MASTER OF SCIENCE
IN ENGINEERING

MA_SeS - Introduction

Luca Haab, Michael Mäder, Florent Glück

September 15, 2025

Some administrative matters

- Lecture schedule
  - 11h15-12h00 + 12h05-12h50 + 12h55-13h40
- Resources
  - Site: https://ma-ses.github.io/homepage/
  - Development kit + various software

Course content

- Entire content available at https://ma-ses.github.io/homepage/
- Lectures available as slides
- Throughout the semester, you will have to complete a certain number of labs:
  - Guided, hands-on configuration/coding
  - For each lab, you will have to thoroughly describe your actions and solutions, especially regarding the various questions asked
  - Must be delivered on GitHub

Grading

- Labs
  - You will be working in teams of 2 students
  - Most labs will be graded
- Oral exam
  - At the end of the semester
- Final grade: labs 30%, oral exam 70%

Communication

- The communication takes place on Teams (*MA_SeS : Secure Embedded Systems 2025/2026*)
- The code for registering yourself into this team is **hhio4w7**
- After you have registered into the Teams instance, make sure to fill in the following form : link (the *classlist.xlsx* file in the *General* channel, under *Files*)

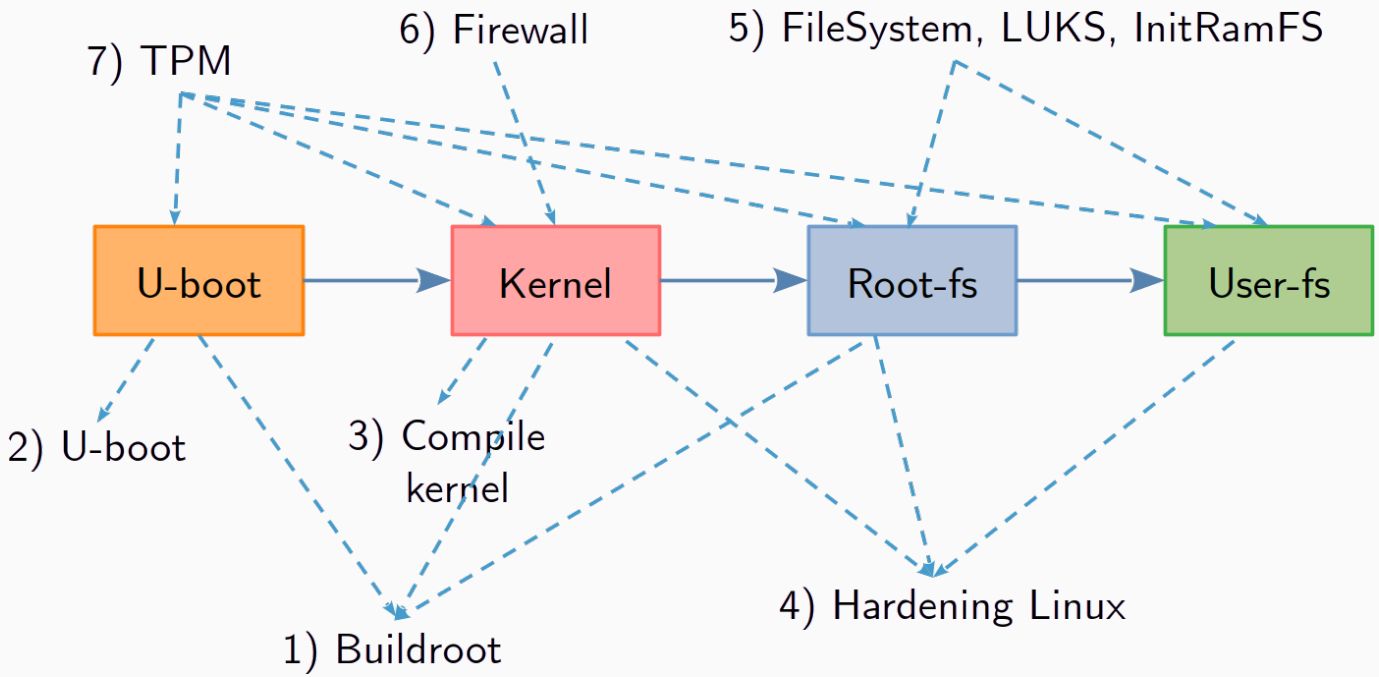
> **Important**
>
> Make sure you have a project partner so that you can pick a team name already - both of you (Alternatively, you can add this information later on)

