Template Week 3 – Hardware

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Assignment 3.1: Examine your phone

What processor is in your phone?

iPhone 15 Pro uses the Apple A17 Pro.

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

The A17 Pro is based on a 64-bit ARM architecture (as are all modern “A-series” iPhone chips)

How much RAM is in it?

8 GB

How much storage does your phone have?

256 GB

What operating system is running on your phone?

It originally shipped with iOS 17

Approximately how many applications do you have installed?

More than 20

Which application do you use the most?

Youtube

Can your phone be charged with what type of plug?

With USB-C port

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

On the outside you will see a **USB-C port** at the bottom. There is no 3.5 mm headphone jack. Also no old-style “Lightning” connector — it’s replaced by USB-C.

Assignment 3.2: Examine your laptop

What processor is in your laptop?

Intel(R) Core(TM) i7-7700HQ CPU @ 2.80GHz

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

x86-64 it is a 64-bit Intel architecture processor

How much RAM is in it? 16 GB

How much storage does your laptop have?

SSD: 239 GB

HDD: 932 GB

Which operating system is running on your laptop? Windows 11

Approximately how many applications do you have installed? About 25

Which application do you use the most? Google Chrome

Can your laptop be charged with what type of plug? Barrel-style DC charger

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

USB-A ports 3
HDMI
Mini DisplayPort or full DisplayPort
3.5 mm headphone jack
SD card reader
USB-C

Assignment 3.3: Power to the laptop

What is the input voltage?

The input voltage is what the power adapter receives from the wall outlet.

What is the output voltage?

It is the voltage the power adapter delivers to the laptop.

How many watts can your power adapter deliver?

Wattage = 19 × 3.42 ≈ **65W**

Is the input voltage AC or DC?

AC

Is the output voltage AC or DC?

DC

AC/DC what is that?

AC means Alternating Current, which is the type of electricity that comes from wall outlets. The electric current constantly changes direction back and forth. DC means Direct Current, which is the type of electricity that comes from batteries and is required by electronic devices like laptops. In DC, the electric current flows in only one direction. A laptop charger takes AC from the wall and converts it into DC so the laptop can use it.

If you reverse the polarity of the output voltage, is that bad for your laptop?

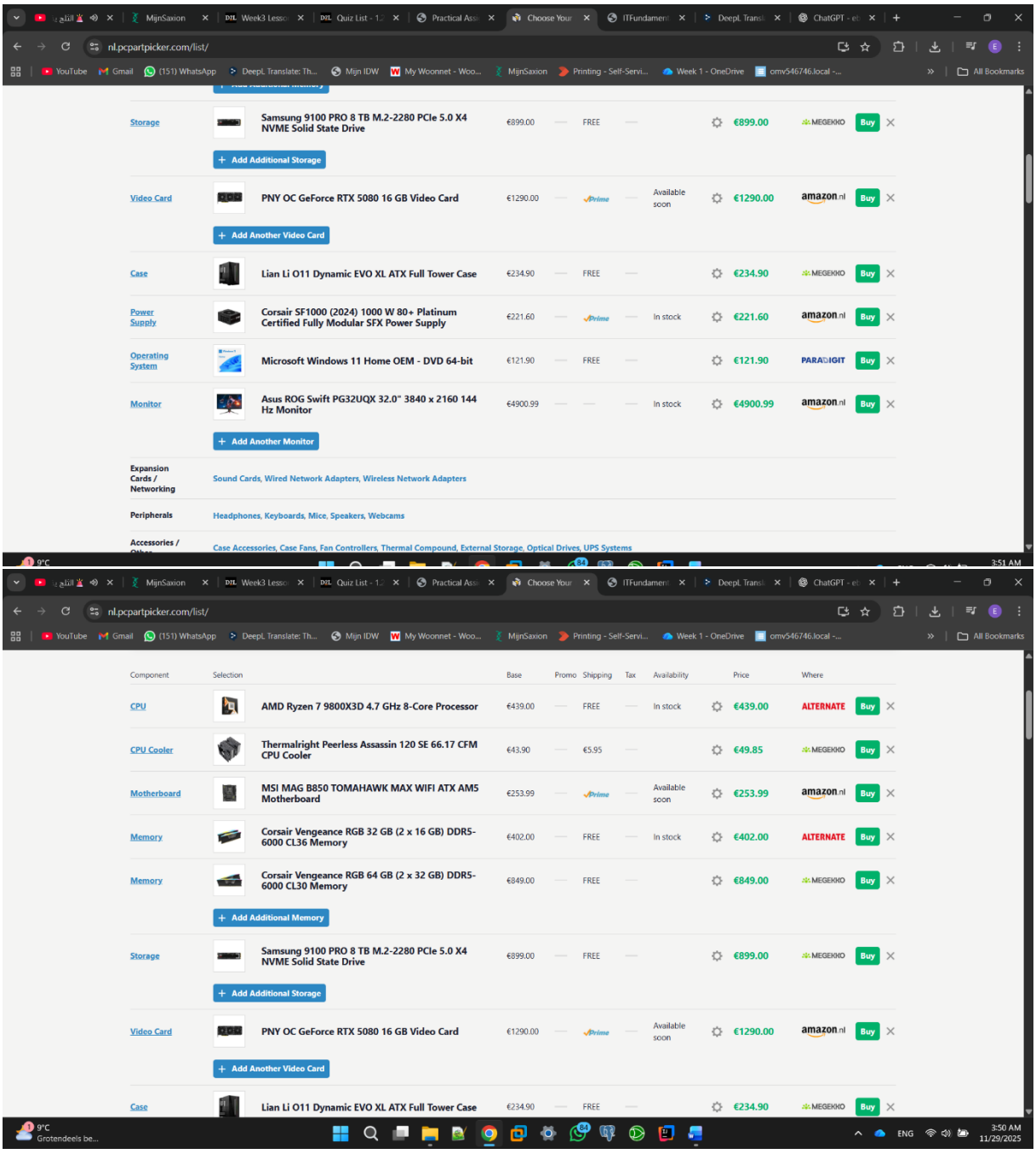
Yes, reversing the polarity is bad for the laptop. Laptops are designed to receive power in one specific direction, and if the positive and negative wires are swapped, the electrical components can be damaged. This can harm the motherboard or the charging circuit and may prevent the laptop from turning on. Some laptops have protection circuits, but not all, so reversing polarity is considered dangerous.

