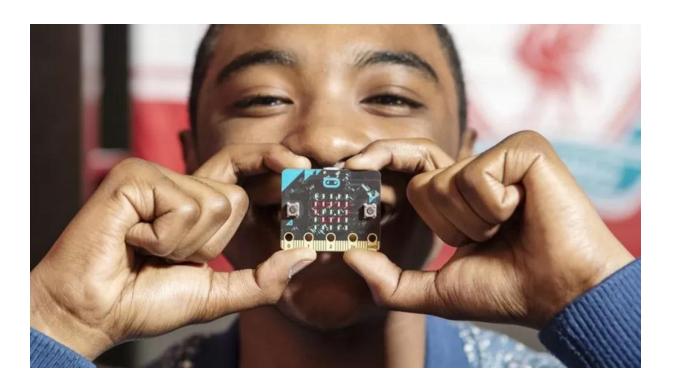edp

*Introdução à ciência de computação e aos microcontroladores com* **BBC micro:bit**
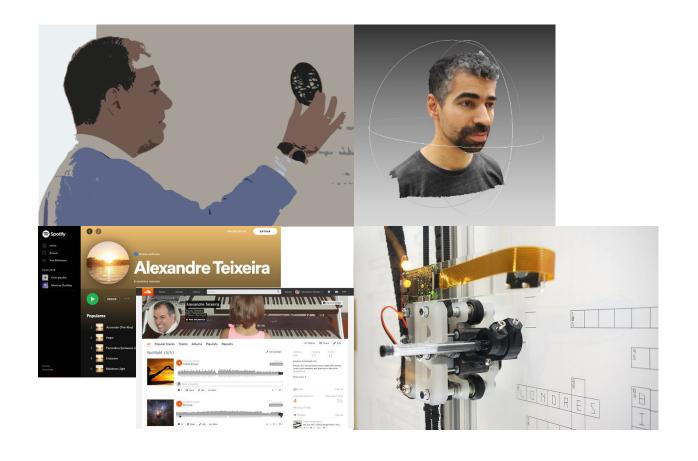


**Workshop FabLab EDP**
*18 de setembro de 2023*

# FabLab EDP – equipa



https://hackmd.io/@fablabedp/workshop-microbit

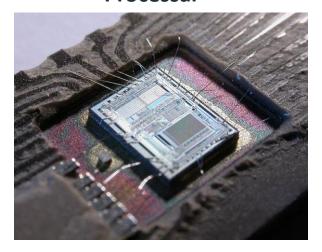# Microcontrolador e computação física

Domínio físico – **átomos**

Domínio físico – **átomos**

**Processar**

Estímulos

*input*



*output*

Ações

*Domínio Digital* – **bits**
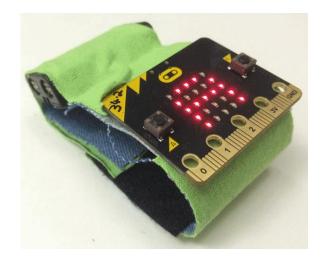
# Plataformas de computação física – *Diferenças*

The BBC Micro, launched in 1981, was at the centre of the **BBC's original UK computer literacy project**. Most schools in the UK had at least one BBC Micro and television programmes like The Computer Programme and Micro Live spread its influence beyond the classroom and into people's homes.

Along with other home computers, the **BBC Micro inspired a whole generation of UK school children to pursue careers in technology and in particular computer game design,** which has become an incredibly important entertainment industry worldwide.
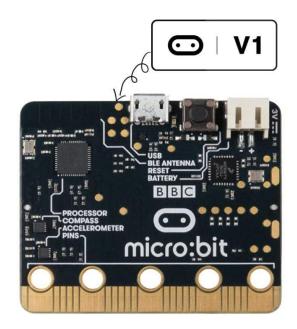
The BBC tasked Acorn Computers in Cambridge, England with designing and building the BBC Micro. Acorn would go on to become **ARM, whose processor designs are at the heart of almost every smartphone** in pockets all over the world.

