

KICK-OFF

THE LIFI-PROJECT



DISCLAIMER

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They contain mostly visuals and are not meant to as a script for studying. Please always watch the video or listen to the audio along with these slides and read the respective lessons in the [online script](#).

Please consider the environment before printing these slides.

Always use the [link to the original slides](#) to access the latest version. The slides are likely to change during a semester.

- Team up with a partner and discuss the question:

How can you communicate words using only a flashlight?

- Come up with a system and share it with the rest of the group!
- Try your system and compete with another group for faster communication!



THE FLASHLIGHT GAME

WHAT'S THIS?

4



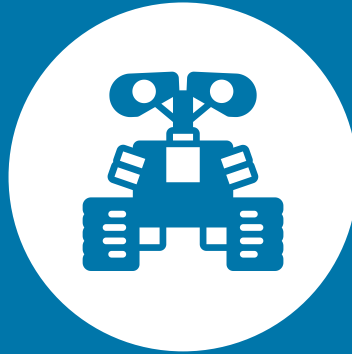
- A dot is **one unit** long
- A dash is **three units** long
- A gap between dots and dashes within the same symbol is **one unit** long
- A gap between symbols is **three units** long
- A gap between words is **seven units** long
- [Listen to the alphabet in Morse code](#)

A	● —	N	— ●
B	— ● ● ●	O	— — —
C	— ● — ●	P	● — — ●
D	— ● ●	Q	— — ● —
E	●	R	● — ●
F	● ● — ●	S	● ● ●
G	— — ●	T	—
H	● ● ● ●	U	● ● —
I	● ●	V	● ● ● —
J	● — — —	W	● — —
K	— ● —	X	— ● ● —
L	● — ● ●	Y	— ● — —
M	— —	Z	— — ● ●

Source: https://en.wikipedia.org/wiki/Morse_code

Source: https://rsgb.org/main/files/2012/10/Morse_Code_Sheet_01.pdf

THE LIFI-PROJECT



AN ENGINEERING PROBLEM

Can we transmit information using light?

What is the best protocol for data transmission using an LED?

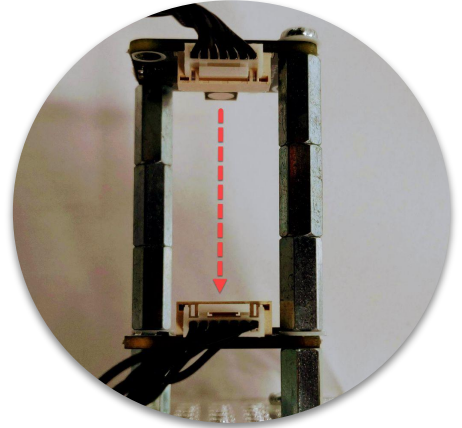
How fast can we transmit information?

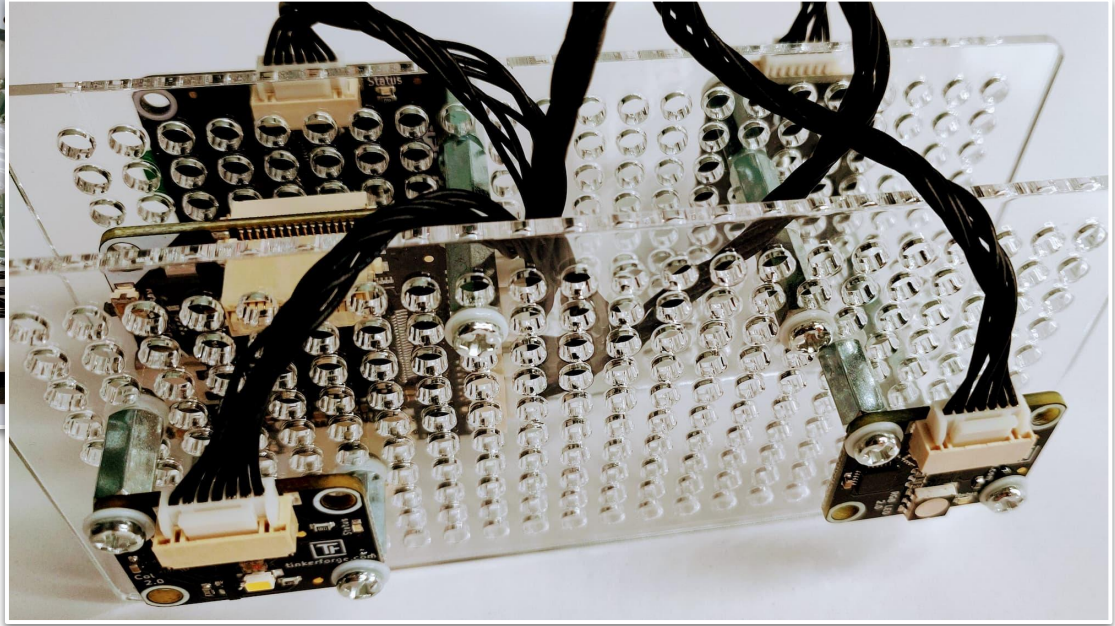
How reliable is the data transfer?

