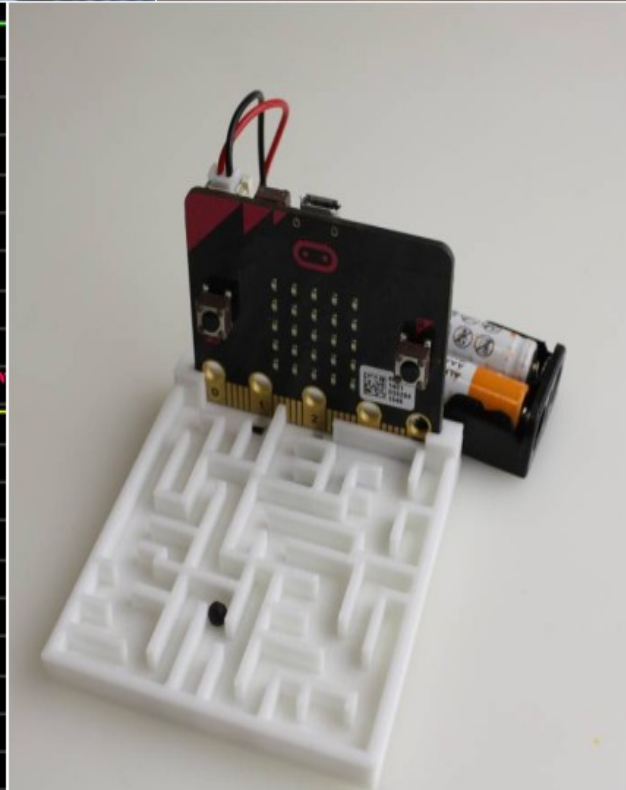
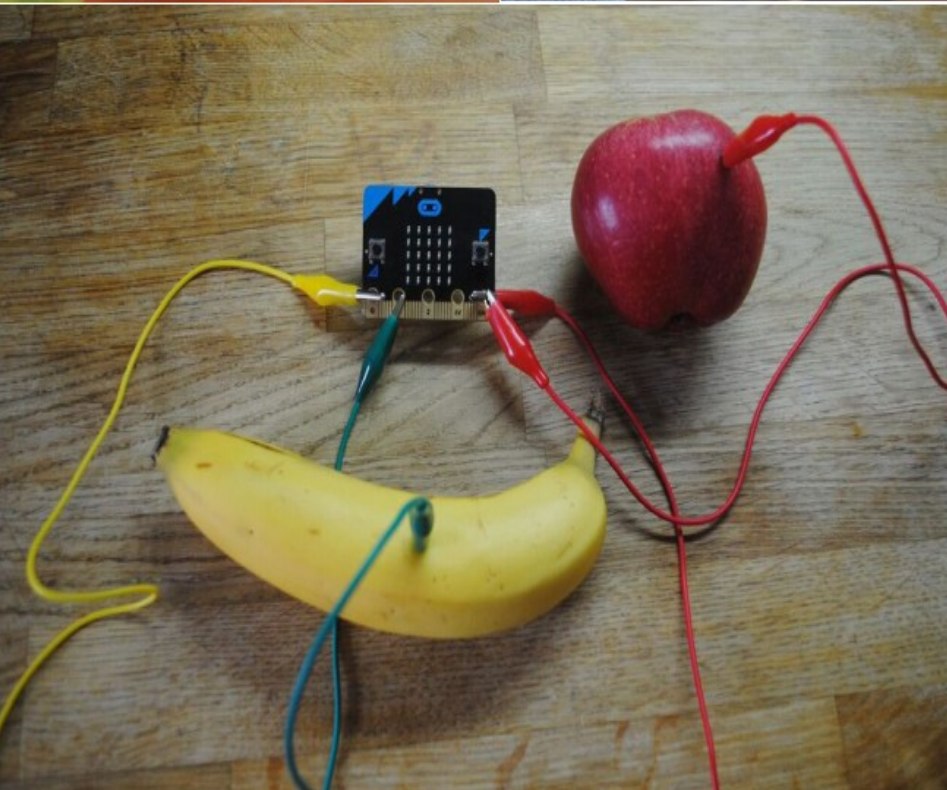
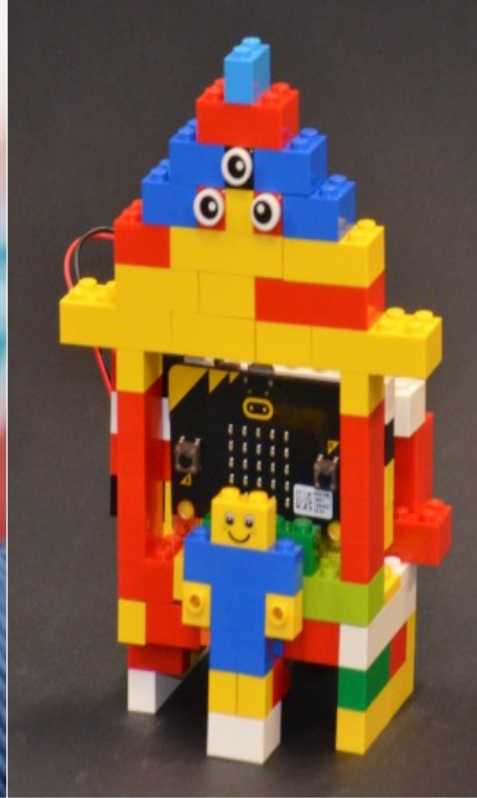
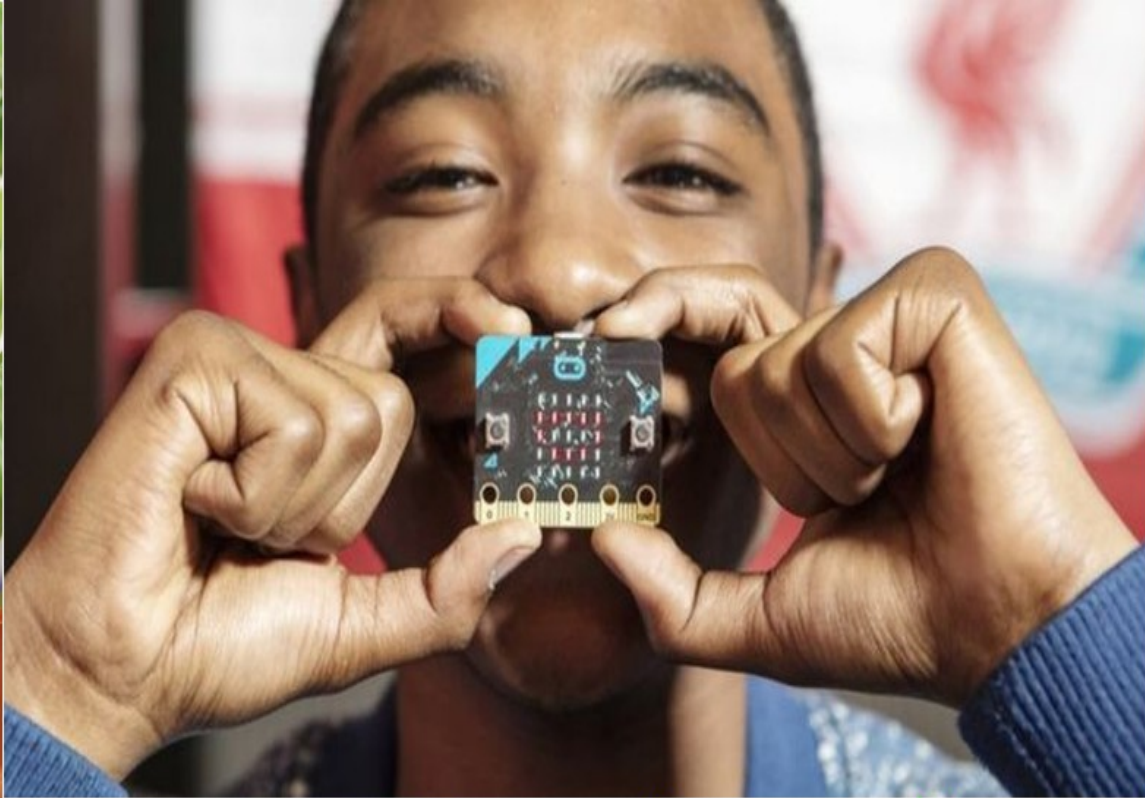


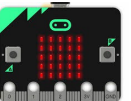
Úvod pre micro:bit

Richard Balogh





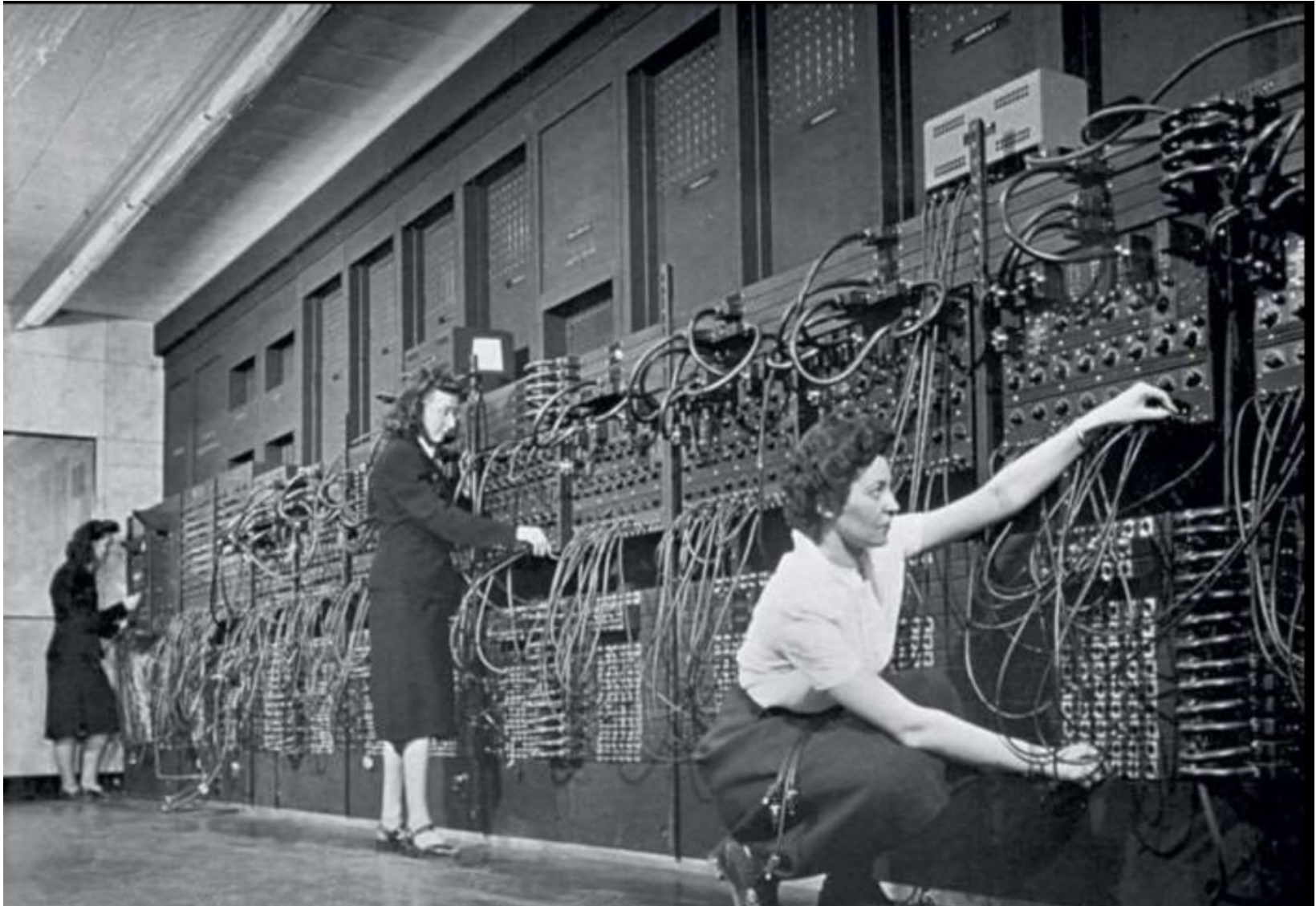
Richard Balogh



 micro:bit

prečo?

