Stink or Swim workshop
- programming and wiring

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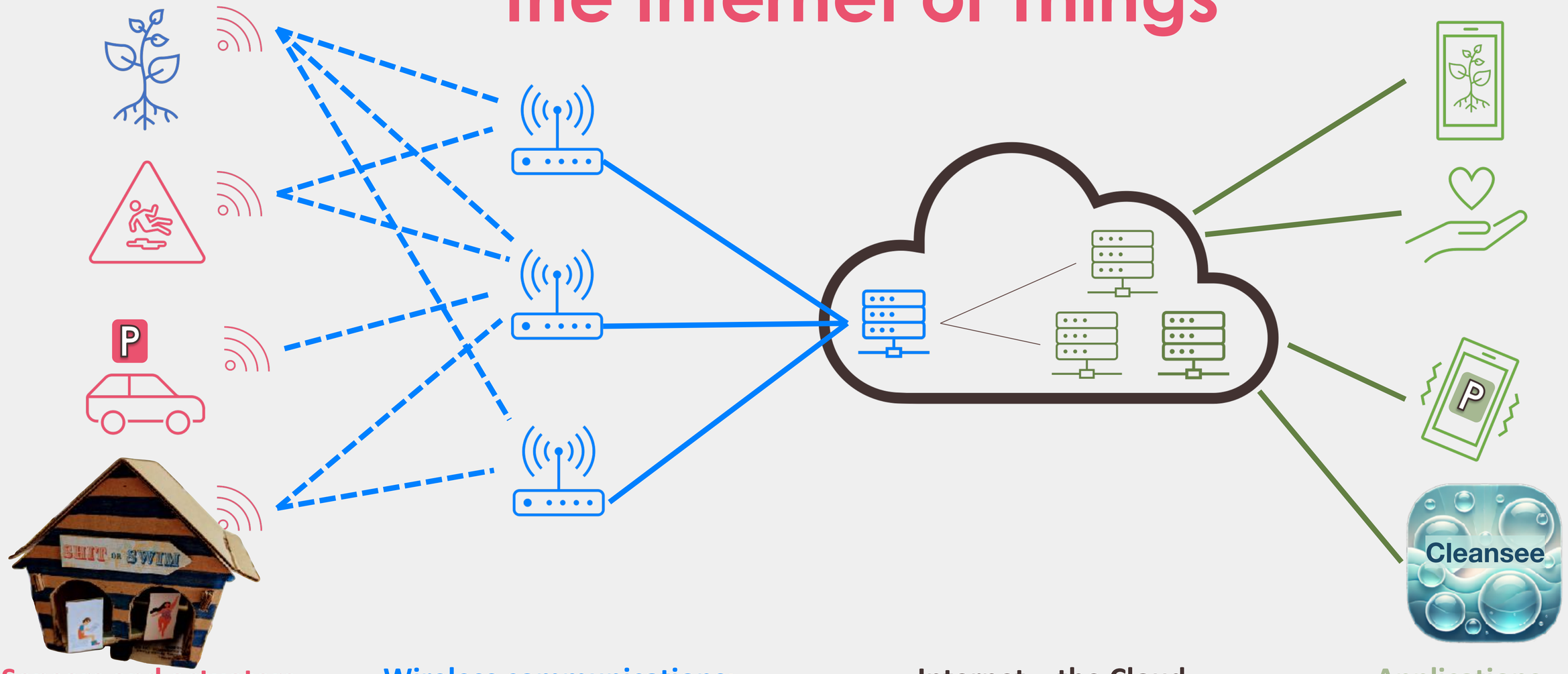
Thingitude

Component parts of the Internet of Things



Sensors and actuators - the "Things"