Expectations & Knowledge

In order to understand your expectations (though that will not change the course content 😉) and have a rough idea about your knowledge, head to https://www.wooclap.com/ and enter the code **MASESDAY0**

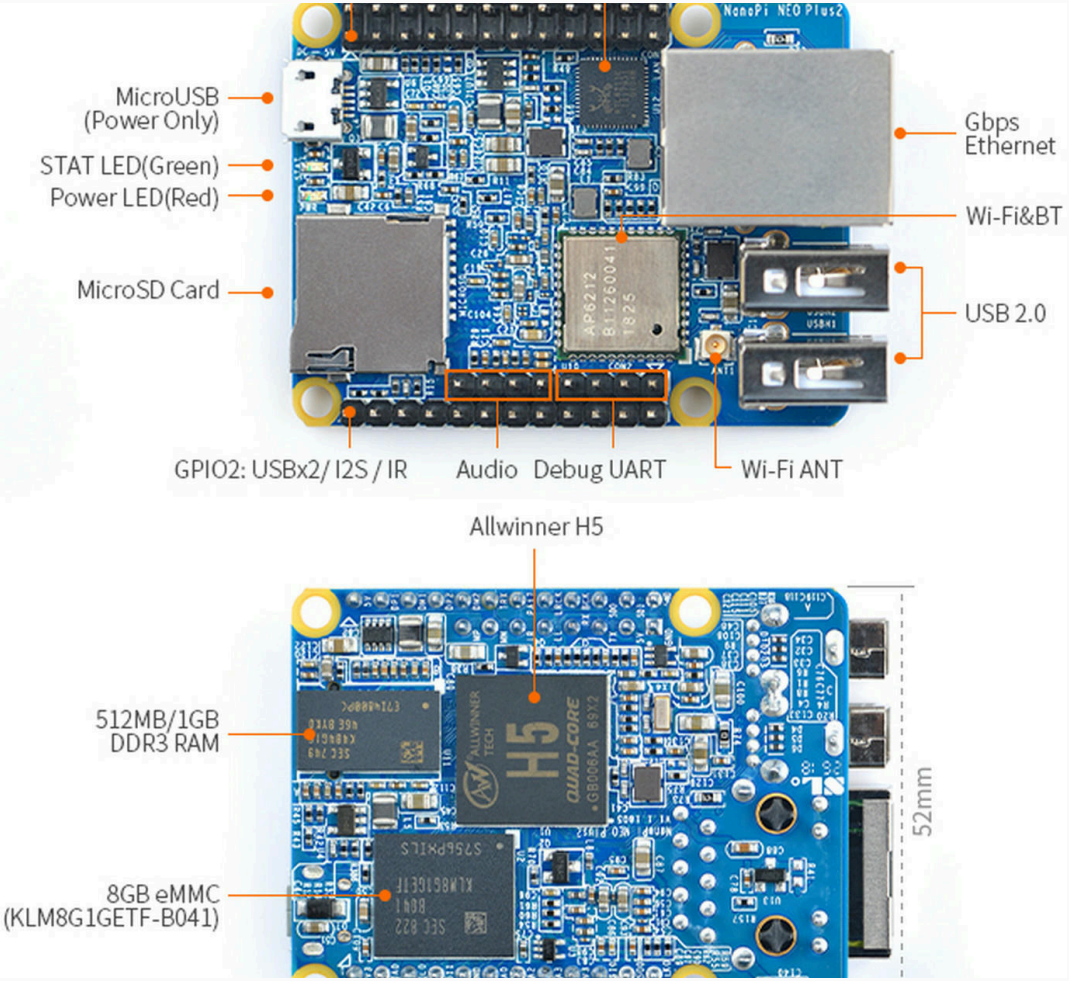
Subjects

1. Buildroot
2. U-boot
3. Compile kernel
4. Hardening Linux
5. FileSystem, LUKS, InitRamFS
6. Firewall
7. TPM (Trusted Platform Module)
8. Intro to IEC 62443