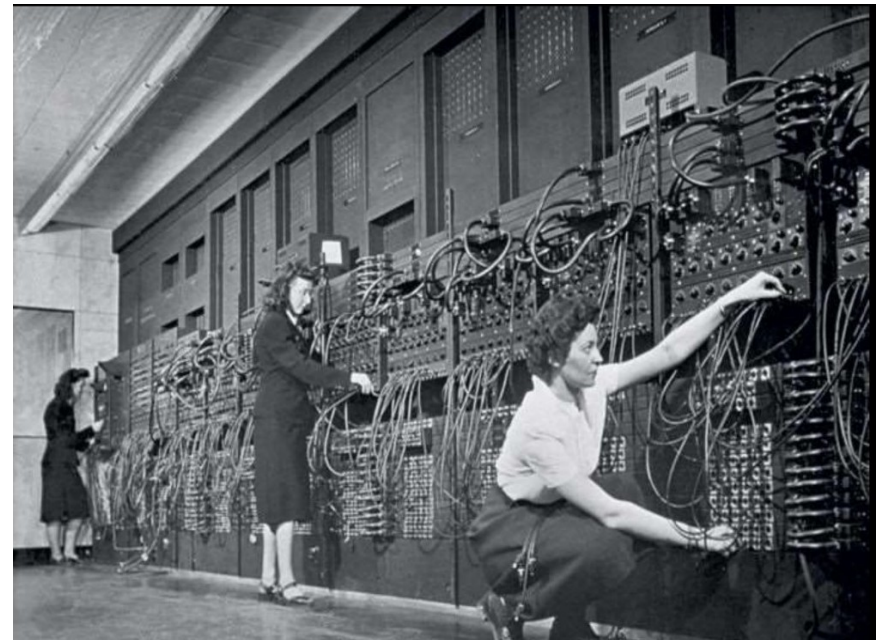
Physical Computing



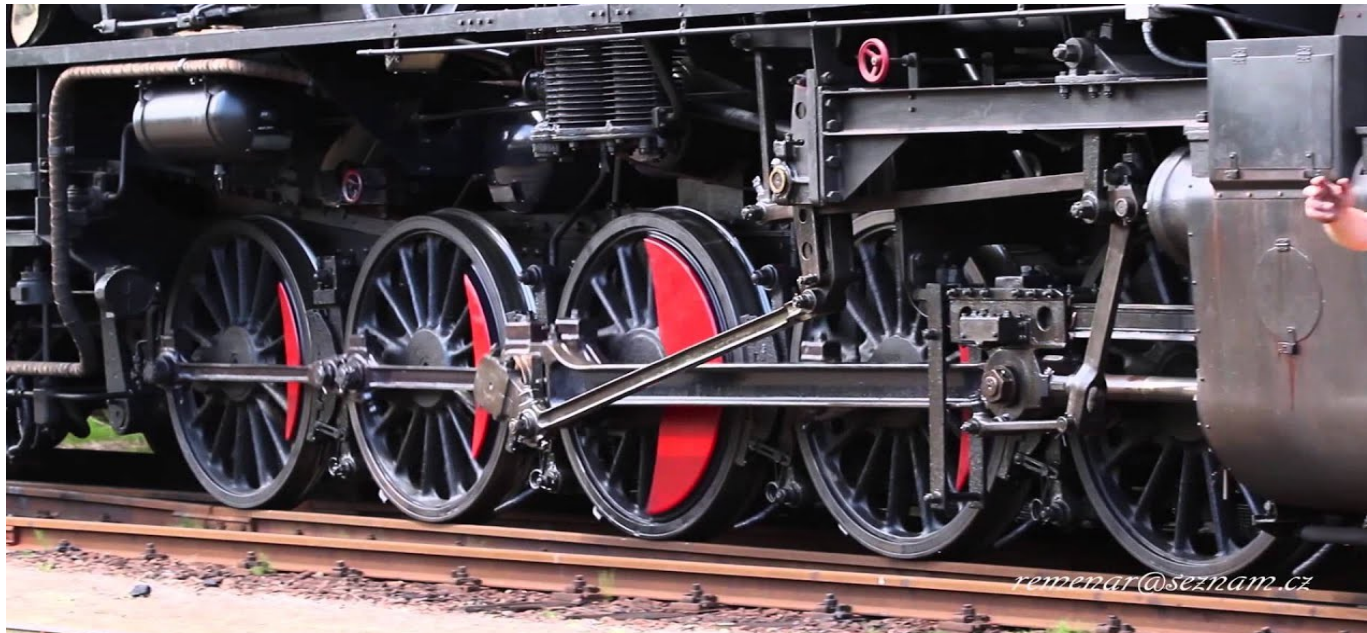
Embedded Computing



Play Games With the Entire Family!



Steampunk style



Dizajn - konečný

Opravy

Doplňky

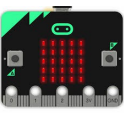
Viditeľná funkcia

Pochopenie

Rýchlosť

Ľudská mierka

vývoj SW



```
.ORG    0030h
DB      03h,01h,02h,03h
.ORG    0000

LDA      0030H
MOV      C,A ; Initialize C-counter
SUB      A ; sum = 0
LXI      H,0031H ; Initialize
BACK:    ADD      M ; SUM = SUM + data
INX      H ; increment pointer
DCR      C ; Decrement counter
JNZ      BACK ; if counter 0
STA      040H ; Store sum
```

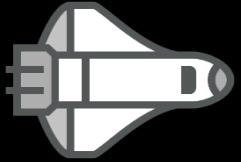
```
for (;;)
{
    c = (char)rand();
    printf("%d,%d\r", (int)(100*(sin(x)+1)), c);
    if (c>245)
        printf("Alarm! Temperature HIGH!!!\r");
    if (c<5)
        printf("Alarm! Temperature LOW!!!\r");
    _delay_ms(300);
    x=x+0.1;
}
return 0;
} /* End Of Main */
```

```
from microbit import *

display.show(Image.YES)

while True:
    if button_a.is_pressed() and button_b.is_pressed():
        display.show(Image.HEART)
        sleep(500)
    elif button_a.is_pressed():
        display.show(Image.HAPPY)
    elif button_b.is_pressed():
        display.show(Image.SAD)
```

σύνοψ HW



4+1

1 MB pamäte

550 W

29 kg

1,2 MIPS

6000 x

100 x

150 x

8000 x

4+4

6 GB RAM + 64 GB sd

5 W

191 g

10 000 MIPS



miniaturizácia



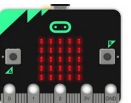
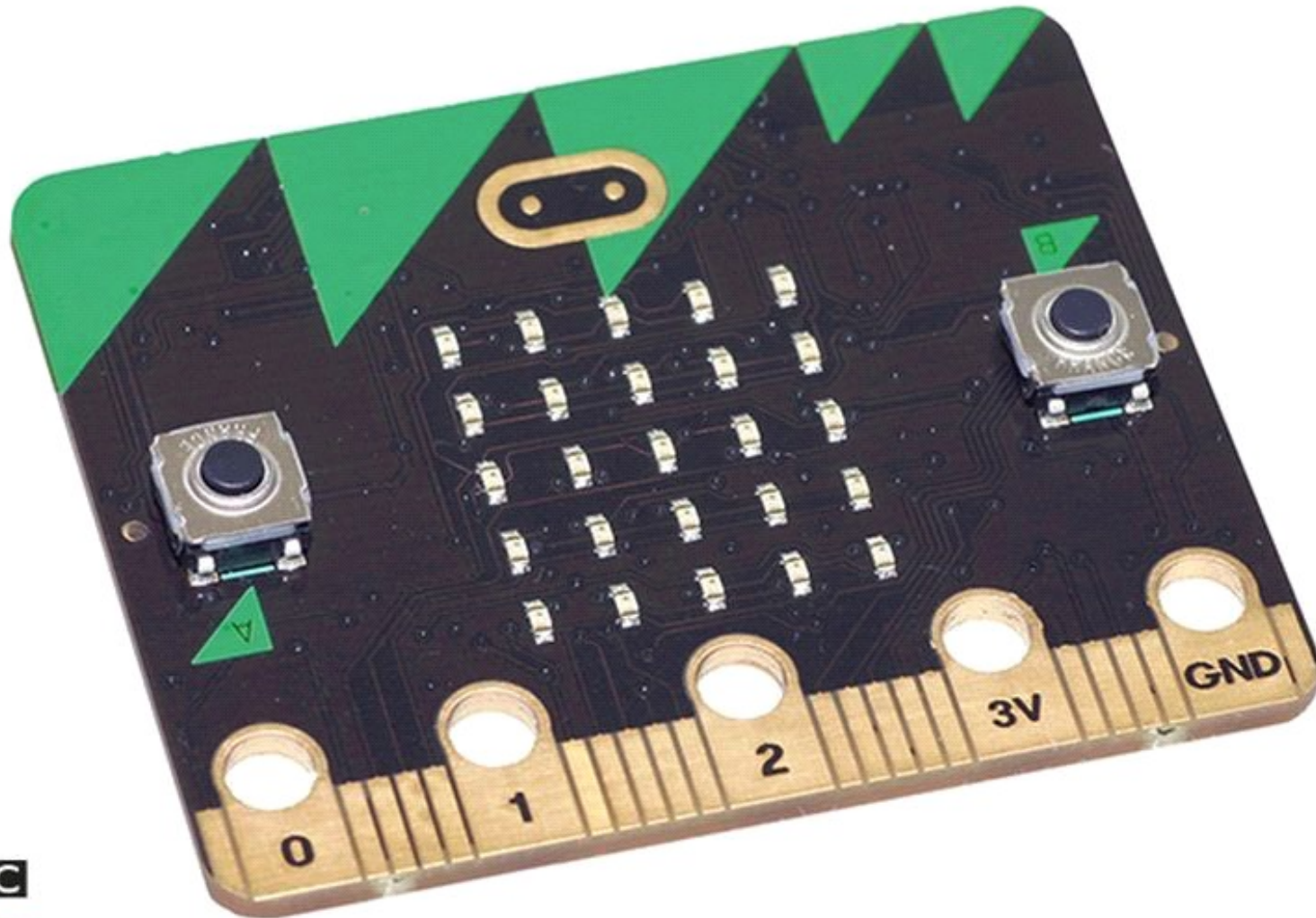