Wireless communications: Gateways

Internet – the Cloud

Applications

Stink or Swim - programming and wiring

1: Setting up Arduino IDE on your laptop

2: Wiring the servo, button and Heltec microcontroller

3: Programming the Heltec LoRa v3 microcontroller

4: Extra information and links

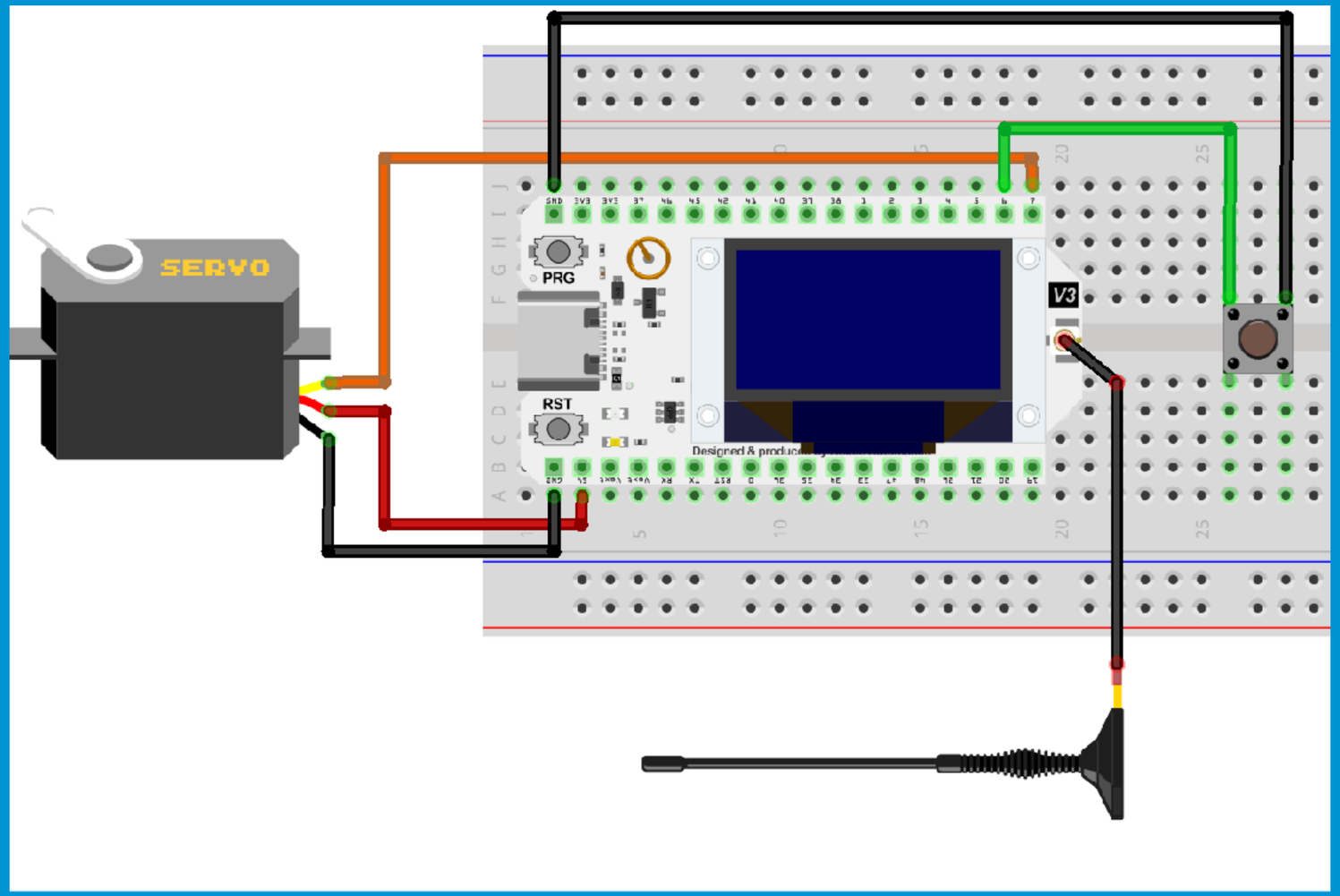
Install Arduino IDE on your laptop

1. In your browser, go to: https://www.arduino.cc/en/software
2. Select the version for your laptop (Windows or Mac) from the box on the right.
3. Click **JUST DOWNLOAD** on the next screen.
4. Run the installer once it has downloaded. Accept any default options.