Over what distance can we transfer data?

Under what environmental conditions does the setup work properly?

How can we make our data transfer secure?

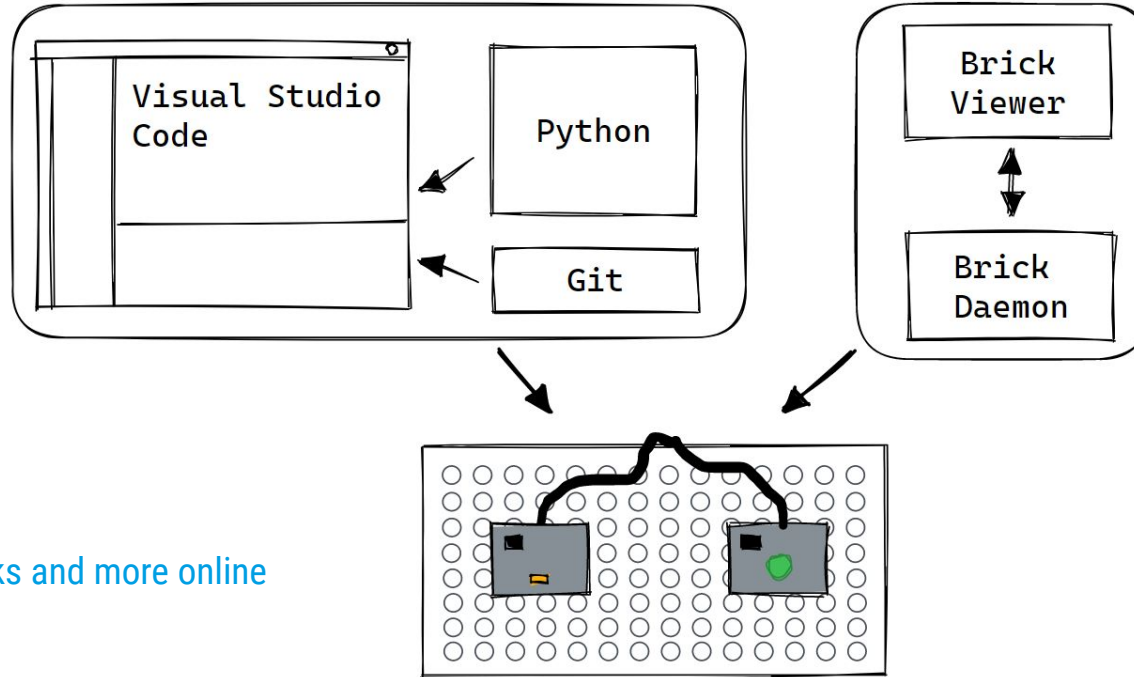




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Integrated Development Environment (IDE)

Tinkerforge Software



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LiFi Hardware Prototype

KEY QUESTIONS

How does the digital world work?

Binary Code Analog vs. Digital Digitization

How do digital computers work?

Logic Gates Code Systems Information Transmission
Input Processing Storage

How can we solve problems with digital computers?

Programming Algorithms Data