Template Week 3 – Hardware

Student number: 529471

Assignment 3.1: Examine your phone

What processor is in your phone?

A16 Bionic chip

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

RISC (Reduced Instruction Set Computer)

How much RAM is in it?

6GB

How much storage does your phone have?

256GB

What operating system is running on your phone?

IOS

Approximately how many applications do you have installed?

130

Which application do you use the most?

WhatsApp

Can your phone be charged with what type of plug?

Lightning connector

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

Lightning port

Assignment 3.2: Examine your laptop

What processor is in your laptop?

AMD Ryzen 7 6800H with Radeon Graphics

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

CISC (Complex Instruction Set Computer)

How much RAM is in it?

16GB

How much storage does your laptop have?

1TB

Which operating system is running on your laptop?

Windows

Approximately how many applications do you have installed?

168

Which application do you use the most?

Google Chrome

Can your laptop be charged with what type of plug?

DC plug

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

USB type A, USB type C, HDMI, Audio jack, Ethernet

Assignment 3.3: Power to the laptop

What is the input voltage?

100-200V

What is the output voltage?

20.0V

How many watts can your power adapter deliver?

240.0W

Is the input voltage AC or DC?

AC

Is the output voltage AC or DC?

DC

AC/DC what is that?

AC stands for alternating current, which means; an electric current that regularly changes direction. The standard use of AC is to transmit electricity from power plants to homes and businesses. Devices like lamps, appliances, televisions, and others that connect directly to a wall socket without an adapter, run on AC.

DC stands for direct current, which means the current flows only in one direction. Small electronics like laptops and smartphones operate on DC, where their adapter converts the AC from a wall socket to the DC that the device needs. Batteries also supply power in the form of DC.

When referring to voltage, the terms AC and DC essentially mean “alternating voltage” and “direct voltage” respectively. (Justice, 2020)

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

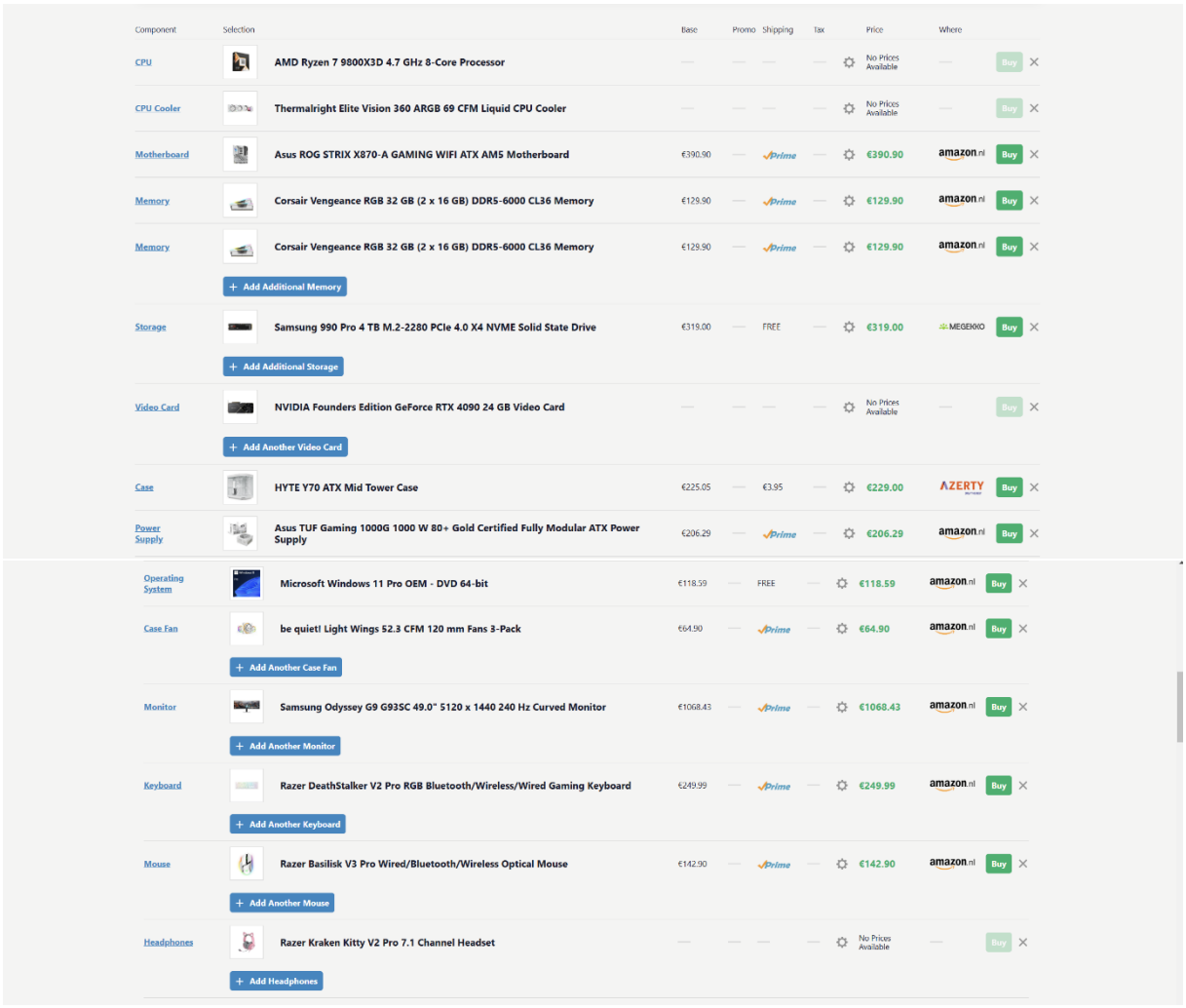
Reversing the polarity of the output voltage on a laptop will affect it badly as it can lead to damage or even failure of the battery and other electrical components, such as PCBs which can be difficult to identify visually (Matric Group, 2023). On the other hand, Some laptops have polarity reversal protection. This will result in cracking and smoke, in case of reversed polarity, but the device may still run on battery power. However, the power supply will stop working (Georgiev, n.d.).