1

1981: BBC micro Computer literacy project



2016: BBC micro:bit



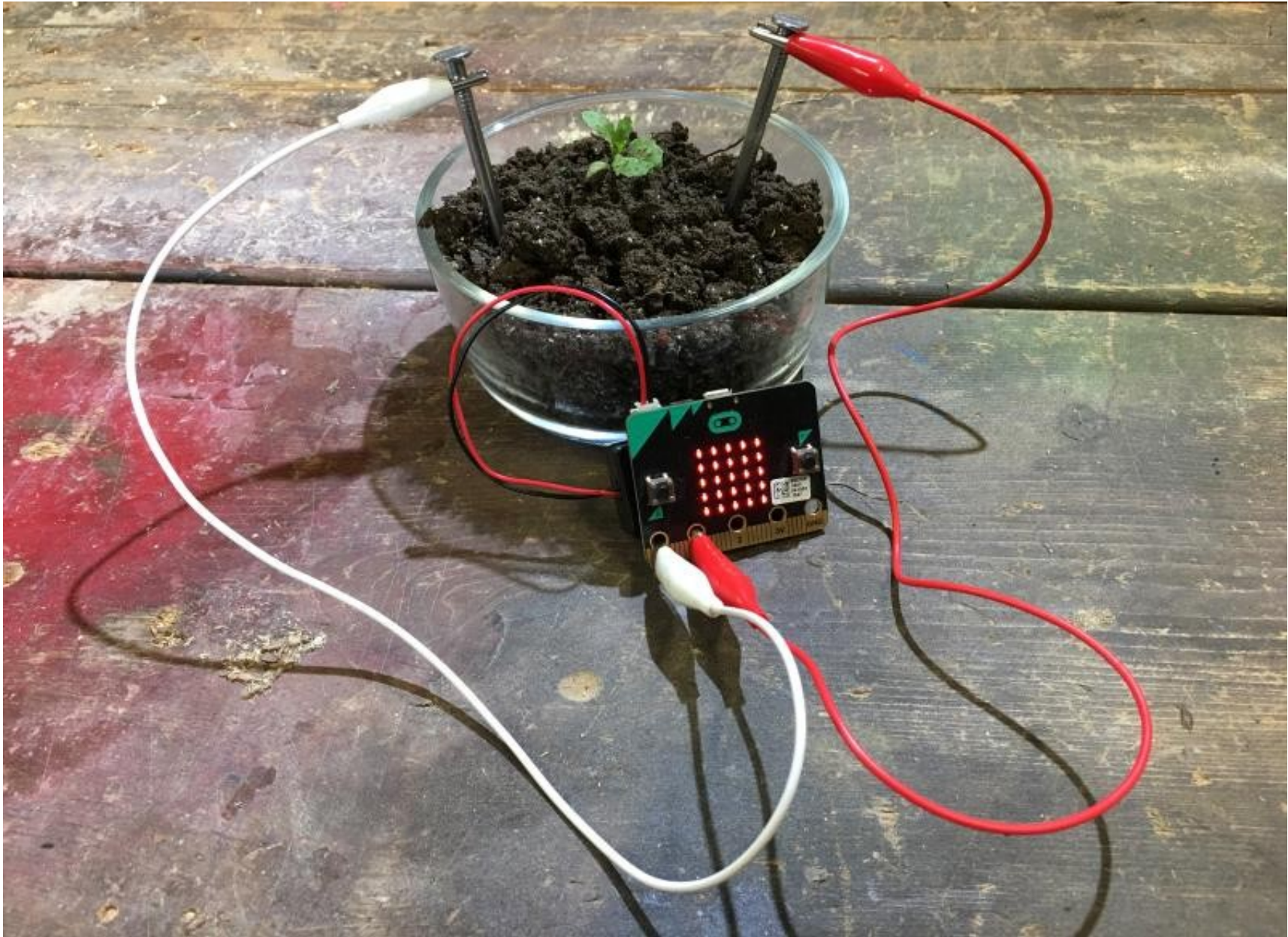
projekty



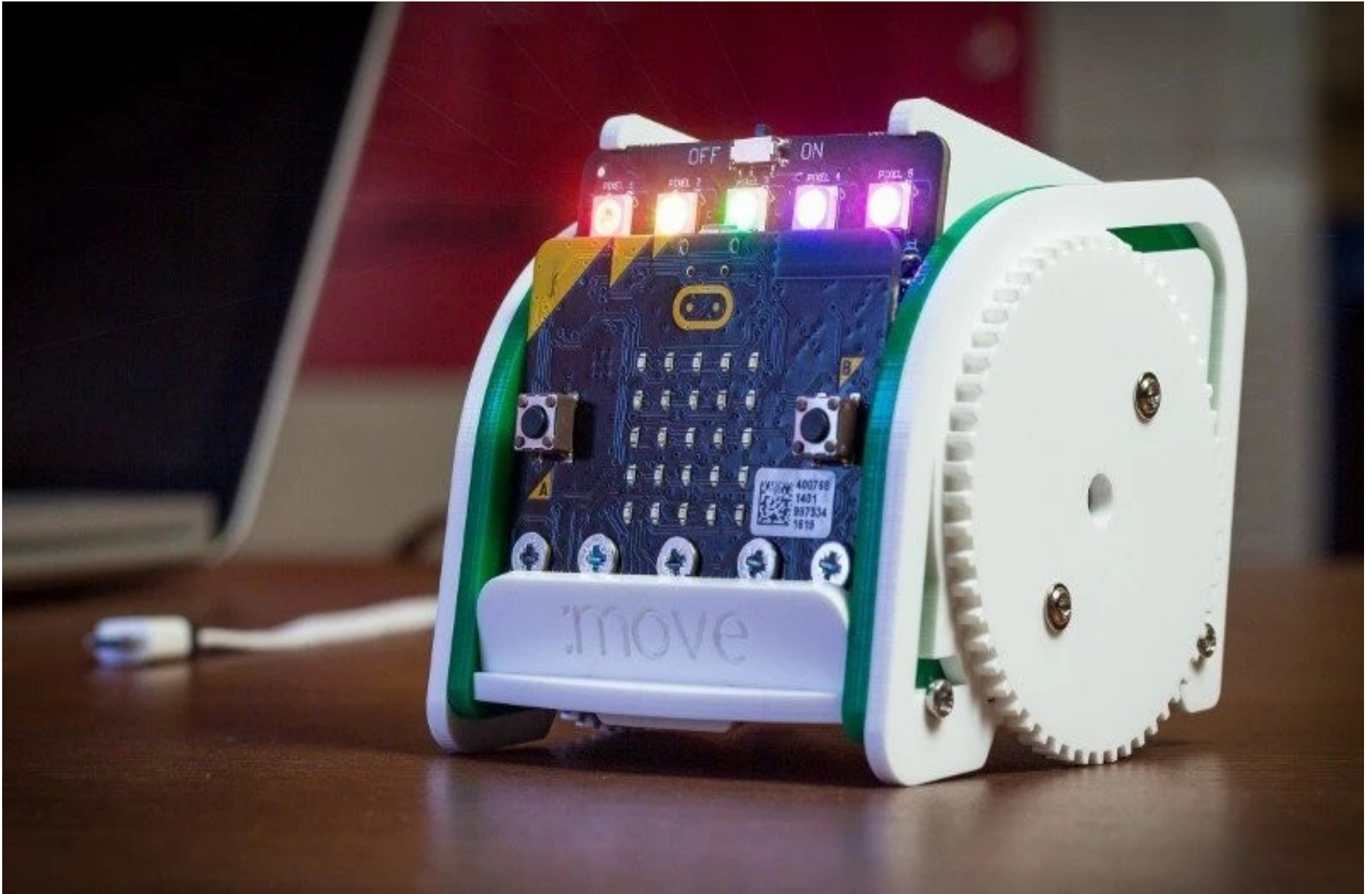
projekty



projekty



projekty



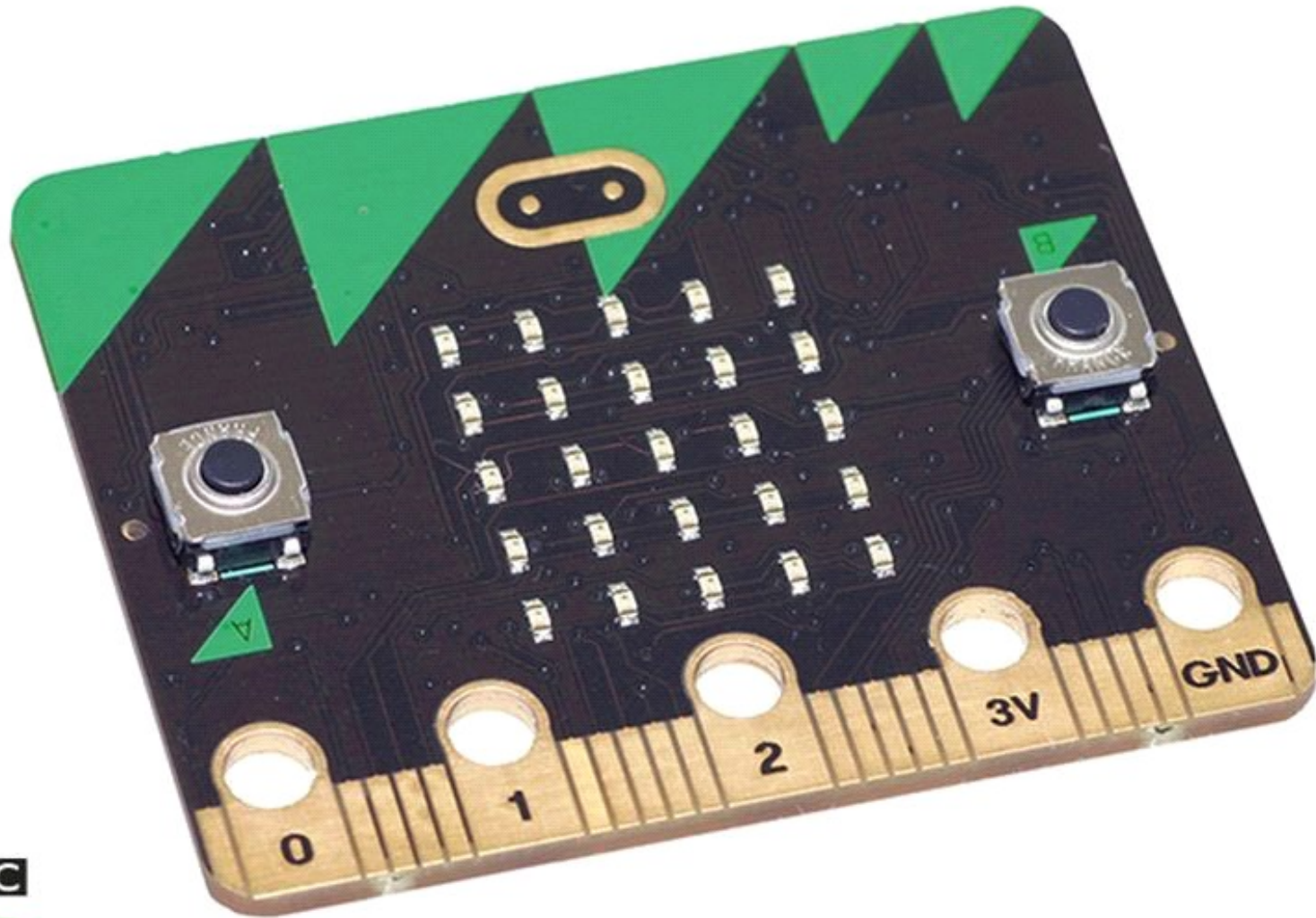
projects





2

2016: BBC micro:bit





Bluetooth ®Smart antenna

32-bit ARM ®Cortex™M0 CPU

Micro USB connector

16K RAM 16MHz with Bluetooth Low Energy

5 cm

4 cm

2 programmable buttons

10 g

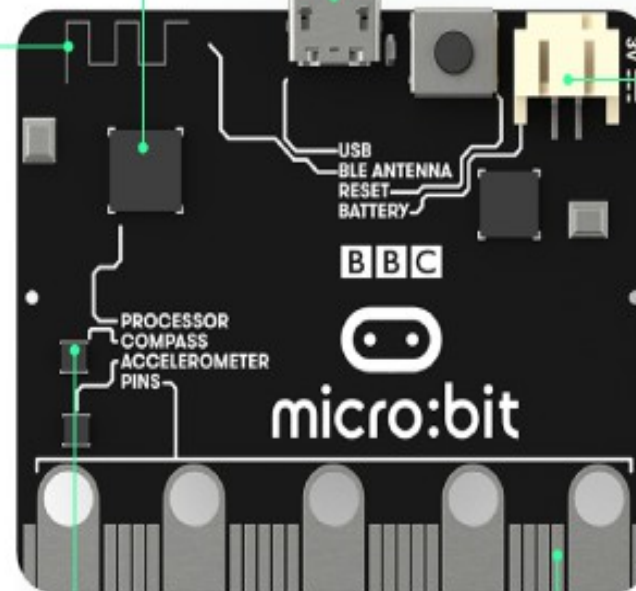
3 digital/analogue input/output rings

25 individually programmable LEDs

power port

ground back port

FRONT



battery connector

USB
BLE ANTENNA
RESET
BATTERY

BBC

