Week 3 – Hardware

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Assignment 3.1: Examine your phone

What processor is in your phone?

- My phone is Motorola Edge Fusion 30, which has Qualcomm Snapdragon 888+ 5G processor.

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

- Snapdragon 888+ 5G processor belongs to ARM64 bit Architecture.

How much RAM is in it?

- It has 8 GB Ram.

How much storage does your phone have?

- It has 128 Gb of storage.

What operating system is running on your phone?

- My phone's operating system is Android 14.

Approximately how many applications do you have installed?

- There are 145 applications installed on my phone.

Which application do you use the most?

- I use Instagram the most.

Can your phone be charged with what type of plug?

- My phone charges from USB Type-C (USB-C) plug.

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

- I have USB-C port on my bottom edge for charging, SIM tray on bottom edge next to USB-C for the sim.

Assignment 3.2: Examine your laptop

What processor is in your laptop?

- The processor in my laptop is 14th-gen Intel Core i9-14900HX.

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

- It belongs to the x86 architecture family.

How much RAM is in it?

- It has 32 GB of RAM.

How much storage does your laptop have?

- My laptop have Storage of 464 GB of storage.

Which operating system is running on your laptop?

- Windows 11 Education is running on my laptop.

Approximately how many applications do you have installed?

- I have 49 applications installed on my laptop.

Which application do you use the most?

- I used Google Chrome the most.

Can your laptop be charged with what type of plug?

- My Laptop can be charged with round DC barrel plug.

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

1. I can see USB Type-A ports rectangular, there are 3× USB-A 3.2 ports one on the left, two on the other side.

2. I have USB Type-C ports small, oval. 2× USB-C on the back
3. I have HDMI port on the back for external monitors/TVs.
4. I have RJ-45 Ethernet port Wide, slightly “tall” port with a clip on the back.
5. I have 3.5 mm audio jack, Small round headphone/mic combo jack on the left side.
6. I have DC power charging port, round barrel-type connector for the power brick, on the back.
7. And a Kensington lock slot Small rectangular slot for a security cable, on the left side.

Assignment 3.3: Power to the laptop

What is the input voltage?

- The input voltage of my Charger is 100-240V and 50-60 Hz.

What is the output voltage?

- The Output voltage of my Charger is 19.5V.

How many watts can your power adapter deliver?

- It can deliver 330 W of power.

Is the input voltage AC or DC?

- = AC

Is the output voltage AC or DC?

- = DC

AC/DC what is that?

- Electrical current comes in two varieties: AC and DC. Direct current, or DC, has a single direction of flow and a voltage that is essentially constant. DC is used in batteries, phones, USB devices, and laptop internal power. This is what comes out of the wall socket for instance, 230 V AC at 50 Hz in many countries, or 120 V AC at 60 Hz. AC (Alternating Current) changes direction numerous times per second and its voltage rises and falls like a wave.

Because all the laptop's electronics require DC to function, your laptop's power adapter converts AC from the wall to DC before sending that DC to your laptop via the charger socket.

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

- Yes, it's awful. A particular DC polarity centre pin = +, outer = − is expected by my laptop. Reversing that could harm the motherboard as a whole or the power circuitry, particularly in a high-power 330 W adaptor.