Setup Arduino IDE for the Heltec microcontroller

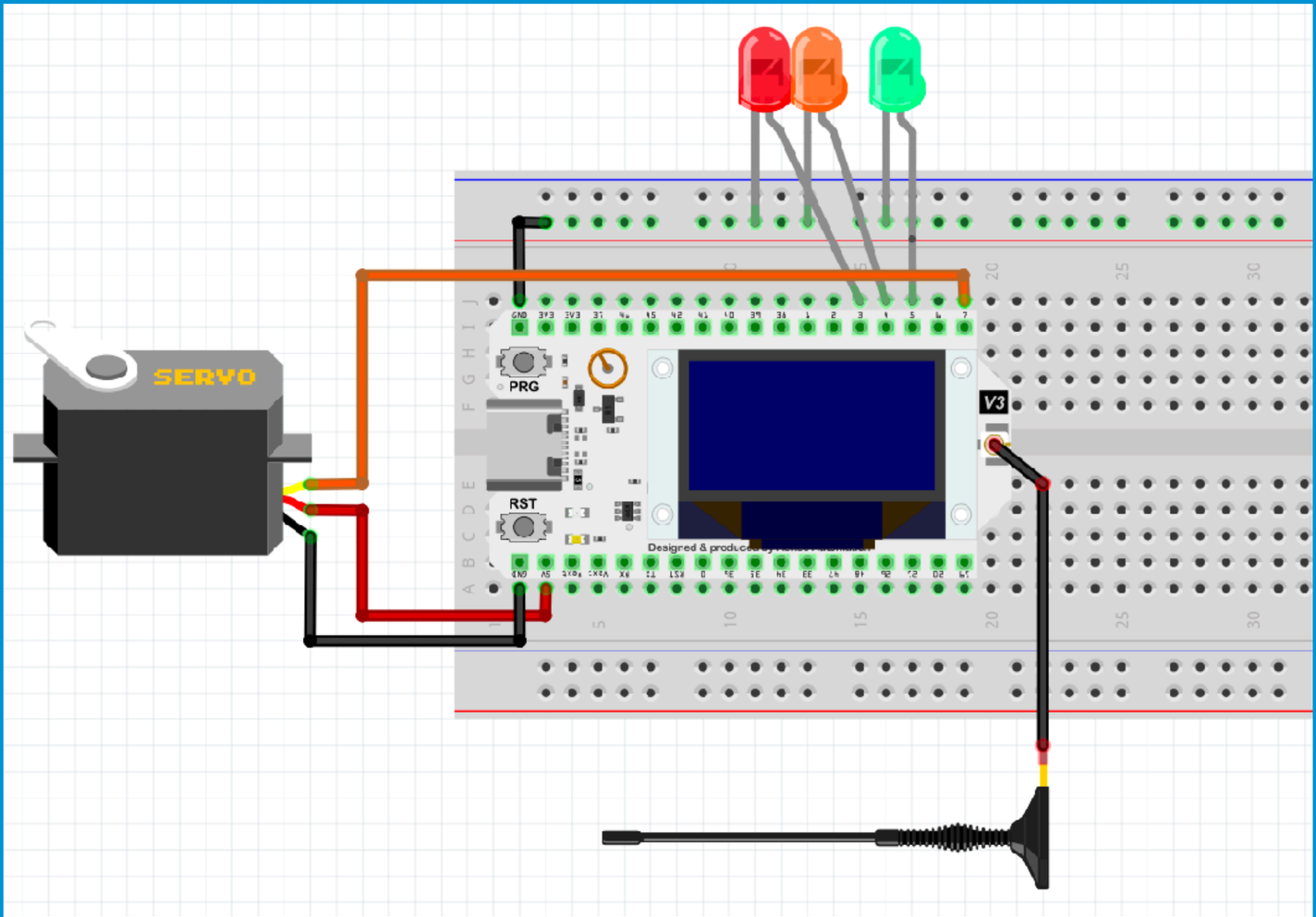
1. Launch the Arduino IDE form your laptop.
2. In **Settings**, go to the “Additional Boards Manager URLs” and add the following: https://resource.heltec.cn/download/package_heltec_esp32_index.json
3. Click **OK**. This will install the necessary files so you can programme the Heltec microcontroller with Arduino IDE.
4. Once done, go to **Tools -> Manage Libraries..**, and in the search box type “Heltec ESP32”. This will filter the huge list of possible libraries to ones for your Heltec boards.
5. Select the “Heltec ESP32 Dev-Boards” library and click Install.
6. You are now ready to connect up your Heltec microcontroller.