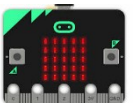
PROCESSOR
COMPASS
ACCELEROMETER
PINS

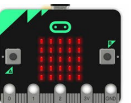
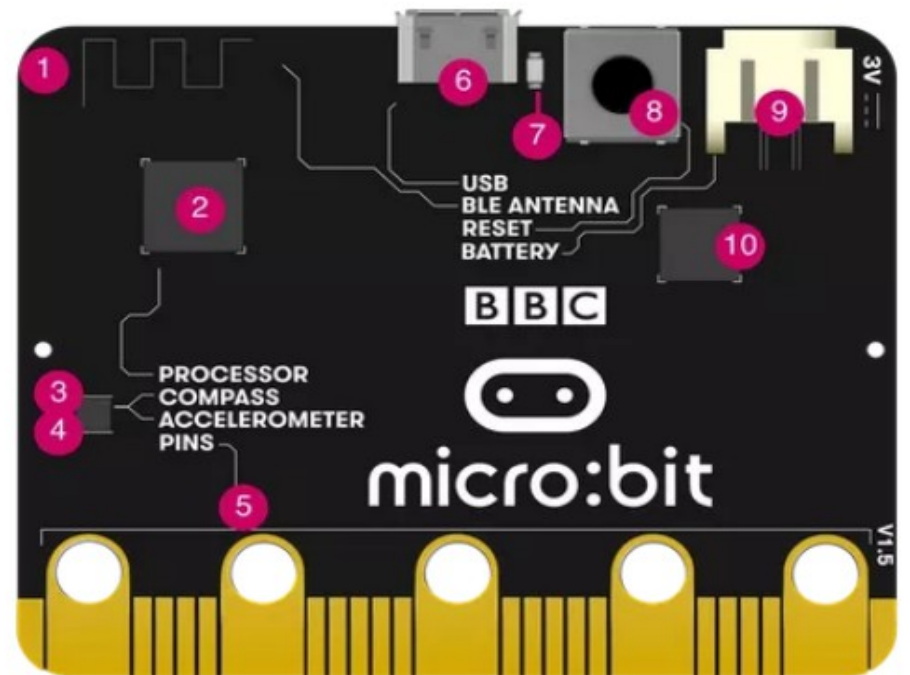
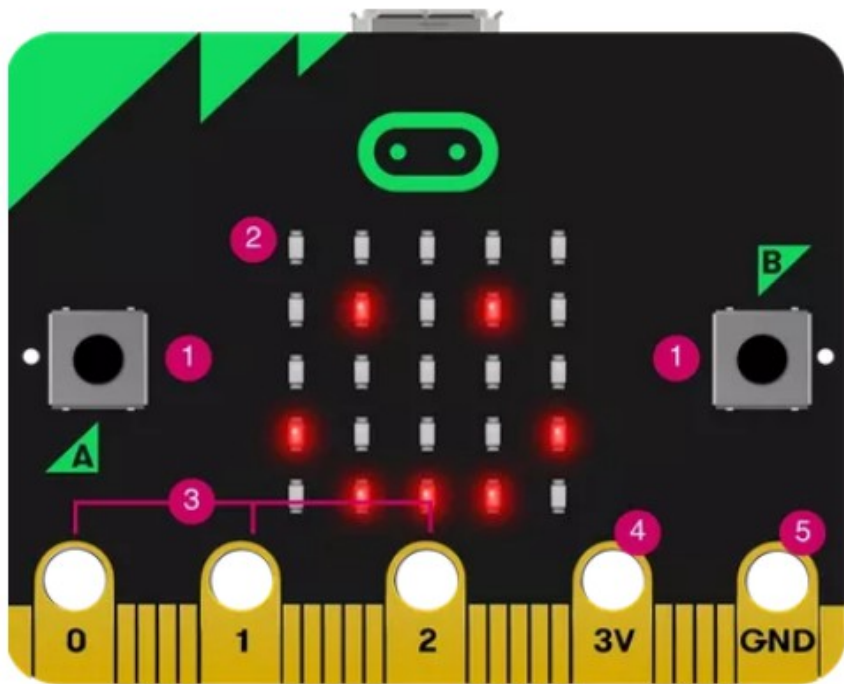
micro:bit

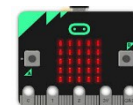
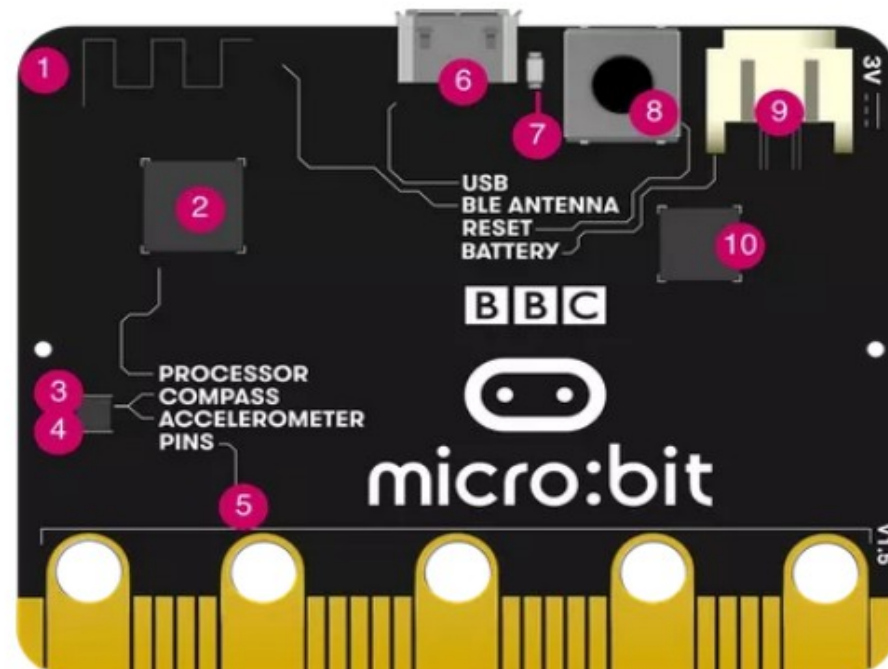
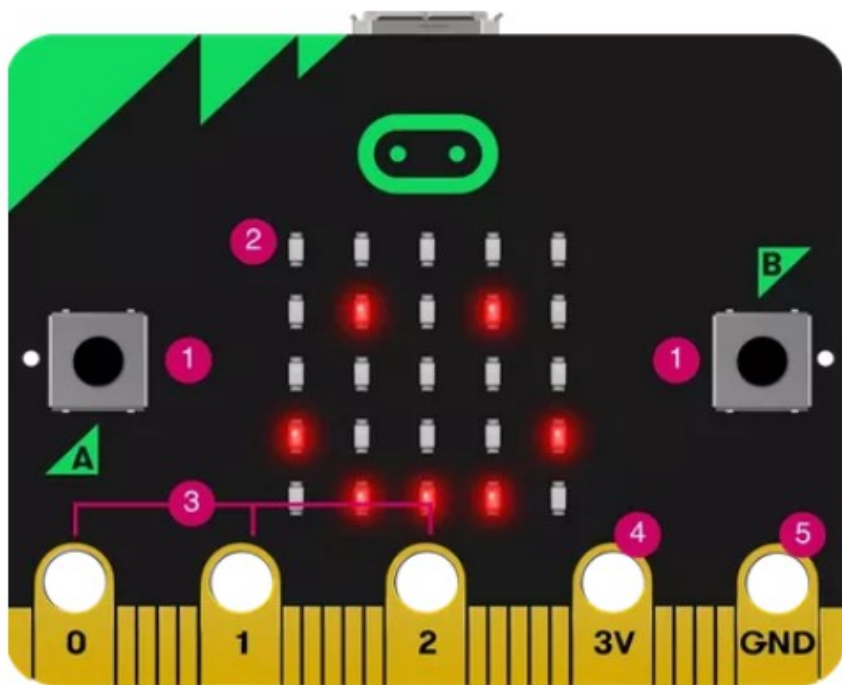
accelerometer and compass

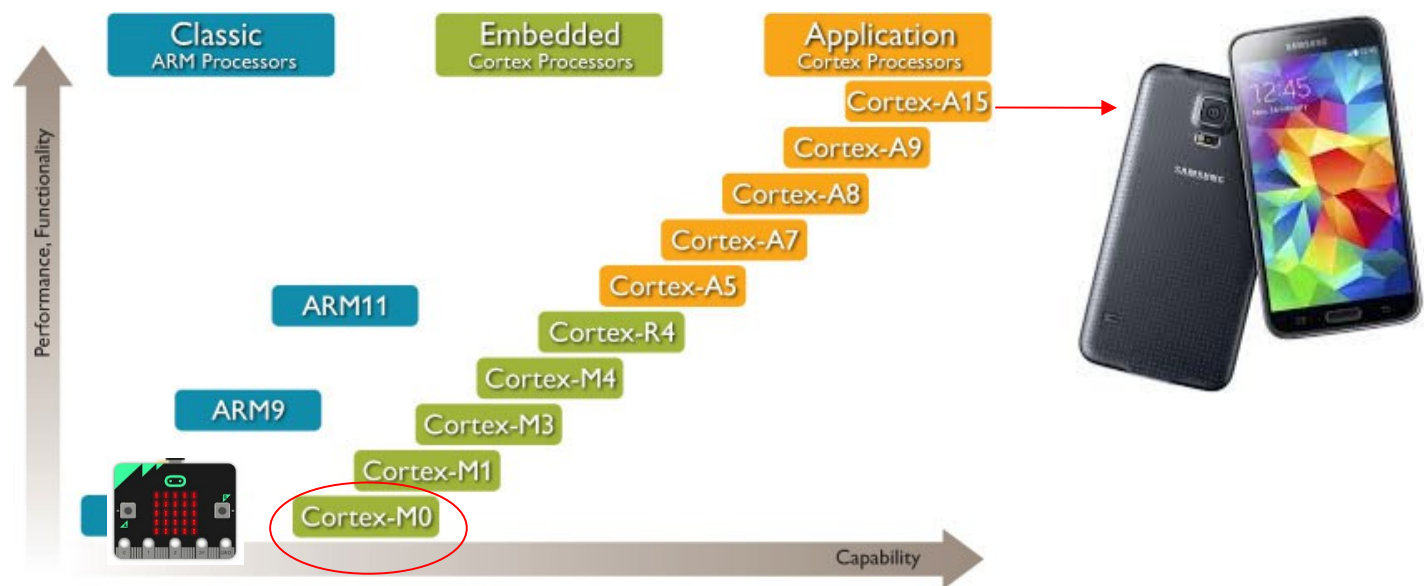
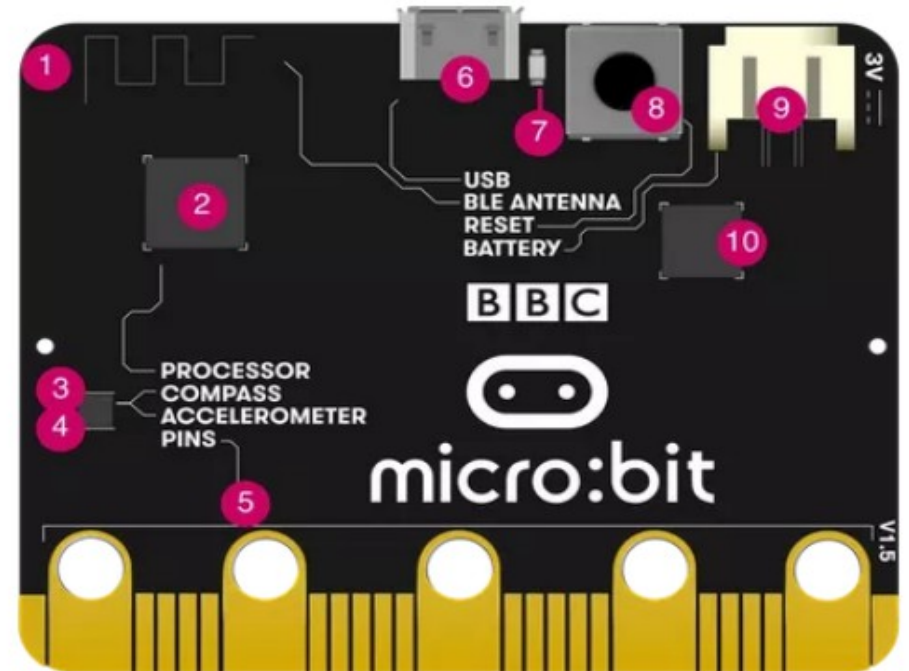
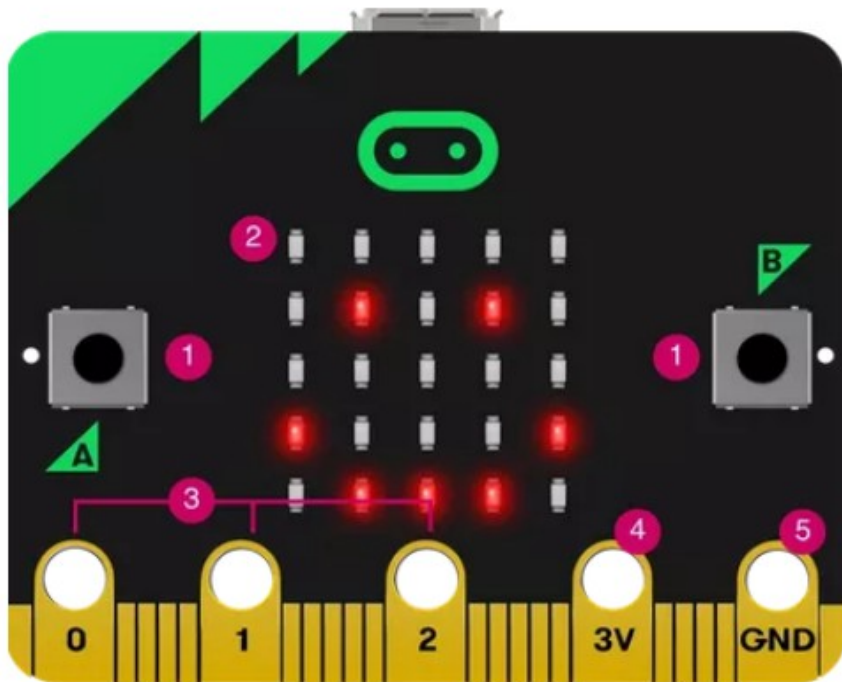
20 pin edge connector

BACK

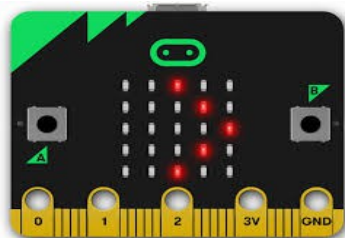








Singleboard computer (SBC) Embedded computer



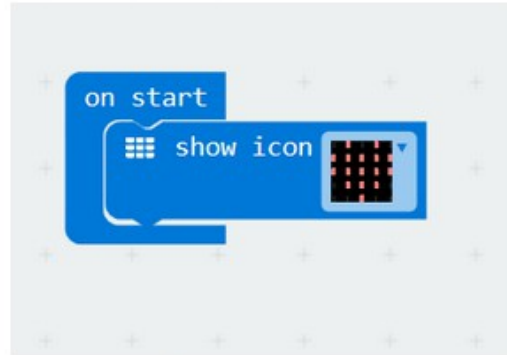
micro:bit ??