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.

If I put a power adapter that can deliver 50 watts while my laptop normally needs only 15 watts, nothing bad will happen as long as the voltage and polarity are the same. The laptop will only take the 15 watts it needs and will not use the extra power. The charger does not push power into the laptop; the laptop pulls the amount it requires. Because of this, the laptop will work normally with the 50-watt adapter.

Assignment 3.4: Build your dream PC

Screenshots PC configuration + motivation:



I chose these components to create a powerful, future-proof gaming PC. The AMD Ryzen 7 9800X3D is one of the best gaming processors available, and with a strong air cooler it stays fast and cool. I picked the MSI MAG B650 Tomahawk MAX WIFI motherboard because it supports modern features like PCIe 5.0 and has great stability. For memory, I selected a total of 96 GB of fast DDR5 RAM, which is more than enough for gaming, multitasking, and heavy work.

For storage, I chose an extremely fast Samsung 9100 PRO 8 TB PCIe 5.0 NVMe SSD to guarantee instant loading times and plenty of space. The RTX 5080 graphics card allows 4K high-FPS gaming with ray tracing. I used the Lian Li O11 Dynamic EVO XL case for good airflow and clean cable management, and a 1000-watt Corsair Platinum power supply to ensure stable power. I also selected a 4K 144 Hz Asus ROG Swift monitor to match the performance of the PC.

Comparison With My Current Laptop : My current laptop has an Intel i7-7700HQ, 16 GB of RAM, a small SATA SSD, and an HDD, which makes it much slower than my dream PC. The Ryzen 7 9800X3D and DDR5 RAM in the dream PC are many generations newer and far more powerful. The 8 TB PCIe 5.0 SSD is much faster than my laptop's SSD and HDD. The RTX 5080 GPU is also massively more powerful than the older mobile GPU in my laptop, allowing smooth 4K gaming.