Wiring the servo, button and Heltec microcontroller



1. Gather your components and carefully follow the diagram:
   - Breadboard
   - Heltec microcontroller and antenna
   - Servo
   - Push button
   - 5 jumper wires
2. Servo wires:
   - Brown wire to first pin under RST button of Heltec (GND)
   - Red wire to 2nd pin on RST button side of Heltec (5V)
   - Orange wire to last pin on PRG button side of Heltec (GPIO 7)
3. Button wires:
   - Black wire to first pin above PRG button of Heltec (GND)
   - Green wire to last-but-one pin on PRG button side of Heltec (GPIO 6)

Wiring the servo, LEDs and Heltec microcontroller



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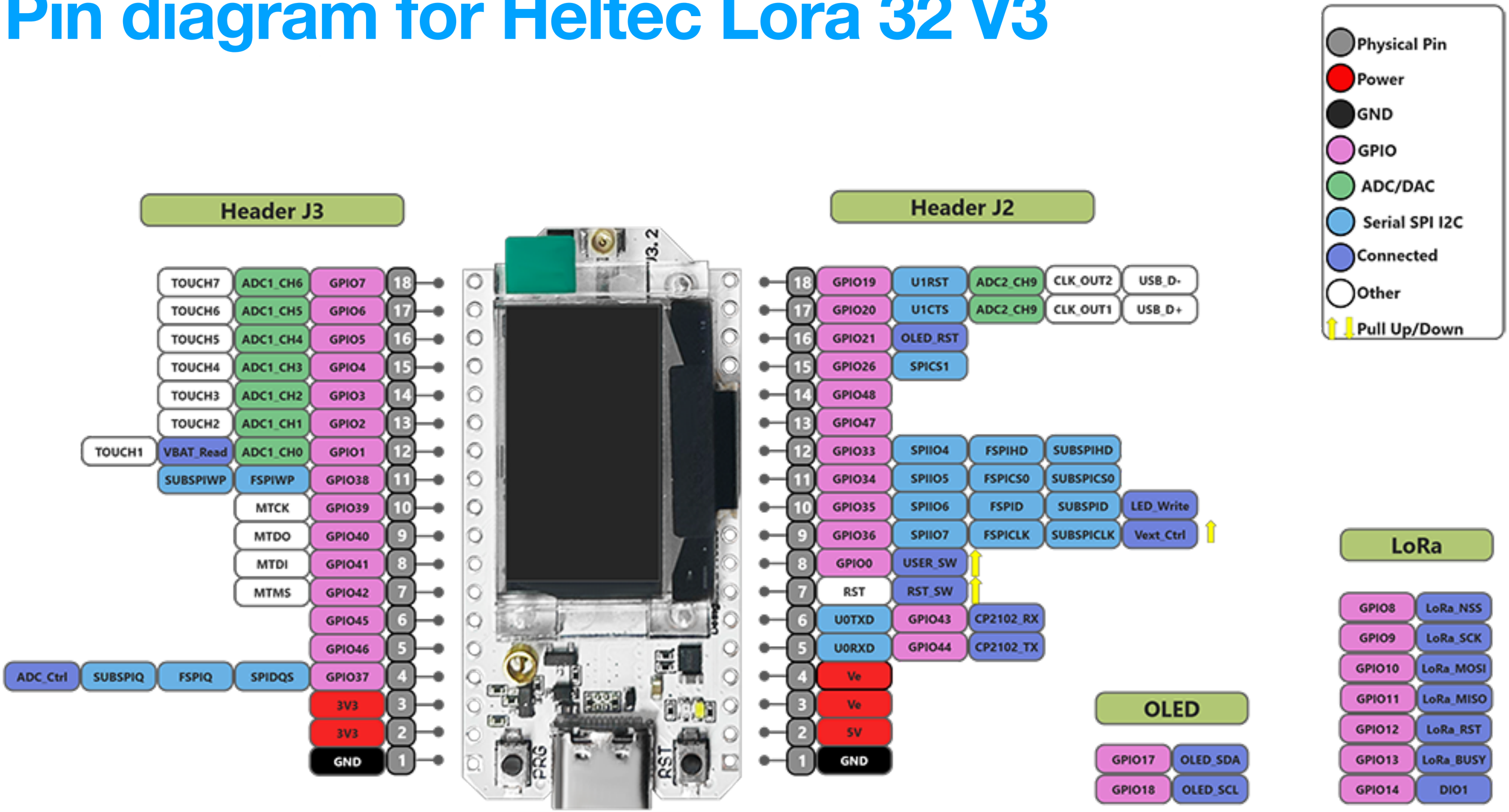
   - Red wire to 2nd pin on RST button side of Heltec (5V)
   - Orange wire to last pin on PRG button side of Heltec (GPIO 7)
3. LED wires:
   - Black wires to GND rail
   - Red wires to GPIO 3,4 and 5 (count back from GPIO 7)