- **Born:** 1 December 1981;  *40+ years ago!*
- Over 1.5 million sold (1981–1994)
- The original ARM chips were even designed on a BBC Micro

# BBC Micro – origem

In 2015, 34 years after the launch of the BBC Micro, the BBC and ARM once again joined forces, this time with dozens of other partners including Microsoft and the IET, to launch a new UK–wide computer literacy project.

In 2016 the BBC founded the Micro:bit Educational Foundation as an independent not–for–profit organization to secure the legacy of the Make It Digital project.
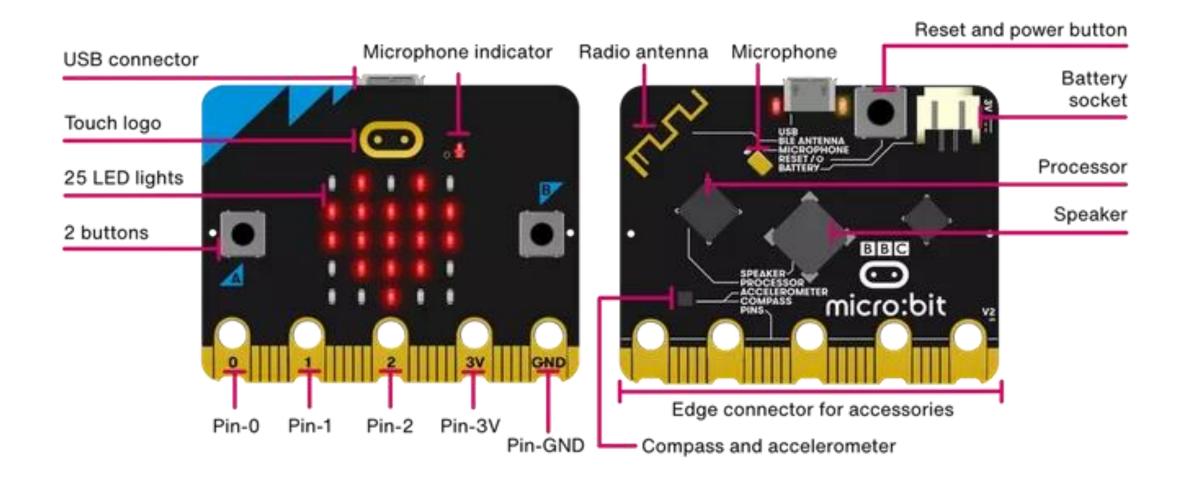
In 2020 the Foundation launched an updated micro:bit (V2) with a built–in speaker, microphone and touch logo. Together with our partners, we've secured the **legacy of this UK computer literacy project**, **with 30 million children** now creating their best digital futures with **6 million micro:bits** worldwide.

**BBC micro:bit** – **8 x** faster ; **8 x** larger memory ; 1 Million donated to schools

FabLab
EDP

# *Micro:bit* – especificações *(layout)*



Micro:bit layout — front view:
- USB connector
- Touch logo
- 25 LED lights
- 2 buttons
- Microphone indicator
- Pin-0, Pin-1, Pin-2, Pin-3V, Pin-GND

Micro:bit layout — back view:
- Radio antenna
- Microphone
- Reset and power button
- Battery socket
- Processor
- Speaker
- Edge connector for accessories
- Compass and accelerometer
- USB, BLE ANTENNA, MICROPHONE, RESET/O, BATTERY
- SPEAKER, PROCESSOR, ACCELEROMETER, COMPASS, PINS
- BBC micro:bit V2

# Micro:bit – especificações *(input / output)*



V2

# Micro:bit – Microsoft MakeCode



Hands-on computing education

micro:bit — Code

Circuit Playground Express — Code

Minecraft — Code

Chibi Chip — Code

# Micro:bit – Microsoft MakeCode



- Vai para Home Page
- Partilha o Projeto
- Programação em Blocos, JavaScript ou Python
- Clique direito no bloco para menu de contexto
- Toolbox dos blocos
- Área de **Workspace** para construção do programa
- Clique direito para menu de contexto do **Workspace**
- **Simulador:** mostra o resultado do programa antes do *download* para o *micro:bit*
- **Toolbar** do Simulador
- *Download* do Projeto para o *micro:bit*
- Grava o projeto com nome *"Smiley"* no PC em formato .HEX
- ***Undo/Redo*** e *Zoom* do **Workspace**