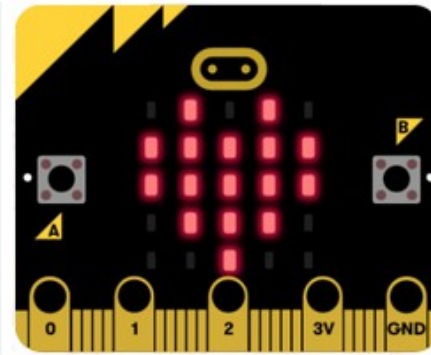
3

micro:bit

možnosti programovania



Prvý program...



...bude vyzerat' v simulátore takto.

Javascript

```
basic.showIcon(IconNames.Heart)
```

Python

```
from microbit import *  
  
display.show(Image.HEART)
```

C++

```
#include "MicroBit.h"  
  
MicroBit uBit;  
MicroBitImage Heart("0,1,0,1,0\n  
                    1,0,1,0,1\n  
                    0,1,0,1,0\n  
                    1,0,1,0,1\n  
                    0,1,0,1,0\n"); // 5x5 image  
  
int main()  
{  
    uBit.init();  
    uBit.display.print(Heart);  
    release_fiber();  
}
```

micro:bit

<https://makecode.microbit.org/>

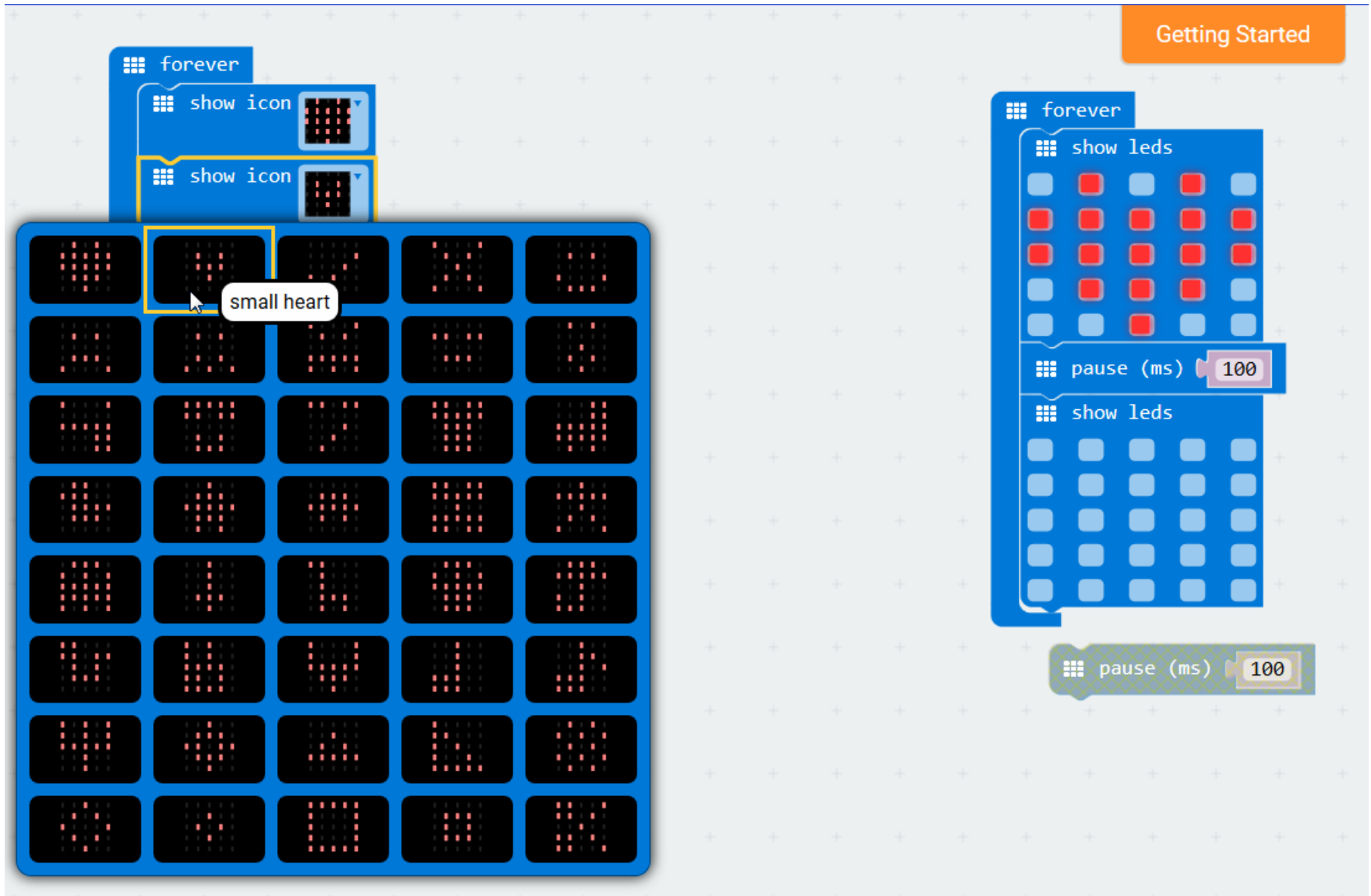
The screenshot displays the micro:bit MakeCode editor interface. At the top, the 'micro:bit' logo is on the left, and 'Projects' and 'Share' icons are in the center. On the right, there are tabs for 'Blocks' and 'JavaScript'. The main workspace is divided into three sections:

- Simulation:** On the left, a virtual micro:bit is shown with its 5x5 LED matrix. The matrix displays a pattern of red and yellow lights. Below the simulation are control buttons: a square button (highlighted with a tooltip that says 'Stop the simulator'), a refresh button, a share button, a volume icon, and a full-screen icon.
- Block Palette:** In the center, a vertical menu lists various code blocks categorized by color: Basic (blue), Input (purple), Music (orange), Led (dark blue), Radio (pink), Loops (green), Logic (teal), Variables (red), Math (purple), Advanced (grey), Functions (blue), Arrays (orange), Text (brown), and Game (teal). A search bar is located at the top of this menu.
- Code Editor:** On the right, a 'forever' loop block is visible. Inside the loop, there are two 'show leds' blocks, each followed by a 'pause (ms)' block set to 100. The 'show leds' blocks are represented by a 5x5 grid of colored squares.

At the bottom of the interface, there is a 'Download' button on the left and a file name '01blinky' with a save icon on the right.

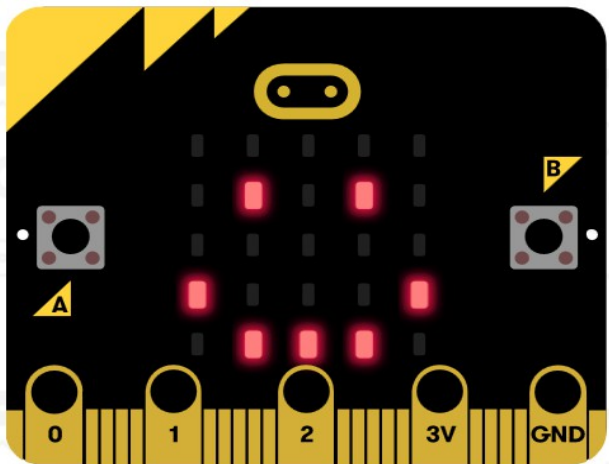
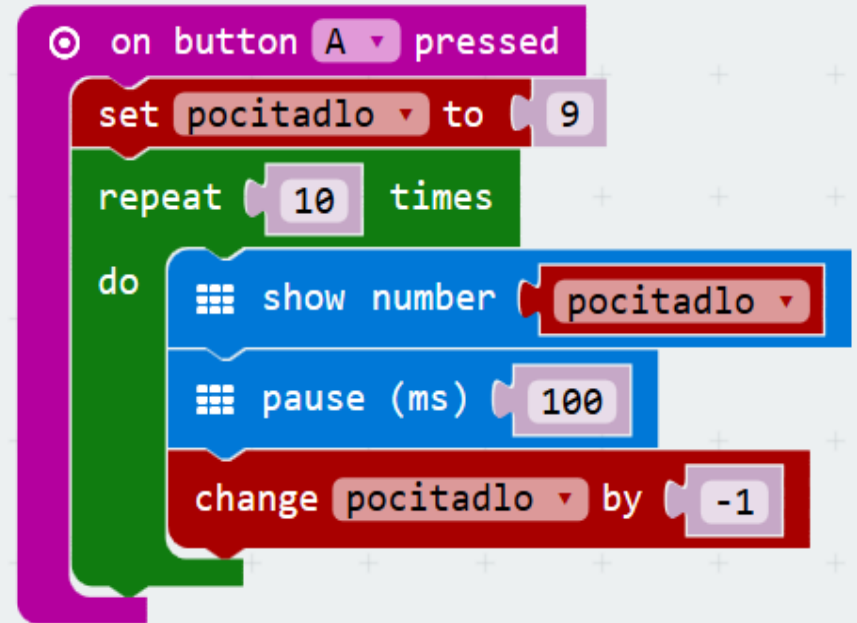
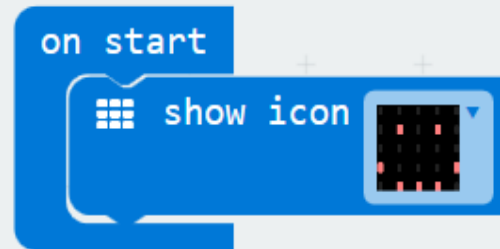
micro:bit