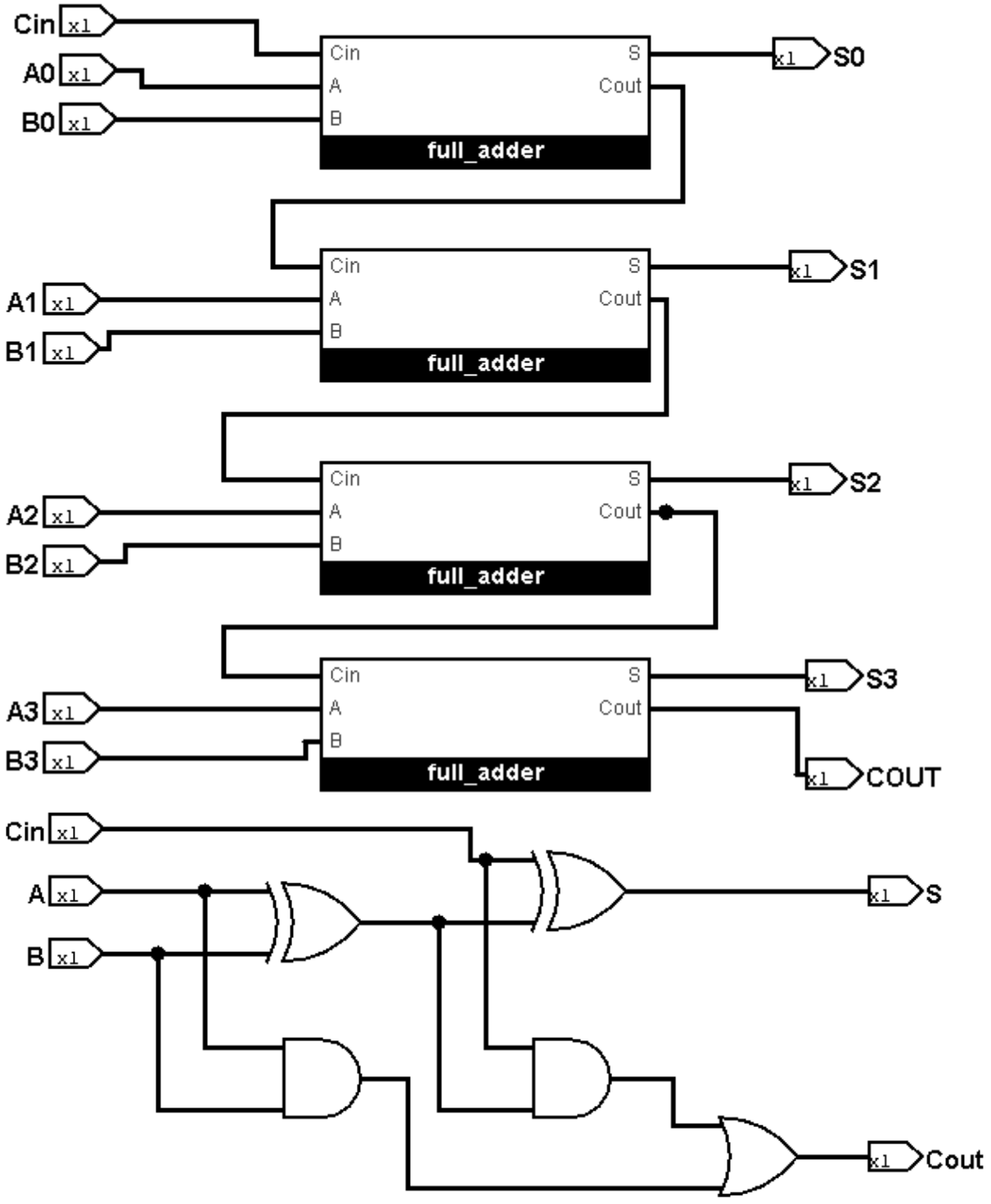
Overall, the dream PC delivers much higher performance, faster loading times, better graphics, and far more upgrade potential than my current laptop.

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.

Ebrahim Alantari



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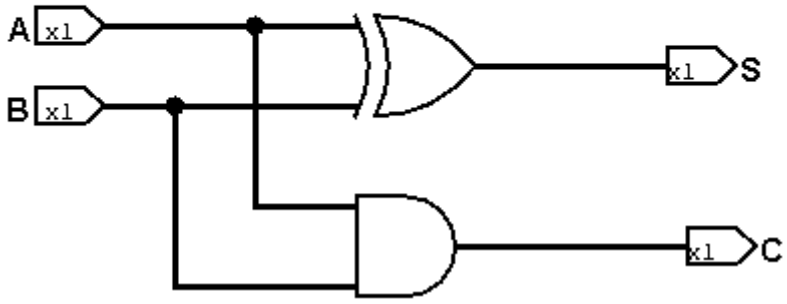

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