átomos

# Descodificando os Blocos



## Loops
Loops and repetition.



## Logic
Logic operators and constants.



## Variables
Variables.
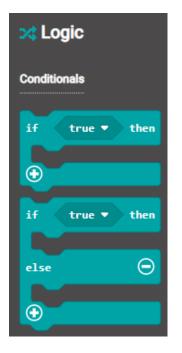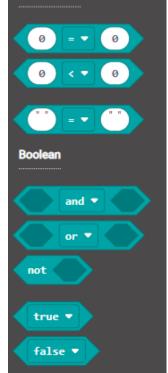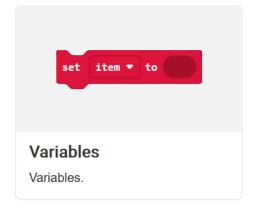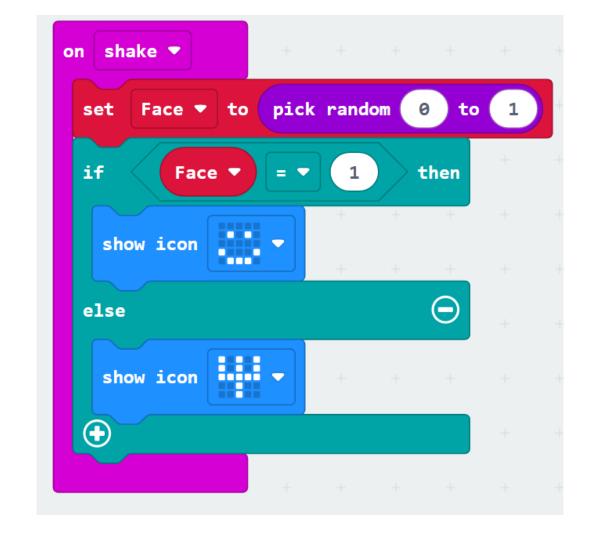
**bits**

# *Desafio 1* – Moeda ao ar *(solução)*



Número aleatório

Variável para guardar cara ou coroa

**bits**

Mudança
de estado
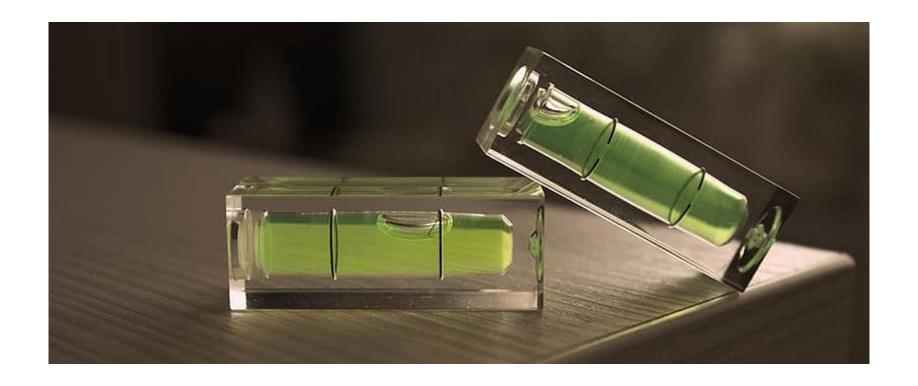
Álgebra
de Boole

**bits**
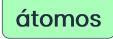
# *Exemplo 2* – Nível de bolha digital



**átomos**

átomos

Utilização de Rotinas:

*Função ou Procedimento*

bits

átomos

átomos

Maestro
*conductor*

Jogador
*player*

# *Micro:bit* – aplicações

# *Obrigado!*



Steve Jobs

"Everyone should learn how to code, it teaches you how to think."

Computer science is the operating system for all innovation.

Steve Ballmer