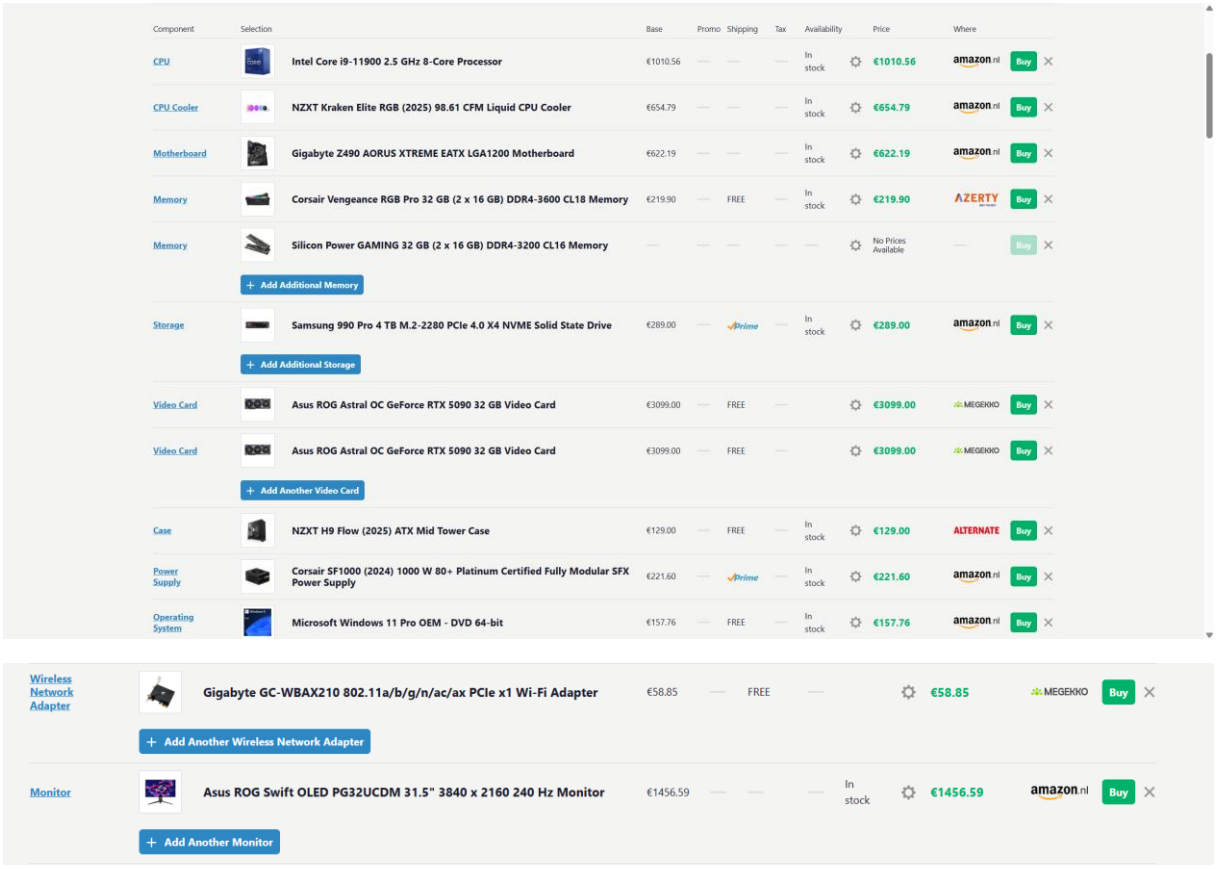
You forgot your power adapter; your laptop normally needs 15 watts. You will be loaned a power adapter that can deliver 50 watts. Voltage, polarity, etc. are all the same compared to the original power adapter. You can connect the borrowed power adapter to your laptop. What will happen? Also explain why you think that.

- If I connect the 50 W power adapter to my laptop, the laptop will still only take the power it needs, which is about 15W. The important thing is that the voltage and polarity are the same as the original adapter. The power rating 15 W or 50 W is just the maximum the adapter can deliver, not what it forces into the laptop.

  The laptop behaves as the load and decides how much current to draw. The adapter provides a fixed voltage U; the laptop then draws a certain current I, so the power is P = U. Even though the new adapter can supply up to 50 W, the laptop will only draw about 15 W, so the adapter is working well below its limit and is safe to use.

Assignment 3.4: Build your dream PC

Screenshots PC configuration + motivation:



Component	Selection	Base	Promo	Shipping	Tax	Availability	Price	Where
CPU	Intel Core i9-11900 2.5 GHz 8-Core Processor	€1010.56	—	—	—	In stock	€1010.56	amazon.nl Buy
CPU Cooler	NZXT Kraken Elite RGB (2025) 98.61 CFM Liquid CPU Cooler	€654.79	—	—	—	In stock	€654.79	amazon.nl Buy
Motherboard	Gigabyte Z490 AORUS XTREME EATX LGA1200 Motherboard	€622.19	—	—	—	In stock	€622.19	amazon.nl Buy
Memory	Corsair Vengeance RGB Pro 32 GB (2 x 16 GB) DDR4-3600 CL18 Memory	€219.90	—	FREE	—	In stock	€219.90	AZERTY Buy
Memory	Silicon Power GAMING 32 GB (2 x 16 GB) DDR4-3200 CL16 Memory	—	—	—	—	—	No Prices Available	— Buy
	+ Add Additional Memory							
Storage	Samsung 990 Pro 4 TB M.2-2280 PCIe 4.0 X4 NVME Solid State Drive	€289.00	—	Prime	—	In stock	€289.00	amazon.nl Buy
	+ Add Additional Storage							
Video Card	Asus ROG Astral OC GeForce RTX 5090 32 GB Video Card	€3099.00	—	FREE	—		€3099.00	MEGEKKO Buy
Video Card	Asus ROG Astral OC GeForce RTX 5090 32 GB Video Card	€3099.00	—	FREE	—		€3099.00	MEGEKKO Buy
	+ Add Another Video Card							
Case	NZXT H9 Flow (2025) ATX Mid Tower Case	€129.00	—	FREE	—	In stock	€129.00	ALTERNATE Buy
Power Supply	Corsair SF1000 (2024) 1000 W 80+ Platinum Certified Fully Modular SFX Power Supply	€221.60	—	Prime	—	In stock	€221.60	amazon.nl Buy
Operating System	Microsoft Windows 11 Pro OEM - DVD 64-bit	€157.76	—	FREE	—	In stock	€157.76	amazon.nl Buy
Wireless Network Adapter	Gigabyte GC-WBAX210 802.11a/b/g/n/ac/ax PCIe x1 Wi-Fi Adapter	€58.85	—	FREE	—		€58.85	MEGEKKO Buy
	+ Add Another Wireless Network Adapter							
Monitor	Asus ROG Swift OLED PG32UCDM 31.5" 3840 x 2160 240 Hz Monitor	€1456.59	—	—	—	In stock	€1456.59	amazon.nl Buy
	+ Add Another Monitor							

I'm now using an Acer Predator Helios Neo 16 gaming laptop, which has a 16" high refresh rate display, an RTX 40 series mobile GPU, 16–32 GB of RAM, and an Intel Core i9–14900HX. The CPU is newer and quicker than the 11th-generation desktop i9-11900 in my dream PC, and it is already powerful enough for gaming and education.

My Dream PC would be a high-end desktop with two RTX 5090 32 GB GPUs, 64 GB RAM, and a 4 TB Samsung 990 Pro SSD for optimal gaming and graphics performance. In addition, I selected a 31.5" 4K 240 Hz OLED monitor, which would provide me with more screen real estate and significantly higher image quality than my laptop display. I want a gaming PC that can run any game, both current and future, at very high graphics settings and high frames per second without latency because I enjoy gaming so much. The ideal PC would provide me with significantly more RAM, storage, and GPU speed than my current laptop, but it would be more costly, use more power, and not be portable.

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.