Pin diagram for Heltec Lora 32 V3



Power it up!

1. Connect the Heltec to your laptop with a USB-C cable.
2. The device should power-up and messages will start appearing on the display. The device will attempt to join The Things Network, and ask for the state of the beach you have configured in Cleansee.
3. The device will check every 5 minutes automatically, but the messages are only updated every hour. For a quicker response during the workshop, ask Stan to send your device a message. Once he has done that, press the reset button and the device will ask TTN for the message.

Modify the code

1. You can download the source code for the Heltec here: https://github.com/Thingitude/stink-or-swim-sept2025
2. Download the zip file, unzip it, then copy the folder (stink-orpswim-sept2025) into Documents/Arduino on your laptop.
3. In Arduino IDE, click **File -> New Sketch**, and paste the code from the clipboard into the sketch, replacing whatever was there.
4. Tell Arduino which board is connected by clicking:
   Tools->Board->Heltec ESP32 Series Dev-boards->WiFi LoRa 32(v3)
5. Tell Arduino which port it is connected to by clicking:
   Tools->Port-> …and then the port, which will be COMxx on Windows, or /dev/cu.usbserial-xxx on Mac.
6. Find the line that defines devEui (currently line 48) - and change it to the devEUI for your device.
7. Click **File->Save** and give your sketch a name.

Modify the code 2/2

1. Change the startup message on line 22 from “Hello water geeks” to something you prefer.
2. Save, and click **Sketch->Upload** to compile and upload the sketch to your Heltec.
3. Note - Arduino may complain about missing libraries on your first attempts.
   Use Tools->Manage Libraries to install any missing ones, and then try Sketch->Upload again.
4. Your Heltec will restart and you should see your new startup message.
5. Congratulations - we are excited to see what modifications you make!

Extra information and links

1. These devices work with Thingitude's Cleansee app - it gives beach users live updates about their favourite beaches.

   Android: 

   iPhone: 

2. We use The Things Network - a worldwide, crowd-sourced, free to use data network. You can use it too: https://thethingsnetwork.org

3. The microcontroller is the Heltec LoRa 32 v3.2. It has wifi and bluetooth as well as LoRaWAN and is very popular.
   Read more here: https://heltec.org/project/wifi-lora-32-v3/#DocsResource

4. We support the Clean Water Action Group here in Hastings: https://www.facebook.com/cleanwateractgp/#

If you want to learn more about LoRaWAN or our IoT projects please get in touch

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