

Week 3 – Hardware

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Assignment 3.1: Examine your phone

What processor is in your phone?

-Apple A17 Pro chip

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

-ARM architecture, specifically ARM64 (AArch64)

How much RAM is in it?

-8 GB RAM

How much storage does your phone have?

-256 GB

What operating system is running on your phone?

-iOS 18.6.2

Approximately how many applications do you have installed?

-113 applications

Which application do you use the most?

-Instagram

Can your phone be charged with what type of plug?

-It can be charged with USB-C plug

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

-USB-C port (I)

-Speaker holes(O)

-Microphone holes (I)

Assignment 3.2: Examine your laptop

What processor is in your laptop?

-I have Intel Core i5-10400H @ 2.60 GHz in my laptop

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

-x86-64

How much RAM is in it?

-16 GB RAM

How much storage does your laptop have?

-1 TB SSD, but can be used only 954 GB

Which operating system is running on your laptop?

-Windows 11 Education

Approximately how many applications do you have installed?

-Approximately 35 (used for education only)

Which application do you use the most?

-Google Chrome and IntelliJ

Can your laptop be charged with what type of plug?

-It can be charged with barrel connector (round DC plug), that is using AC/DC adapter

-Also with USB-C, but it takes longer time to charge.

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

-USB-A ports(3)

-HDMI (1)

-Ethernet (RJ-45) (1)

-Charging port (2):

 1.USB-C (1)

 2.Round DC plug

-Headphone jack(1)

-SD port(1)

Assignment 3.3: Power to the laptop

What is the input voltage?

-It's in range 100-240 V

What is the output voltage?

-The output one is 19.5V

How many watts can your power adapter deliver?

-90 Watts (Output voltage is 19.5 and current is 4.62 A)

Is the input voltage AC or DC?

-AC

Is the output voltage AC or DC?

-DC, because laptops require DC power to work

AC/DC what is that?

-AC is Alternating Current that changes direction

-DC is Direct Current that can flow only in one direction

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

-It's really bad, because It will instantly damage the laptop, because the electricity flows the wrong way

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 and It will work normally. The reason is that voltage and polarity (the important things for proper charging) are same as the original power adapter has. And about the power, the laptop only takes the one it needs(so the laptop will take only 15W even if you give 100W)

Assignment 3.4: Build your dream PC

Screenshots PC configuration + motivation:

My dream PC configuration is shown below:

COMPONENT	IMAGE	ITEM	PRICE	SHIPPING	TAX	AVAILABILITY	LINK	WHERE	BUTTON	X	
CPU		AMD Ryzen 9 9950X3D 4.3 GHz 16-Core Processor	€649.00	—	FREE	—	In stock		€649.00	Buy	
CPU Cooler		Lian Li Galahad II LCD SL-INF 79.9 CFM Liquid CPU Cooler	€249.33	—	€5.95	—	In stock		€255.28	Buy	
Motherboard		Asus ROG CROSSHAIR X870E HERO ATX AM5 Motherboard	€499.00	—	FREE	—	In stock		€499.00	Buy	
Memory		G.Skill Trident Z5 Neo RGB 64 GB (2 x 32 GB) DDR5-6000 CL30 Memory	€699.00	—	FREE	—	In stock		€699.00	Buy	
+ Add Additional Memory											
Storage		Samsung 990 Pro 4 TB M.2-2280 PCIe 4.0 X4 NVME Solid State Drive	€289.00	—	FREE	—		€289.00	Buy		
+ Add Additional Storage											
Video Card		NVIDIA Founders Edition GeForce RTX 5090 32 GB Video Card	€3589.00	—	—	—	In stock		€3589.00	Buy	
+ Add Another Video Card											
Case		HYTE Y70 Touch Infinite ATX Mid Tower Case	€399.00	—	€5.95	—	In stock		€404.95	Buy	
Power Supply		Corsair AX1600i 1600 W 80+ Titanium Certified Fully Modular ATX Power Supply	—	—	—	—		—	Buy		
Operating System		Microsoft Windows 11 Pro OEM - DVD 64-bit	€157.76	—	FREE	—	In stock		€157.76	Buy	

I chose this configuration to achieve the best possible PC for games, that has maximum frame rates at 4K resolution with full Ray Tracing enabled.

The reasons for this components are next:

- **CPU (Ryzen 9 9950X3D)** - everyone says this is the "king of gaming" right now. The 3D cache makes games run smoother than Intel CPUs.
- **GPU (RTX 5090)** - it's the most powerful graphics card in the world. With 32GB of memory, I can play *Cyberpunk* or *GTA VI* on max settings with Ray Tracing and get high FPS.
- **RAM (64GB)** - 32GB is probably enough, but 64GB means I won't need to upgrade for a long time. It's also very fast (6400MHz).
- **Storage (4 TB)** - it reads data at 4000 MB/s. Game loading screens will be basically instant.

Comparison

My current laptop is good for studying, schoolwork, browsing, and basic tasks. It is not suitable for modern gaming because it has a mid-range mobile CPU and only integrated graphics.

My dream gaming PC is extremely powerful. It has one of the best CPUs, the best GPU (RTX 5090), fast DDR5 RAM, 4 TB of super-fast NVMe storage, strong cooling, and a premium motherboard. This PC can run any modern game at the highest settings, do heavy video editing, and stay fast for many years.

The laptop is made for portability and school, while the dream PC is made for maximum gaming performance and power.

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.