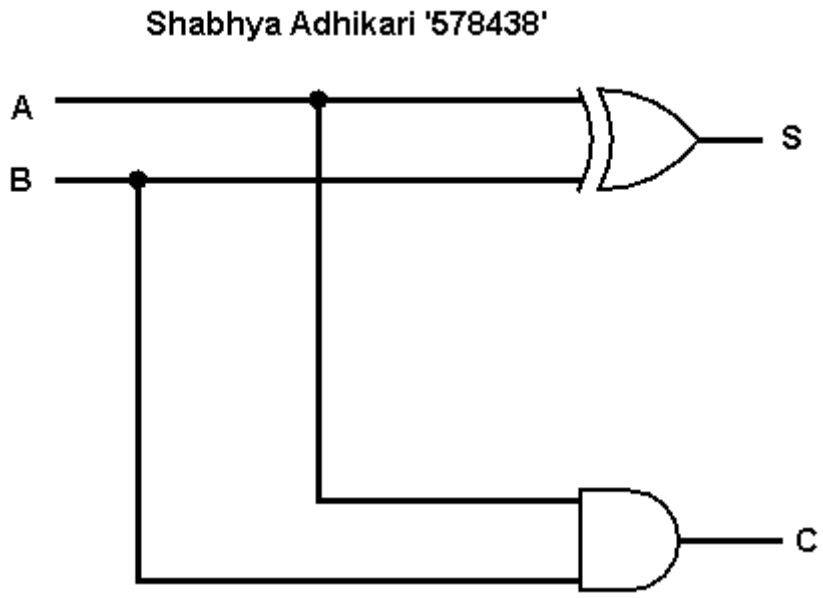


Fig: HALF ADDER

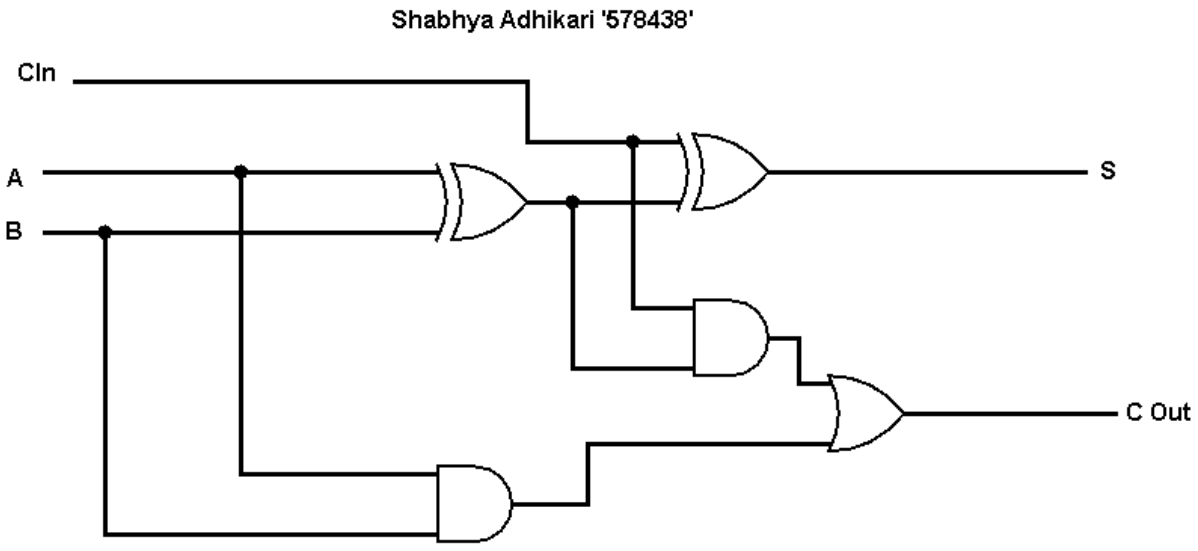


Fig: FULL ADDER

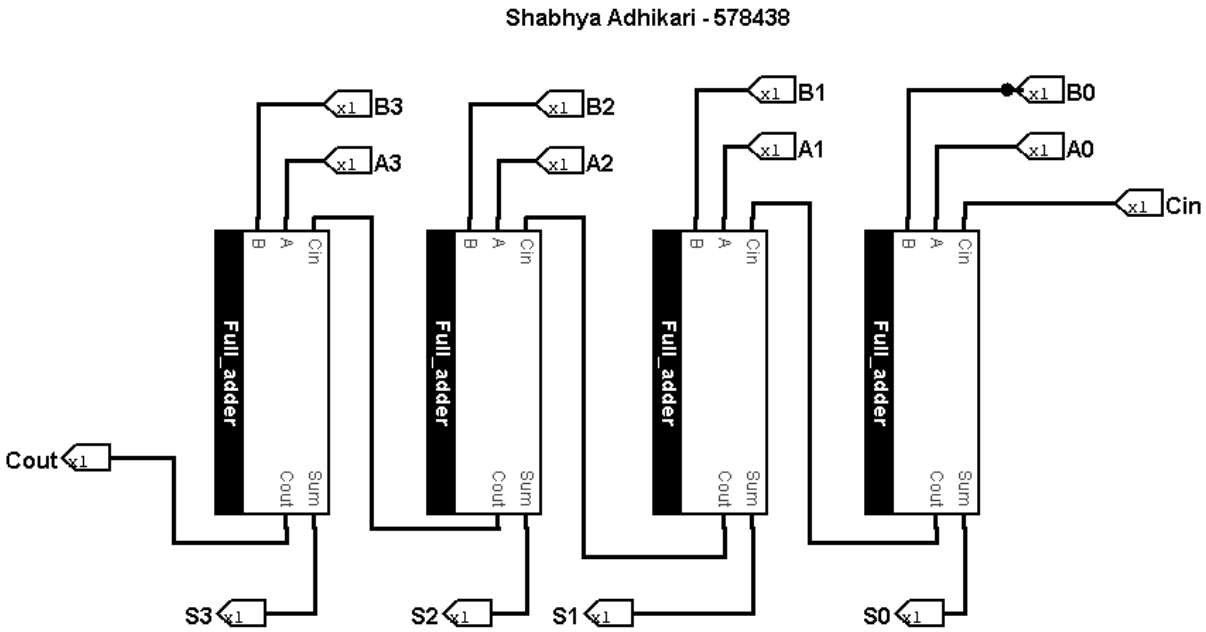


Fig: Four Bit Adder

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