program01



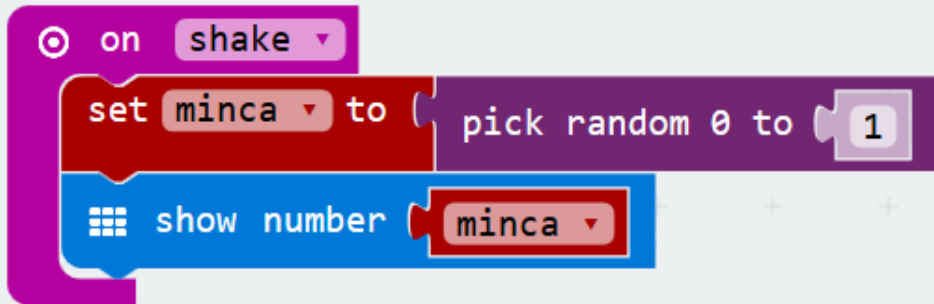
micro:bit

program02

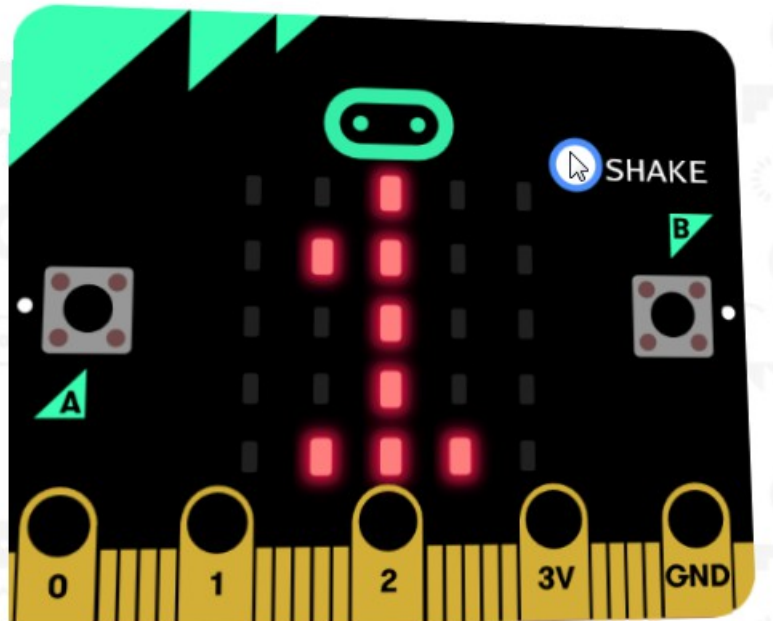


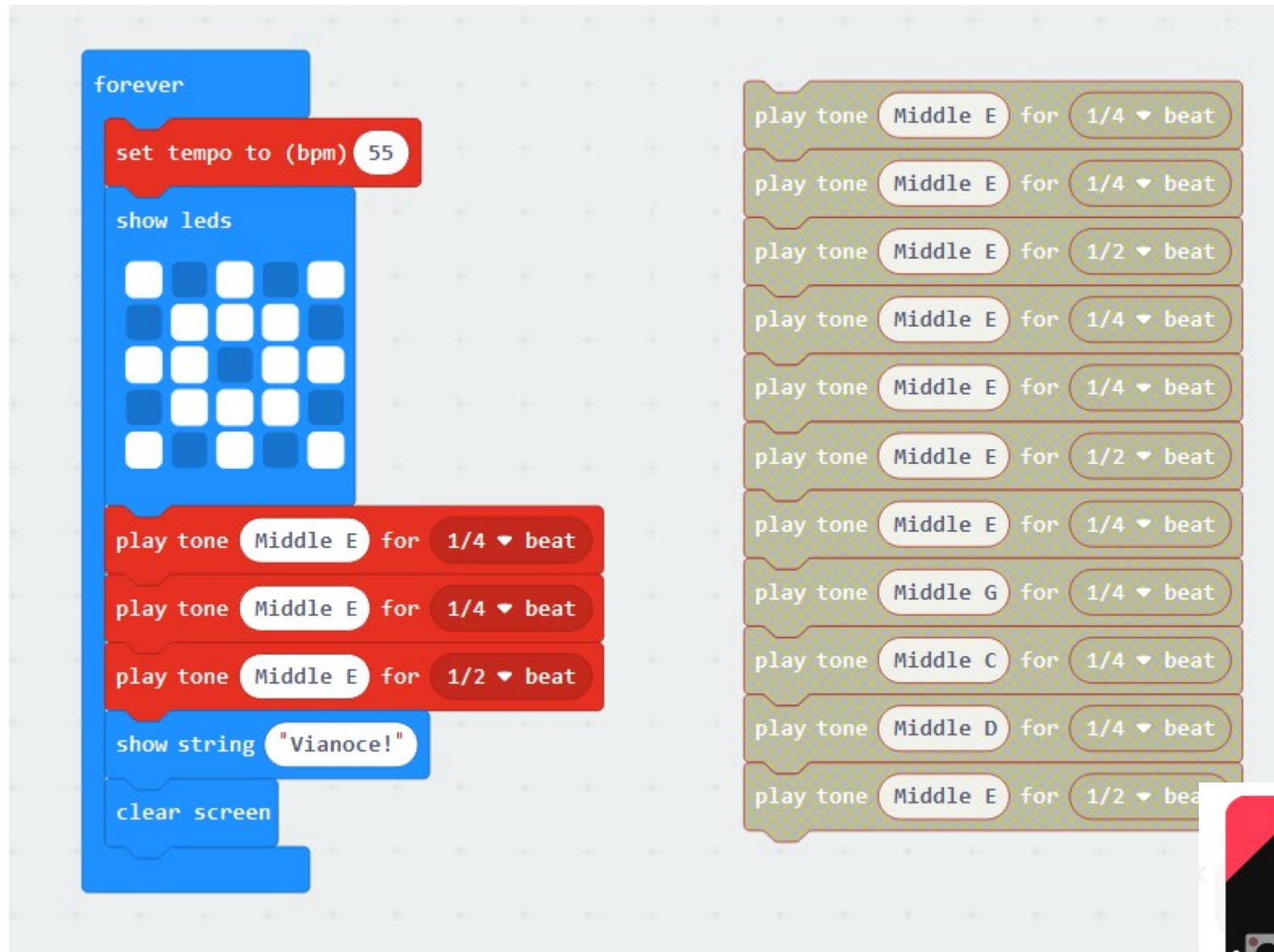
micro:bit

program03

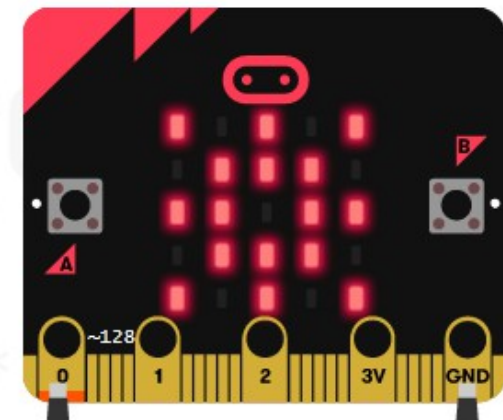


```
1 let minca = 0
2
3 input.onGesture(Gesture.Shake, () => {
4     minca = Math.random(2)
5     basic.showNumber(minca)
6 })
7
```





https://makecode.microbit.org/_WWw58u78aVd5



Sheet music supplied by: www.music-scores.com

Jingle Bells

TRADITIONAL
arr. A.L.Christopherson

Piano

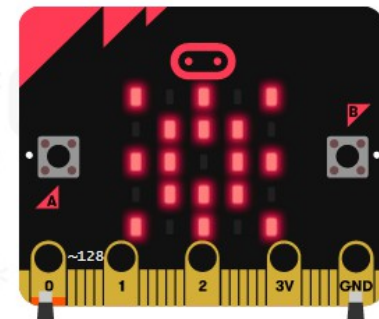
4

7

11

14

Jingle bells, jingle bells,
Jingle all the way,
Oh what fun it is to ride
In a one horse open sleigh. Oh!





Kohútik jarabý



Sheet music for the song "Kohútik jarabý" (The Cockle). The music is written in 2/4 time, with notes and lyrics provided for two staves.

Staff 1:

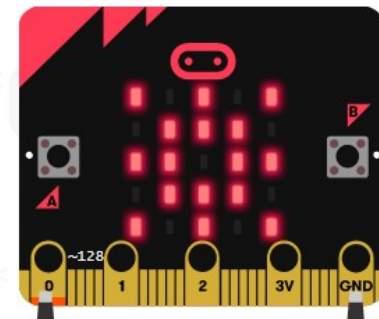
Notes: C D E | F F F | F E D | E E E

Lyrics: Ko - hú - tik | ja - ra - bý, | ne - chod' do | zá - hra - dy,
A keď ťa | za - bi - jú, | tak ťa po - | cho - va - jú,

Staff 2:

Notes: E D C | D D D | D E D | C C C

Lyrics: po - lá - meš | ľa - li - u, | po - tom ťa | za - bi - jú.
do - ta - kej | zá - hra - dy, | kde pá - ni | se - da - jú.

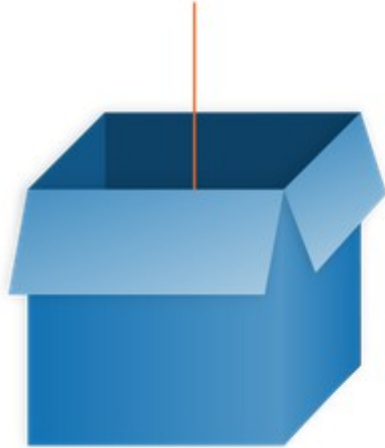




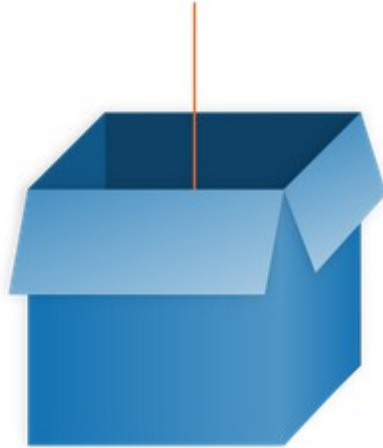
4

Premenná variable

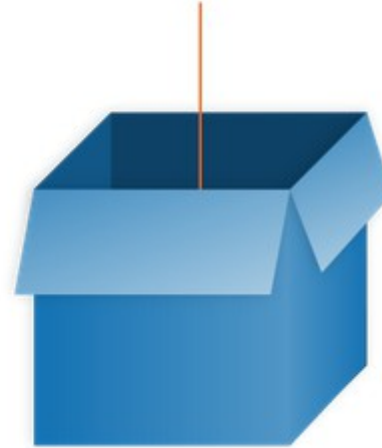
"Bob"



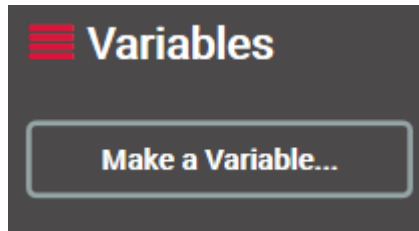
true



35

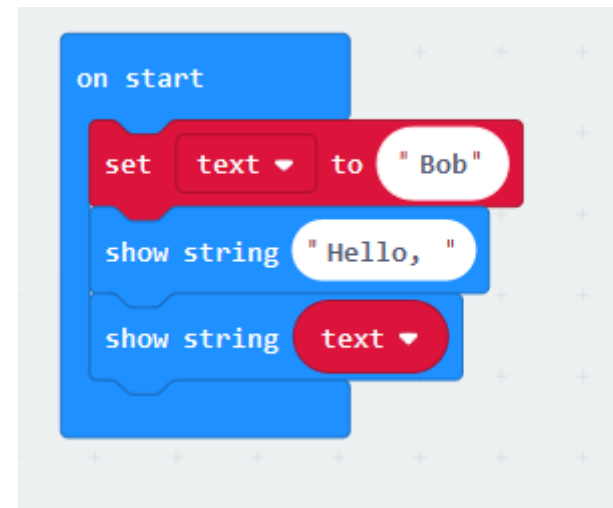
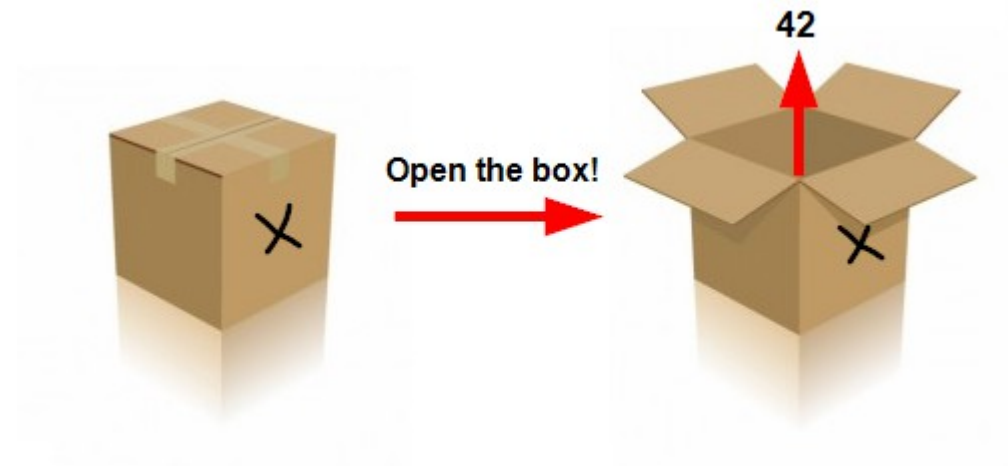


