Capture point realization

This document serves to give more insight into the process of going from a first concept of the flags to the final product. This is done on a per sprint basis. Within each section below will be information given regarding what was achieved in a singular sprint and how these contributions helped in the iterative realisation of the hardware prototype.

Sprint 0

During this preparation period the group shortly discussed how the challenge should be translated into the first concept. We wrote a challenge debrief from which this important relevant analysis information came.

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Focus of new hardware > points to improve upon:

- Visibility
- Scoring mechanics
- Interaction difficulty
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With the initial budget of about 600 euros we set out to design 3 capture points for 200 each.

Sprint 1

In sprint 1 I started with researching which possible microcontrollers we could use and what kind of peripherals we should attach to the system. The current flagpoles were about 5 meters high and the ceiling in the new arena would only be 5-6 meters above so if we wanted to design new flag poles they would have to be about 4-4.5 meters high.

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Main board: ESP32
Height: 4/4.5 meters
Main lighting: Diffused WS2812B NEOPIXEL
Top light: Some kind of siren light or LED matrix
Encryption: RFID (Tags, cards, wristbands), Keypad encryption
Diagnostics: Small OLED screen
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With these technical requirements and hardware specs we designed a basic visualization of what the flagpoles could possibly look like. We made 2 visualizations based upon what would could possibly attract the most attention in our mind.
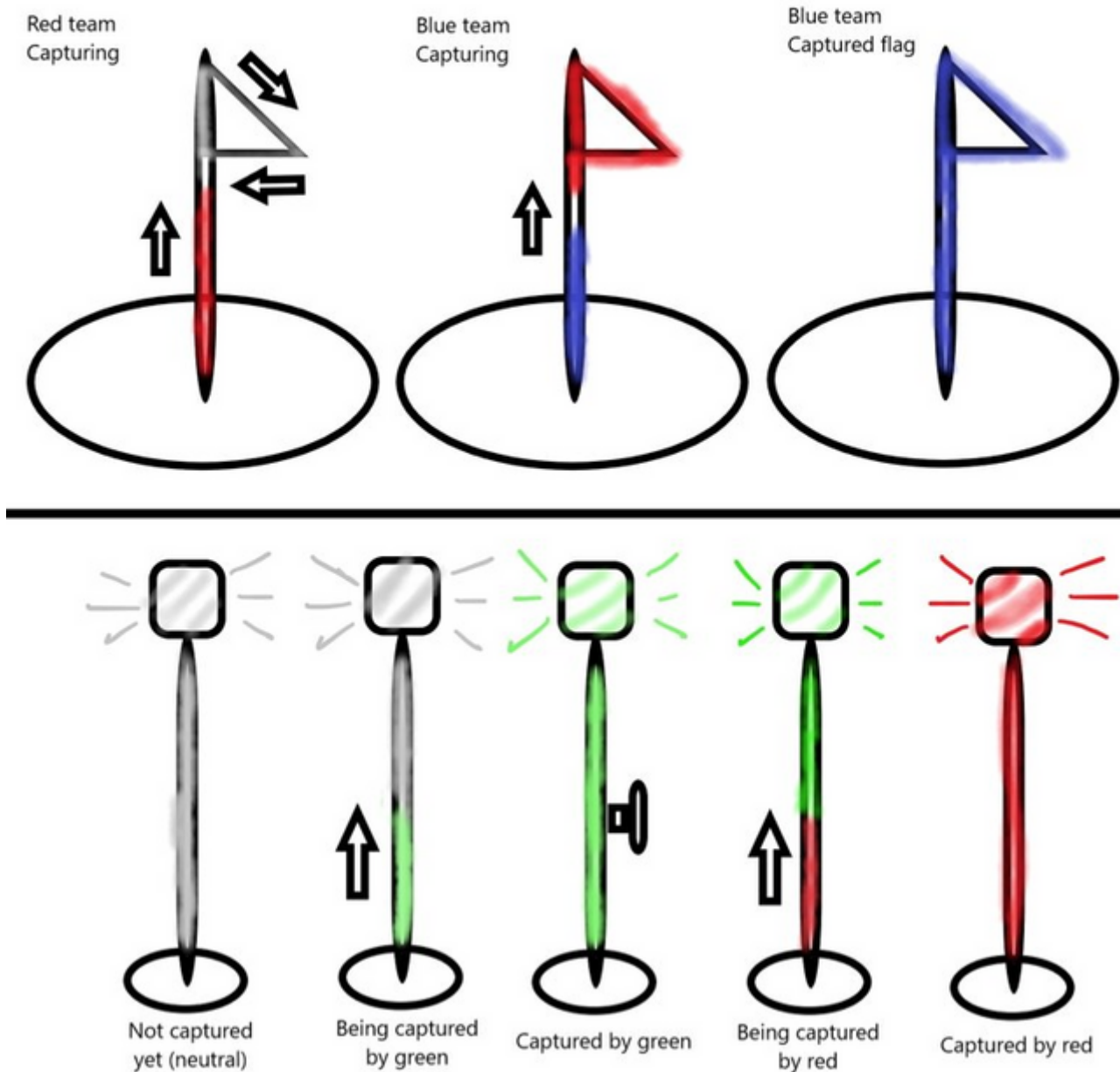
The first budget calculation with designing the flags like this was established relatively fast and can be seen below.

Component	Link	Quantity	Unit price	Total price
WS2812B LED STRIP	https://nl.aliexpress.com/item/2036819167.html?spm=a2g0o.productlist	3	€20,30	€60,90
WS2812B LED Matrix	https://nl.aliexpress.com/item/33025679652.html?_randl_currency=EUR	6	€16,75	€100,50
Acryl Tube	https://kunststofshop.nl/acrylaat-plexiglas/acrylaat-buizen/melkwit-op	6	€34,50	€207,00
LILYGO TTGO T-DISPLAY v1.1 ESP32	https://www.tinytronics.nl/shop/en/development-boards/microcontroller-boards/with-wi-fi/lilygo-ttgo-t-display-v1.1-esp32-with-1.14-inch-tft-display	3	€13,50	€40,50

MFRC522 RFID Kit	https://www.tinytronics.nl/shop/en/communication-and-signals/wireless/rfid/rfid-kit-mfrc522-s50-mifare-with-card-and-key-tag	3	€5,50	€16,50
Keypad	https://www.amazon.nl/dp/B07ZT2RRT1/?coliid=I3LGUMVUDYYJ19	3	€5,00	€15,00
5v 40A power supply	https://www.amazon.nl/Schakelende-Universele-Stroomvoorziening-St	3	€27,00	€81,00

Sprint 2

Sprint 3