Template Week 3 – Hardware

Student number: 590190

Assignment 3.1: Examine your phone

- What processor is in your phone?

- Apple A15 Bionic

- To which architecture family does this processor belong? In other words, which Instruction Set Architecture (ISA) is used?

- ARM Architecture (ARMv8)

- How much RAM is in it?

- 4GB

- How much storage does your phone have?

- 128GB

- Which operating system is running on your phone?

- iOS 26.1

- Approximately how many applications do you have installed?

- 68

- Which application do you use the most?

- Instagram

- Your phone can be charged with which type of plug?

- Lightning (8-pin) connector & MagSafe (Wireless)

- Which I/O ports can you visually see on your phone?

- Lightning Port (Charging/Data port), SIM Card Slot

Assignment 3.2: Examine your laptop

- What processor is in your laptop?

- Apple M1 Pro

- To which architecture family does this processor belong? In other words, which Instruction Set Architecture (ISA) is used?

- ARM Architecture (ARM64 / Aarch64)

- How much RAM is in it?

- 16GB

- How much storage does your laptop have?

- 512 GB SSD (System reports approx. 494 GB available)

- Which operating system is running on your laptop?

- macOS Sequoia (Version 15.6.1)

- Approximately how many applications do you have installed?

- Approx. 334

- Which application do you use the most?

- Chrome

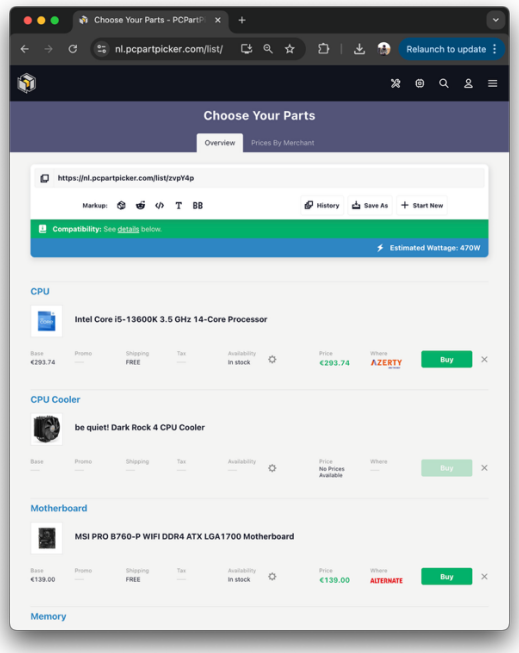
- Your laptop can be charged with what type of plug?
- MagSafe 3
- Which I/O ports can you visually see on your laptop?
- MagSafe 3, 3x Thunderbolt 4 (USB-C), HDMI, SD Card Slot, Headphone Jack