Premenná variable



```
int x;  
x = 42;  
x = x + 1;
```

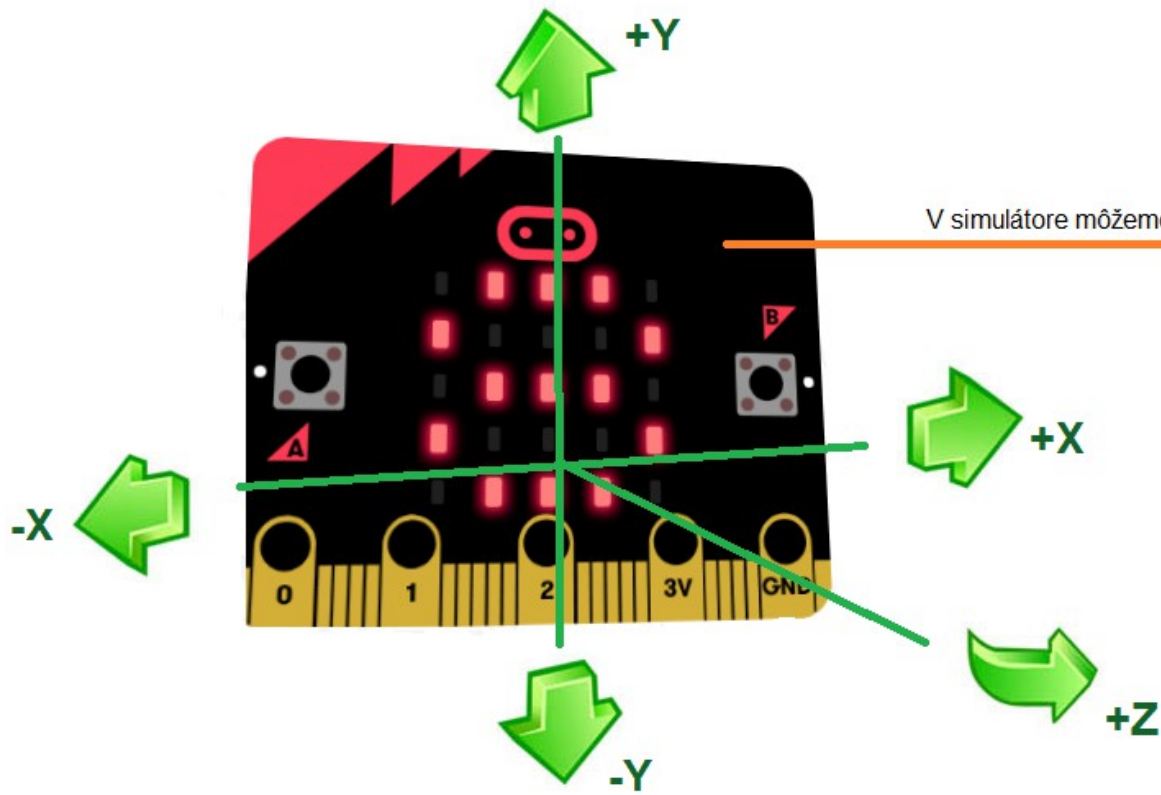
C++



```
let text = "Bob"  
basic.showString("Hello, ")  
basic.showString(text)
```

javascript

Akcelerometer

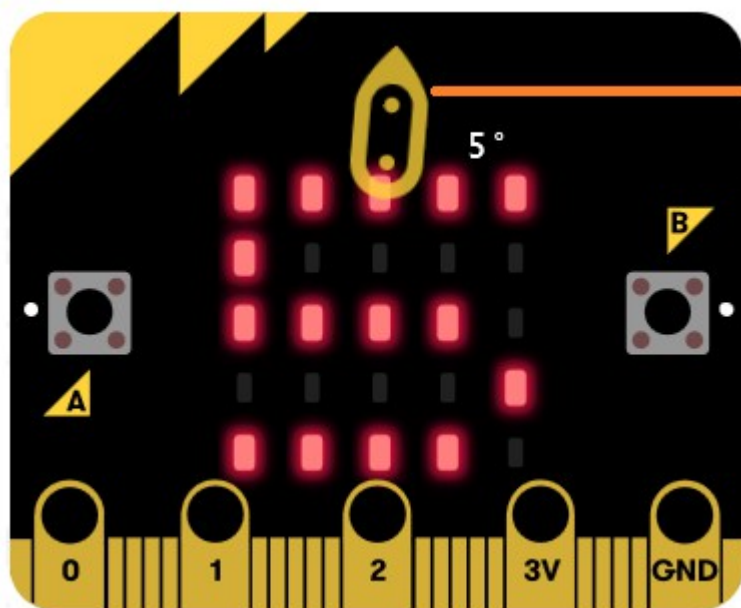


V simulátore môžeme potriasť pomocou myšky

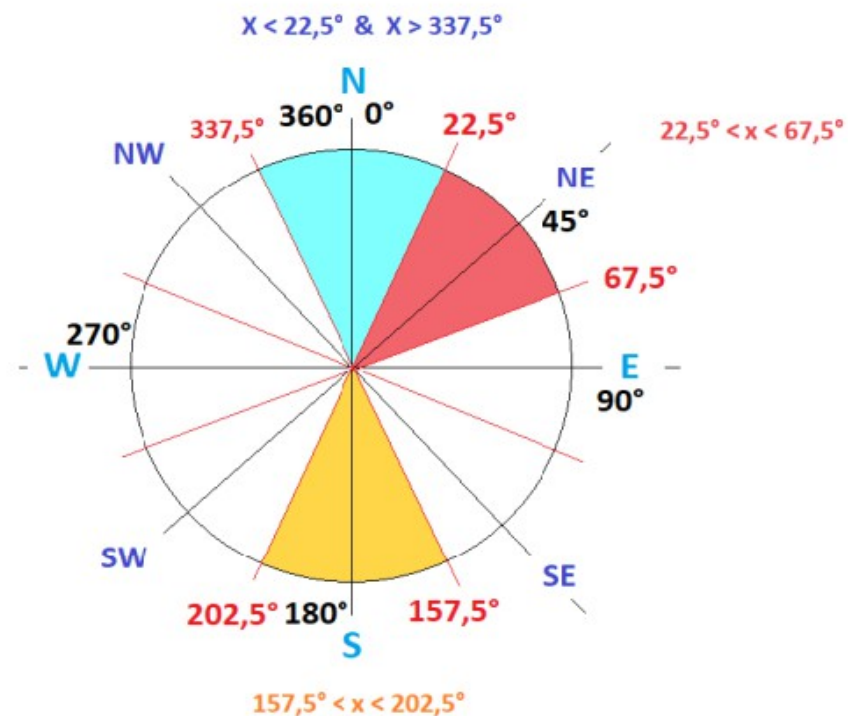
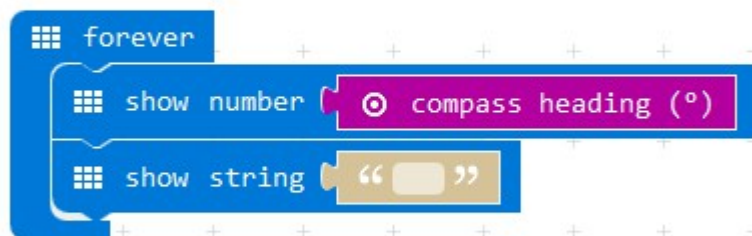