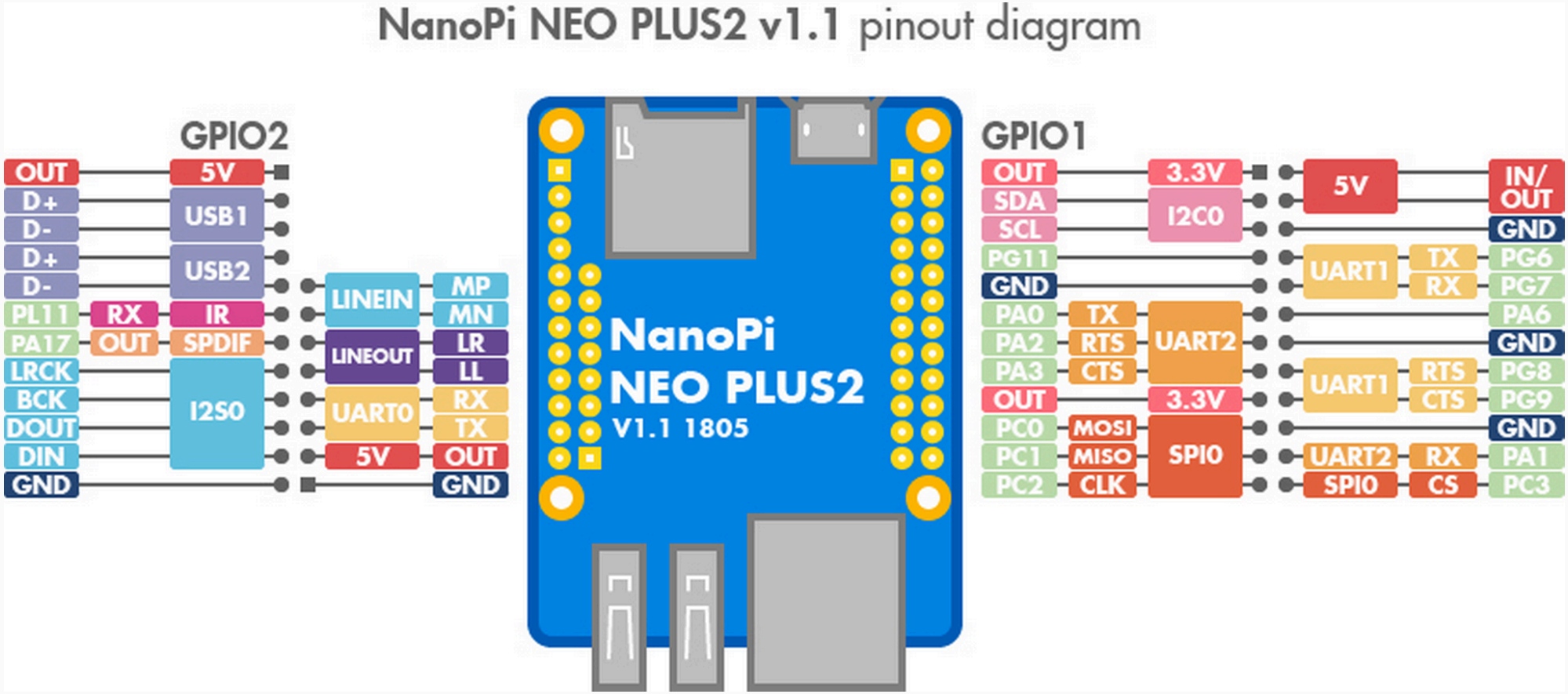


Hardware Platform: Nano Pi NEO Plus2

- Allwinner-based ARM board developed by FriendlyElec (old name: Friendlyarm)
- Uses Allwinner's 64-bit quad-core A53 SoC, 1GB DDR3, 8GB eMMC
- Buildroot uses different names for this board:
  - nanopi neo plus 2
  - sun50i-h5-nanopi-neo-plus2
  - allwinner/sun50i



Nano Pi NEO Plus2: pinout



Nano Pi NEO Plus2: specs

- SoC: Allwinner H5, Quad-core 64-bit Cortex A53
- DDR3 RAM: 1GB
- Storage: 8GB eMMC
- Network: 1Gb Ethernet (RTL8211E-VB-CG)
- WiFi: 802.11b/g/n
- Bluetooth: 4.0 dual mode
- MicroSD: 1 x slot supporting system booting
- Audio Input/Output: 5 pins
- MicroUSB: power input
- Debug Serial: 4 pins
- GPIO1: 24 pins (UART, SPI, I2C and IO)
- GPIO2: 12 pins (USB, IR receiver, I2S and IO)
- Power Supply: DC 5V/2A
- PCB Dimension: 40 x 52mm, 6-layer