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.

Nothing bad will happen to my laptop and it will not draw more than 15W, because the manufacturer designs the laptop that will operate within a specific maximum power consumption, so it will only ever draw the amount of power required at the time (The Laptop Power Supply Shop, 2019).

Assignment 3.4: Build your dream PC

Screenshots PC configuration + motivation:



Component	Selection	Base	Promo	Shipping	Tax	Price	Where
CPU	AMD Ryzen 7 9800X3D 4.7 GHz 8-Core Processor	—	—	—	—	No Prices Available	—
CPU Cooler	Thermalright Elite Vision 360 ARGB 69 CFM Liquid CPU Cooler	—	—	—	—	No Prices Available	—
Motherboard	Asus ROG STRIX X870-A GAMING WIFI ATX AM5 Motherboard	€390.90	—	Prime	—	€390.90	amazon.nl
Memory	Corsair Vengeance RGB 32 GB (2 x 16 GB) DDR5-6000 CL36 Memory	€129.90	—	Prime	—	€129.90	amazon.nl
Memory	Corsair Vengeance RGB 32 GB (2 x 16 GB) DDR5-6000 CL36 Memory	€129.90	—	Prime	—	€129.90	amazon.nl
	+ Add Additional Memory						
Storage	Samsung 990 Pro 4 TB M.2-2280 PCIe 4.0 X4 NVME Solid State Drive	€319.00	—	FREE	—	€319.00	MEGEKKO
	+ Add Additional Storage						
Video Card	NVIDIA Founders Edition GeForce RTX 4090 24 GB Video Card	—	—	—	—	No Prices Available	—
	+ Add Another Video Card						
Case	HYTE Y70 ATX Mid Tower Case	€225.05	—	€3.95	—	€229.00	AZERTY
Power Supply	Asus TUF Gaming 1000G 1000 W 80+ Gold Certified Fully Modular ATX Power Supply	€206.29	—	Prime	—	€206.29	amazon.nl
Operating System	Microsoft Windows 11 Pro OEM - DVD 64-bit	€118.59	—	FREE	—	€118.59	amazon.nl
Case Fan	be quiet! Light Wings 52.3 CFM 120 mm Fans 3-Pack	€64.90	—	Prime	—	€64.90	amazon.nl
	+ Add Another Case Fan						
Monitor	Samsung Odyssey G9 G93SC 49.0" 5120 x 1440 240 Hz Curved Monitor	€1068.43	—	Prime	—	€1068.43	amazon.nl
	+ Add Another Monitor						
Keyboard	Razer DeathStalker V2 Pro RGB Bluetooth/Wireless/Wired Gaming Keyboard	€249.99	—	Prime	—	€249.99	amazon.nl
	+ Add Another Keyboard						
Mouse	Razer Basilisk V3 Pro Wired/Bluetooth/Wireless Optical Mouse	€142.90	—	Prime	—	€142.90	amazon.nl
	+ Add Another Mouse						
Headphones	Razer Kraken Kitty V2 Pro 7.1 Channel Headset	—	—	—	—	No Prices Available	—
	+ Add Headphones						

Main differences:

When compared with my current laptop, my dream PC significantly outperforms my laptop in nearly every aspect. I have built my dream PC which is designed for maximum performance and multitasking, making it an excellent choice for gaming and intensive tasks. Although I love my current laptop as it's a portable and efficient choice for me, it cannot compete with the raw power and capabilities of my dream desktop system. Here are the main differences between the two:

CPU: The custom-built PC's AMD Ryzen 7 9800X3D CPU, surpass the Ryzen 7 6800H in my laptop as it has a higher clock speed and a better architecture which results in a superior gaming experience and productivity.

GPU: Compared with my NVIDIA RTX 3060, which is a mid-range GPU that is more suitable for 1080p gaming, the NVIDIA GeForce RTX 4090 is a top-tier graphics card designed for 4K gaming and professional tasks like editing.

Memory: While the custom-built PC features a 64GB high-speed DDR5-6000 RAM, my laptop only has a 16GB DDR4 memory. This results in the desktop being an ideal for multitasking and memory-intensive applications, whereas my laptop is limited to more basic tasks and moderate gaming.