Voľba osi

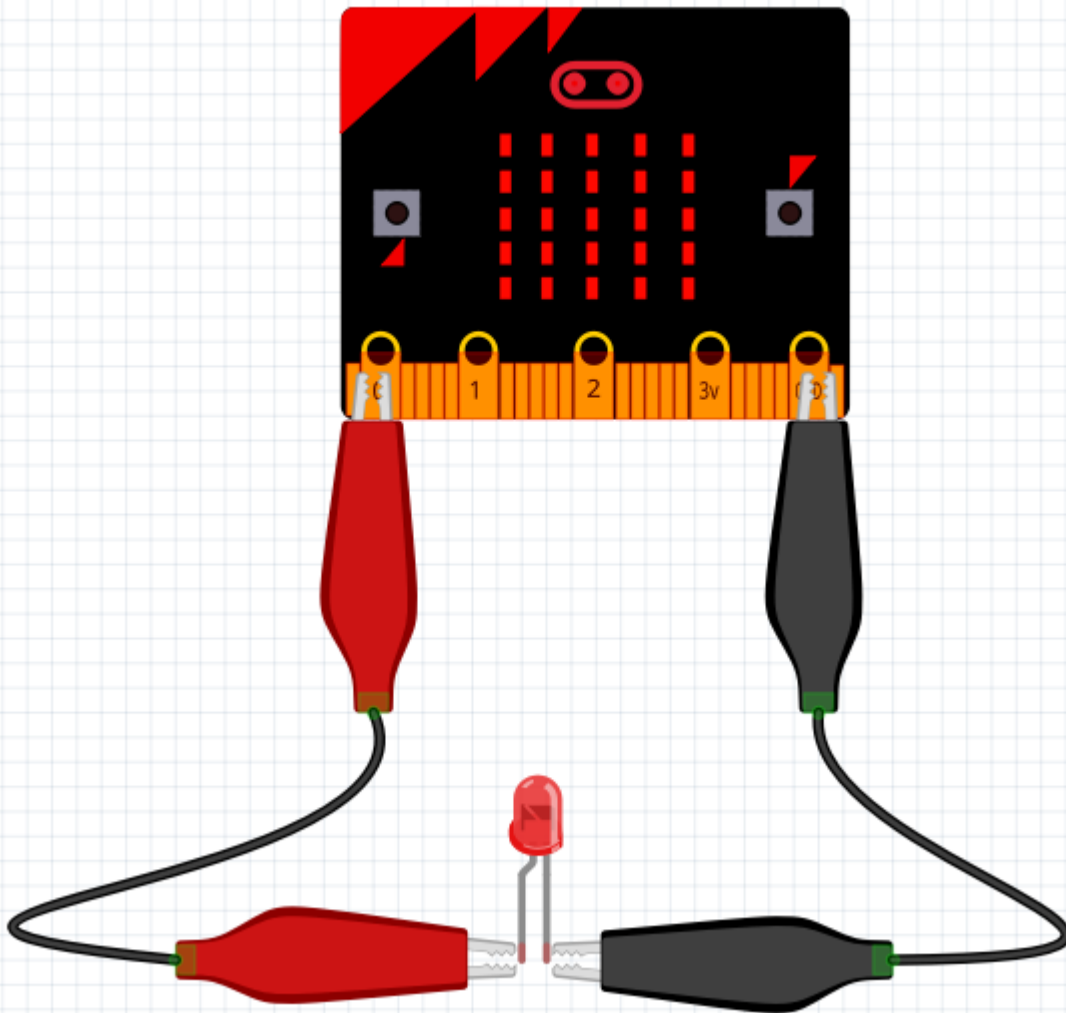
Snímač magnetického pole



V simulátore môžete natáčať túto šípku



Pripojenie externej LED



forever

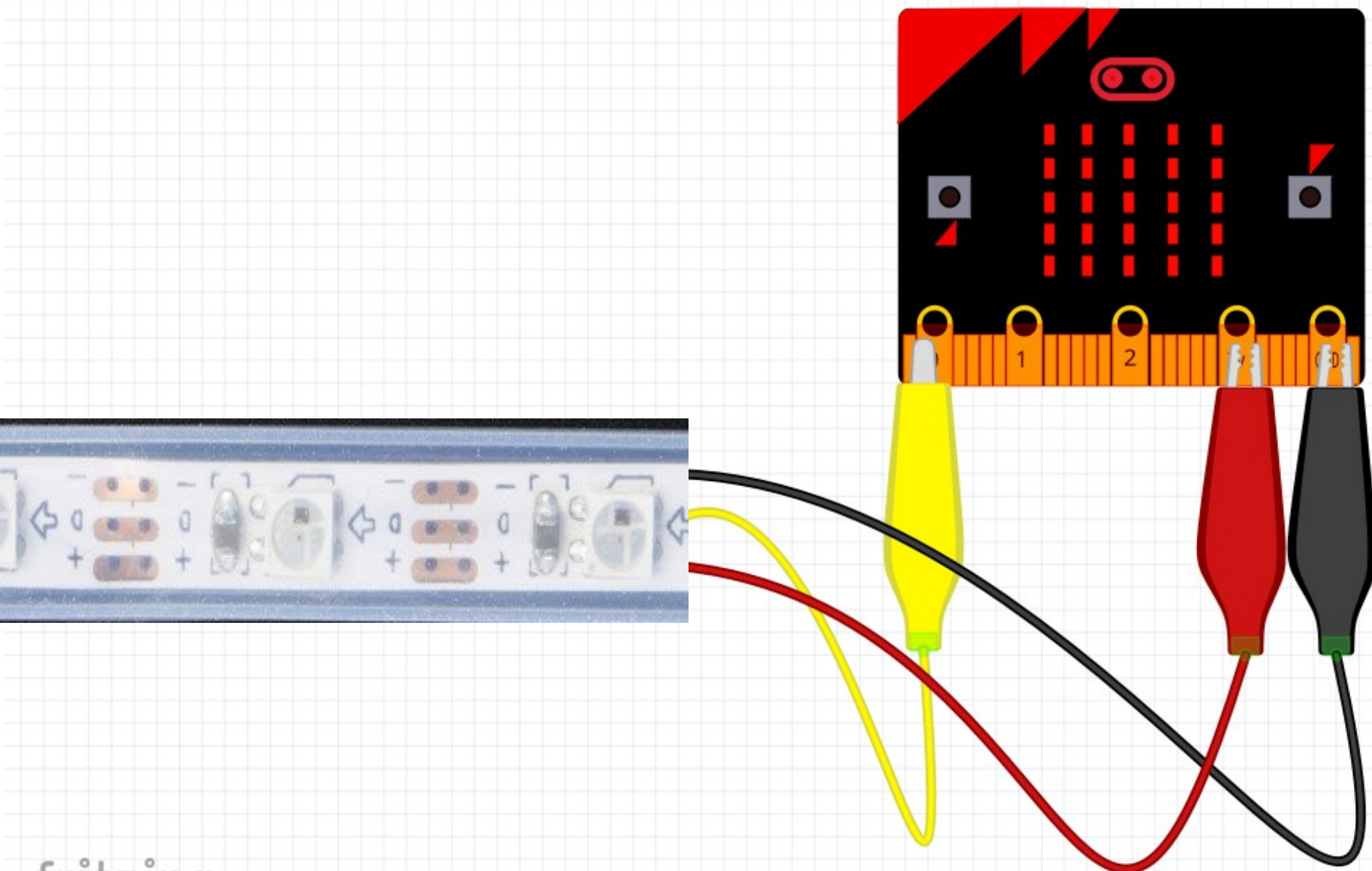
digital write pin P0 ▼ to 0

pause (ms) 500 ▼

digital write pin P0 ▼ to 1

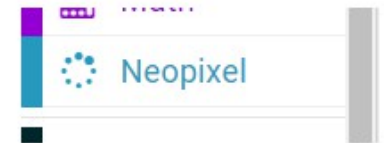
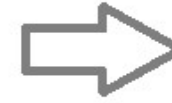
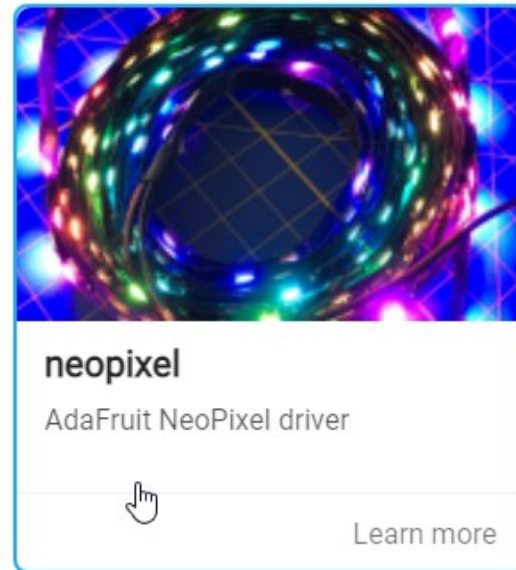
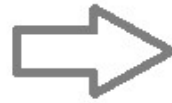
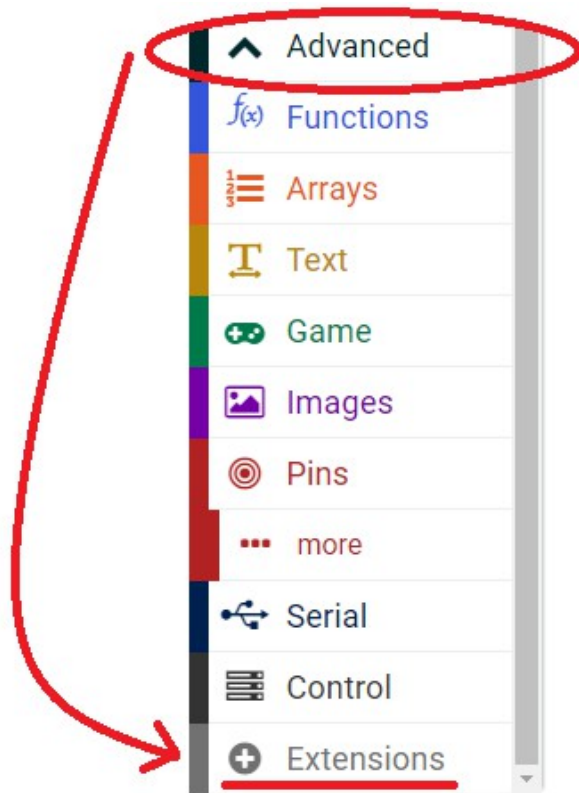
pause (ms) 500 ▼

Pripojenie LED pásika

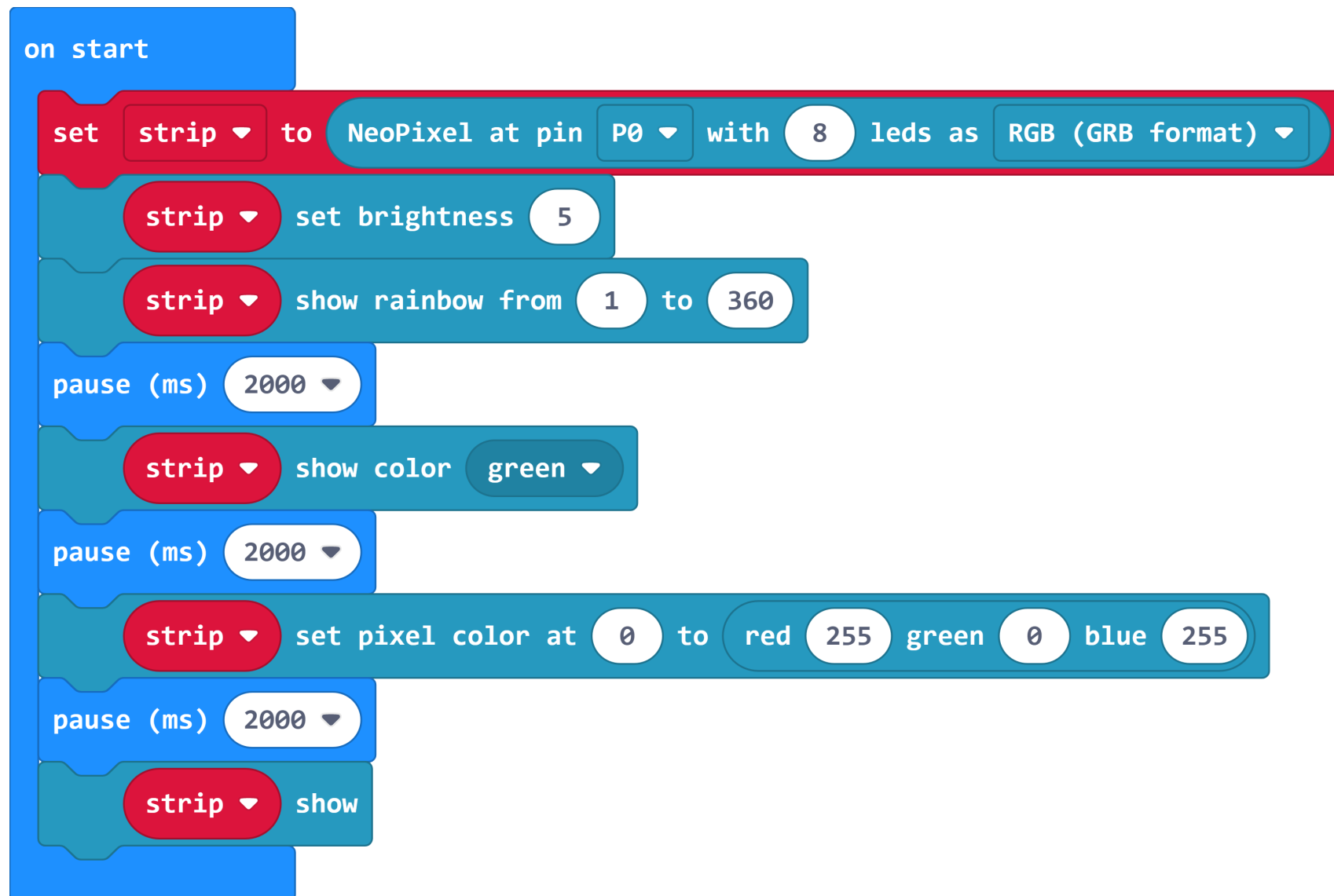


Pripojenie LED pásika

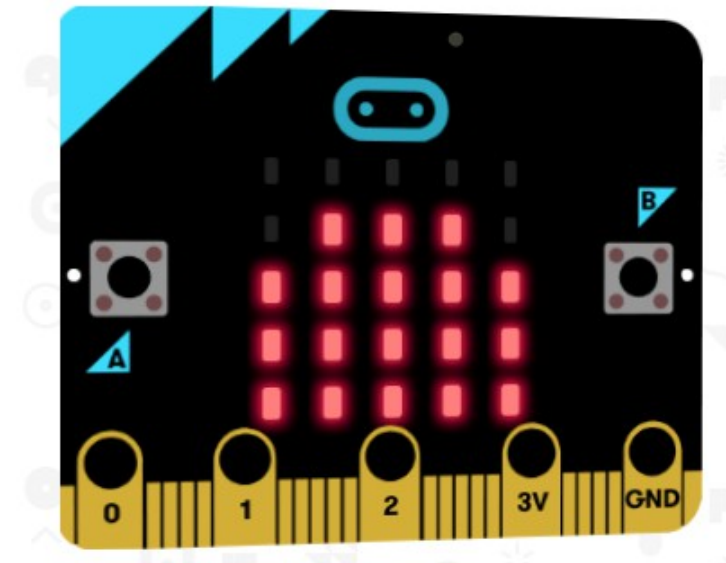
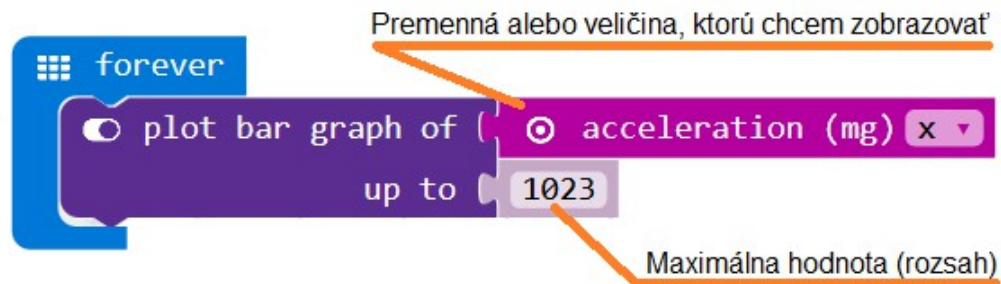
- import nových blokov:



Pripojenie LED pásika



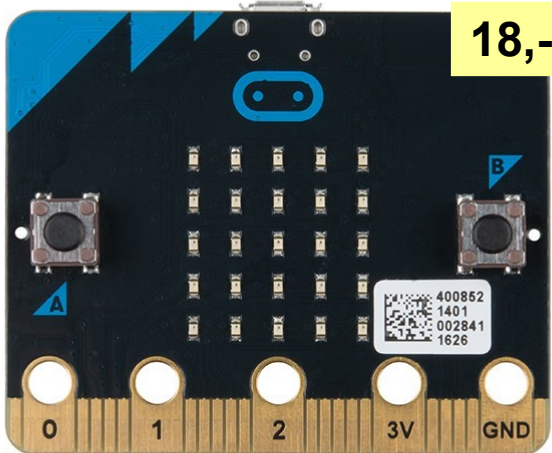
Stípcový graf



Časový priebeh veličiny je možné si aj stiahnuť a analyzovať neskôr napr. v Exceli.



Kol'ko to stojí?



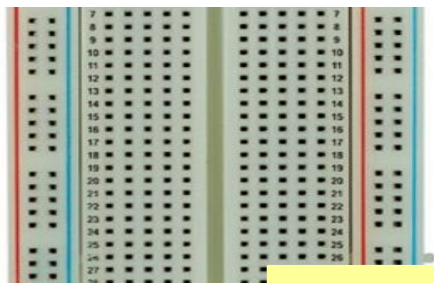
18,- €



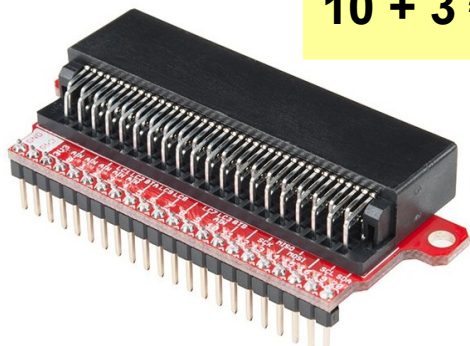
25,- €



75,- €



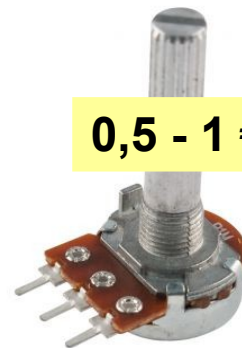
10 + 3 €



10 €



3 €



0,5 - 1 €



0,1 - 1 €



<https://lnk.sk/fpnx/>

<https://www.ucimeshardverom.sk/materialy/>



Thank you!

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richard.balogh@stuba.sk