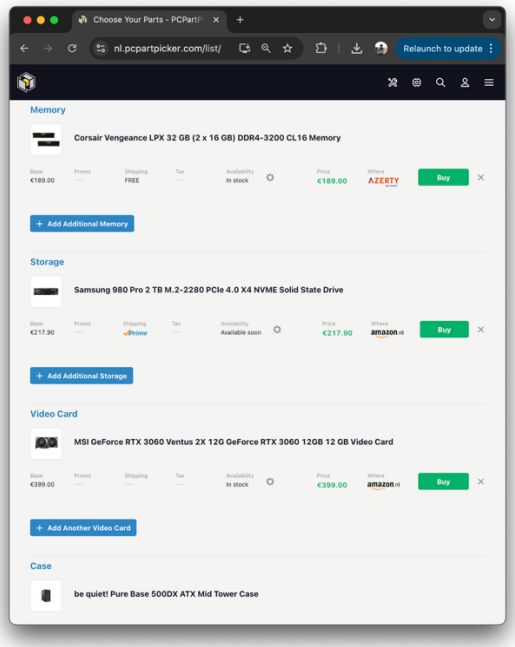
Assignment 3.3: Power to the laptop

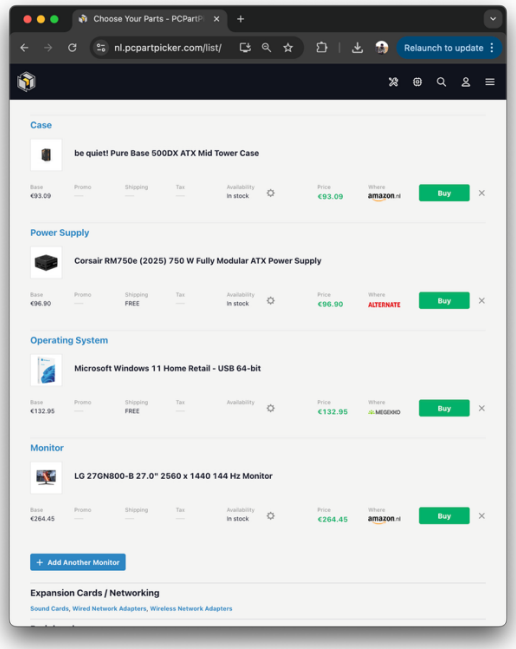
- What is the input voltage?
- 100-240V
- What is the output voltage?
- 20.3V
- How many watts can your power adapter deliver?
- 67W
- Is the input voltage AC or DC?
- AC
- Is the output voltage AC or DC?
- DC
- AC/DC what is that?
- AC (Alternating Current): The direction of the current changes periodically. (Used for power transmisson over long distances, like wall outlets).
- DC (Direct Current): The current flows in only one direction. (Used for electronics and batteries).
- If you reverse the polarity of the output voltage, it's bad for your laptop?
- Yes, it is bad. It can damage the internal circuits or fry the motherboard immediately.
- You forgot your power adapter, your laptop normally needs 15 watts. You will be loaned a power adapter that can deliver 50 watts. Voltage, polarity, etc. are all the same compared to the original power adapter. You can connect the borrowed power adapter to your laptop. What will happen? Also explain why you think that.
- It will work perfectly fine and safely
- Current is drawn by the device, not pushed by the adapter. The laptop will only take the 15 Watts it needs. The 50W rating just means the adapter has the capacity to provide up to 50W, so it has plenty of headroom.

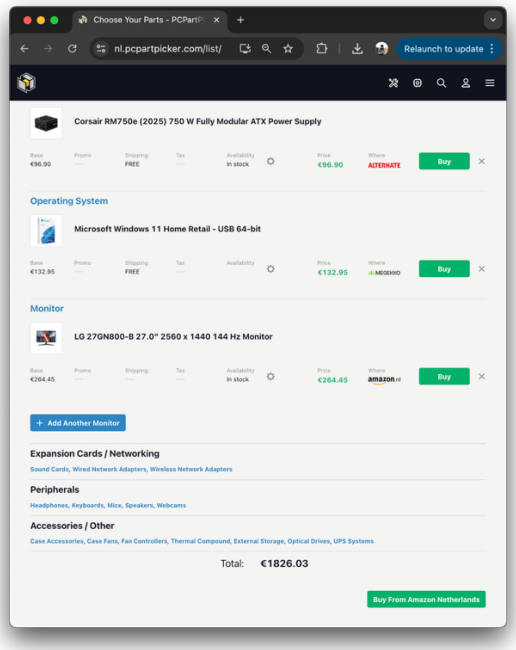
Assignment 3.4: Build your dream PC

Screenshots PC configuration + motivation:









Justification for this configuration: I designed this PC specifically for Music Production (DAW) and composing (My Hobby), focusing on processing power and silence rather than gaming graphics.

- CPU (Intel i5-13600K): Music production relies heavily on CPU performance to run multiple plugins and VSTs simultaneously. This CPU offers excellent single-core performance which is crucial for real-time audio processing.
- RAM (32GB): Heavy sample libraries (like orchestral instruments) load data into the RAM. 32GB ensures I can load many instruments without the system crashing.
- Quiet Components (be quiet! Cooler & Case): For a home studio, silence is golden. I chose a noise-dampening case and a silent cooler to prevent fan noise from ruining my recordings.

- Cost-Effective GPU: Since audio software does not rely on the GPU, I chose a mid-range card (RTX 3060) to save money and invested that budget into a better CPU and Storage.

Comparison with my current laptop (MacBook Pro 14" M1 Pro):

1. Expandability (Storage for Samples):

- My Laptop: Apple's storage is extremely expensive and cannot be upgraded. I always run out of space for my sound libraries.
- Dream PC: I can easily add more NVMe SSDs or huge Hard Drives (HDD) to store terabytes of sound samples cheaply. This is a huge advantage for a composer.

