littleBits™

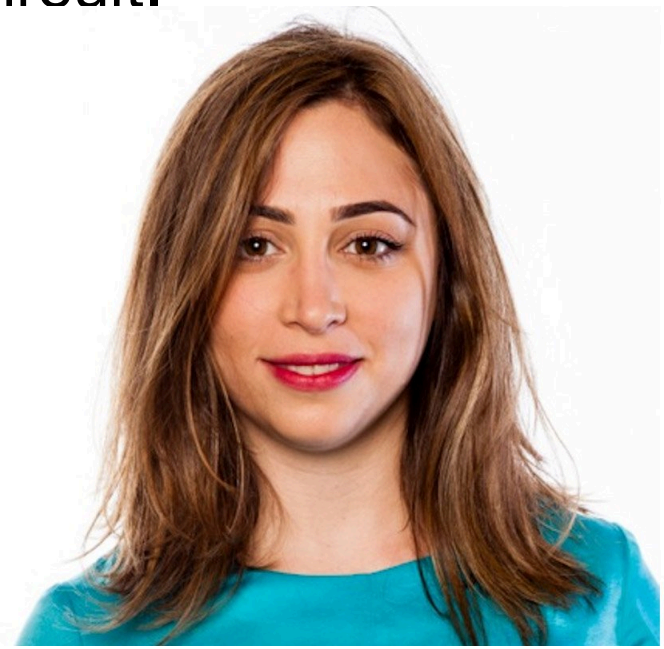
Introduction to Components

What are littleBits™ ?

- Each littleBit is an electronic circuit or switch, and it has its own unique function.

- Each littleBit snaps together using magnets and are connected in a sequence, to make a circuit.

- Developed by Ayah Bdeir while working on her Master's degree in Computing Culture at MIT. She created the first littleBits prototypes on her own in 2011.



How do LittleBits Relate to Cybersecurity Principles?

- **Modularity** - The concept of modularity is like building blocks. Each block (or module) can be put in or taken out from a bigger project. Each module has its own separate function that is interchangeable with other modules.
    - Each littleBit has it's own specific function and you can change out Bits to make different inventions.
- **Abstraction** - A fancy word for summarizing or explaining in a way that we can easily understand.
    - When you connect multiple littleBits together, you create an invention that solves a problem. Summarizing what your invention does is an abstraction of all the parts in the invention.
- **Resource Encapsulation** - Encapsulating (hiding) resources so you can only see the main function of the resource.
    - When you look at the bottom of each littleBit, you see lots of hardware. But you don't need to understand the hardware to know the function of each Bit. The name of the bit is on the top.

littleBits™
BASICS

Bits are grouped into four different categories:

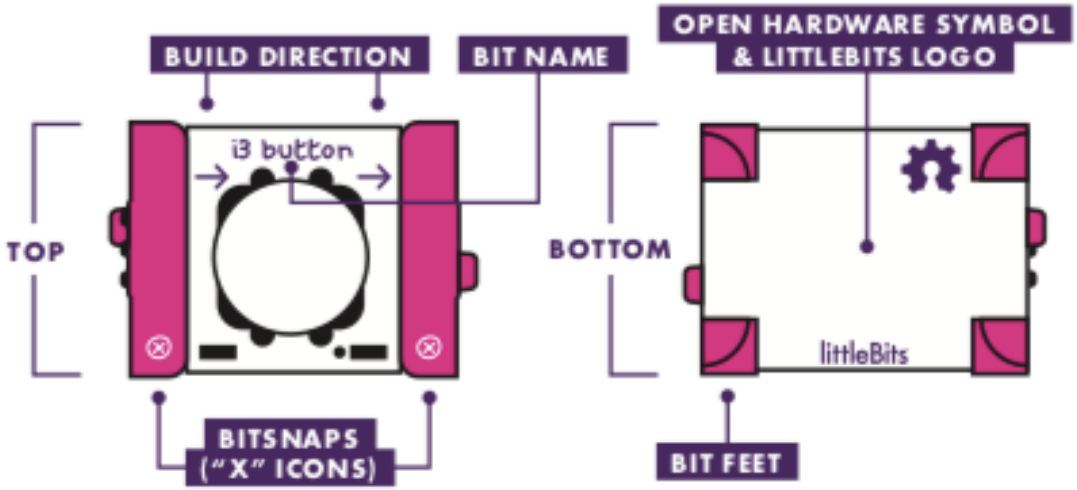
A POWER (BLUE)
Power Bits, plus a power supply, run power through your circuit.

B INPUT (PINK)
Input Bits accept input from you or the environment and send signals that affect the Bits that follow.

C WIRE (ORANGE)
Wire Bits connect to other systems and let you build circuits in new directions.

D OUTPUT (GREEN)
Output Bits do something – light up, buzz, move...

TOP BOTTOM



littleBits™ BASICS

Bits snap together with magnets. The arrows on the magnets always point RIGHT.

ARROWS SHOULD POINT IN THE SAME DIRECTION

IF THE BITS WON'T SNAP TOGETHER, TRY SPINNING ONE AROUND AND MAKE SURE THE ARROWS POINT IN THE SAME DIRECTION

Order is important. Power bits always come first and input bits only affect the output bits that come after them.

WITH NO OUTPUT BIT AFTER IT, THE INPUT BIT HAS NOWHERE TO SEND ITS SIGNAL

THE INPUT BIT AFFECTS THE OUTPUT BITS THAT FOLLOW

Let's build your first littleBits™ Invention

Invention: Let's create a light switch.

PowerBit, 9 volt battery, cord

Input: Button Bit

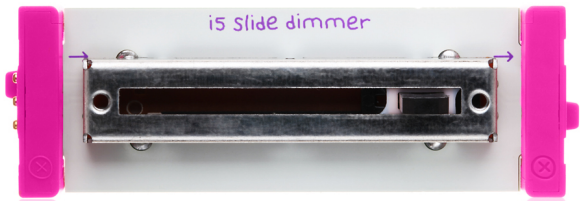
Output: LED Bit

Let's build your first littleBits™ Invention

Invention: Let's create a fan.

PowerBit, 9 volt battery, cord

Input: Slide Dimmer Bit



Output: Fan Bit

What else can you create with LittleBits?

https://www.youtube.com/watch?v=YUUsJSDa7PE

LittleBit Challenge #1

- You suspect that your sibling has been breaking into your room and snooping around in your stuff, but you never seem to catch them in the act. You decide to create a littleBit Invention that will alert you the next time your sibling is in your room.

LittleBit Challenge #2

- Get alerted if your refrigerator door has been left open for too long! The FDA says that your fridge should be set between 38 and 40 degrees Fahrenheit. If the temperature rises above this temperature for an extended period of time, your food could go bad. Prevent this from happening by creating an invention littleBits smart fridge circuit so you can save your food!