Storage: The storage difference speaks for itself as the desktop has a 4TB SSD and my laptop has a 1 TB SSD.

Power Supply: The power supply in the custom-built PC is a 1000W Corsair PSU, whereas my laptop's power supply is 240W. This means that the desktop provides a reliable power for high performance components while also leaving room for future upgrades. On the other hand, my laptop's power supply is enough for modest power requirements and has a limited expandability.

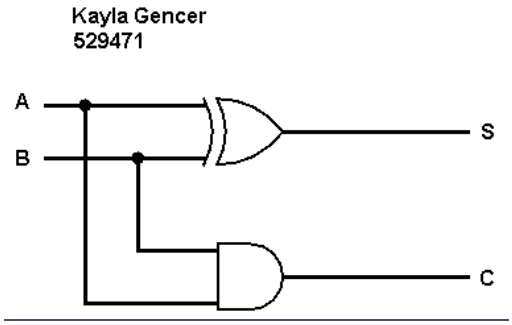
Monitor: The desktop features a 49-inch ultra-wide display, with 5120x1440 resolution and 240Hz refresh rate which offers highly responsive gaming experience. On the other hand, my laptop has a 2560x1440, 165Hz display which still offers a responsive gaming experience but cannot match the quality of the desktop's monitor.

Bonus point assignment – week 3

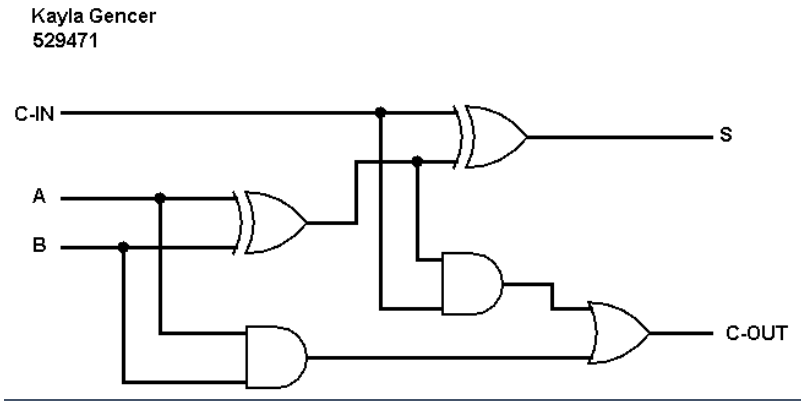
Complete the **half adder**, **full adder** and **4-bit adder** assignment as described in the PowerPoint slides of week 3 in Logisim. Save the chip design and also export three PNG pictures of the separate finished designs. See the PowerPoint slides of week 3.

Paste the three exported PNG pictures in here.

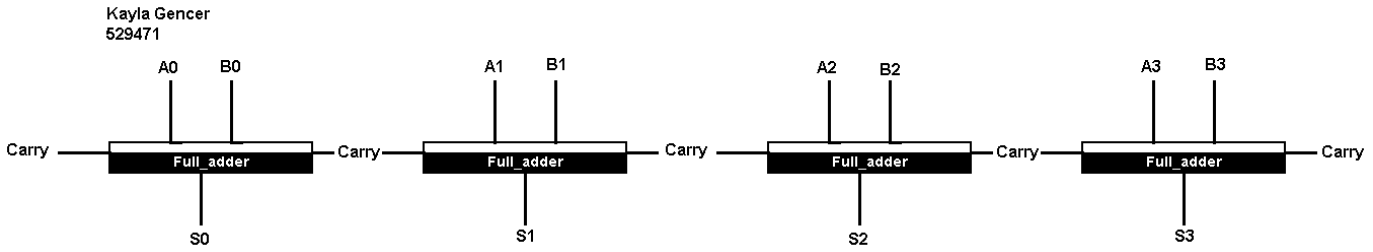
Half adder



Full adder



4-bit adder



References

Georgiev, A. (n.d.). *What can go wrong if you not use the correct charger for your laptop?* Retrieved from Batteryland: https://batteryland.com/en/blog/read/how-to-use-correct-laptop-or-smartphone-charger/#:~:text=Some%20laptops%20and%20other%20devices,power%20supply%20will%20stop%20working

Justice, M. (2020). *How Computers Really Work: A Hands-On Guide to the Inner Workings of the Machine.*

Matric Group. (2023, April). *A Guide to Reverse Polarity Protection in PCB Design*. Retrieved from Matric: https://blog.matric.com/pcb-design-guide-reverse-polarity-protection#:~:text=Reversed%20poles%20occur%20when%20you,potentially%20causing%20an%20electrical%20shock.

The Laptop Power Supply Shop. (2019, July 2). *Can I use a Laptop Charger with a Higher Wattage?* Retrieved from The Laptop Power Supply Shop: https://www.thelaptoppowersupplyshop.co.uk/can-i-use-a-laptop-charger-with-a-higher-wattage

Ready? Save this file and export it as a pdf file with the name: **week3.pdf**