2. Operating Environment (Silence vs. Power):

- My Laptop: It is virtually silent and portable, which is great for sketching ideas anywhere.
- Dream PC: It is a fixed workstation. While I chose quiet parts, it will still have some fan noise compared to the MacBook. However, it offers more raw power for running very heavy projects with high track counts.

3. Connectivity (I/O):

- My Laptop: It only has USB-C ports. I always need a dongle/hub to connect my MIDI keyboard, Audio Interface, and iLok key.
- Dream PC: It has many dedicated USB Type-A ports on the back, so I can connect all my music equipment directly without messy dongles.

4. Cost Performance:

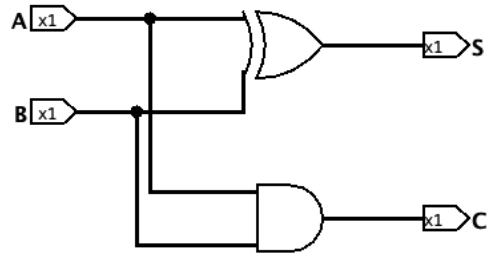
- My Laptop: Getting 32GB RAM and 2TB SSD on a MacBook costs a fortune.
- Dream PC: I can build a machine with the same RAM and Storage specs for a much lower price.

Assignment 3.5: Adders

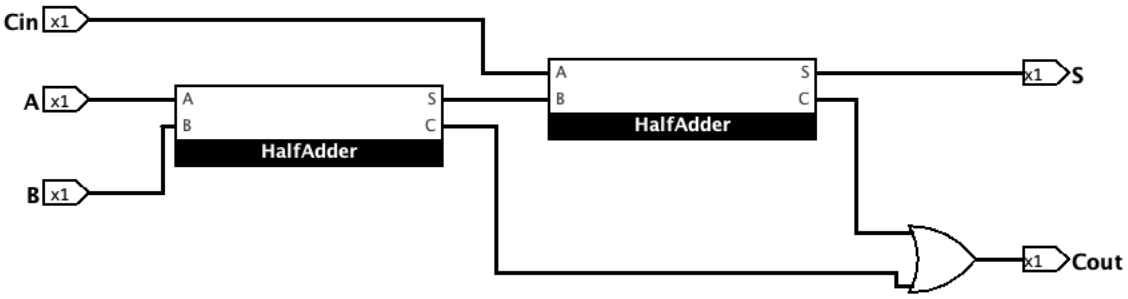
Complete the **half adder**, **full adder** and **4-bit adder** assignment as described in the PowerPoint slides of week 3 in Logisim. Save the chip design and also export three PNG pictures of the separate finished designs. See the PowerPoint slides of week 3.

Paste the three exported PNG pictures in here.

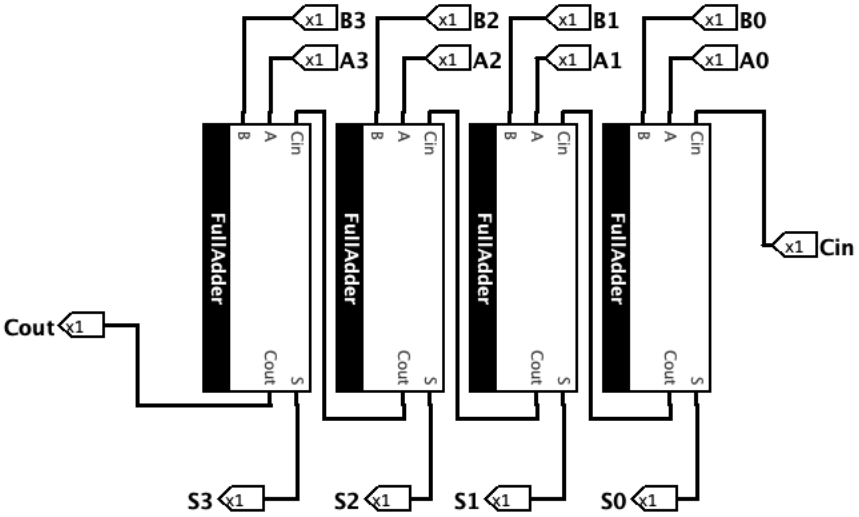
Half Adder 590190 Chanjune Park



Full Adder 590190 Chanjune Park



4 Bit Adder 590190 Chanjune Park



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