wU6RT>

## FINAL QUESTIONS

- Does it matter if you put a pause command before or after **show leds**? (Try it)
- What does the micro:bit **pause (ms)** do while executing the command? (Nothing just waiting)

## LESSON SUMMARY

In this lesson, we programmed our “digital label”. If you want to use it now, you can disconnect the micro:bit from the USB cable and connect the battery to the micro:bit. Even after connecting to the battery, your program will remain stored on the micro:bit and will start automatically.