Internal Hardware

Definitions

> Computer science is the study of computation, information, and automation.
>
> -- *Wikipedia*

To accomplish the abovementioned goals of computation, information and automation a computer is frequently used.

There are three main parts by which computer is divided:

- Hardware
- Software
- Data

> Hardware - interconnected electronic components which perform analog or logic operations on received and locally stored information to produce as output or store resulting new information or to provide control for output actuator mechanisms
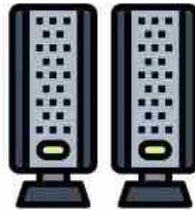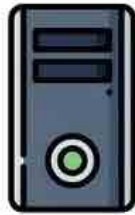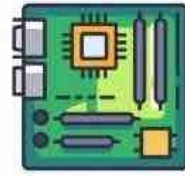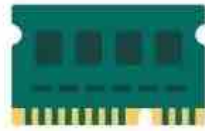>
> -- *Wikipedia*

> Software - computer programs that instruct the execution of a computer. Software can be defined broadly to include design documents, specifications, and testing suites.
>
> -- *Wikipedia*

> Data - smallest units of factual information that can be used as a basis for calculation, reasoning, or discussion.
>
> -- *Wikipedia*

Quests:

👍

Research about first computer

🏅

What is Turing's machine?
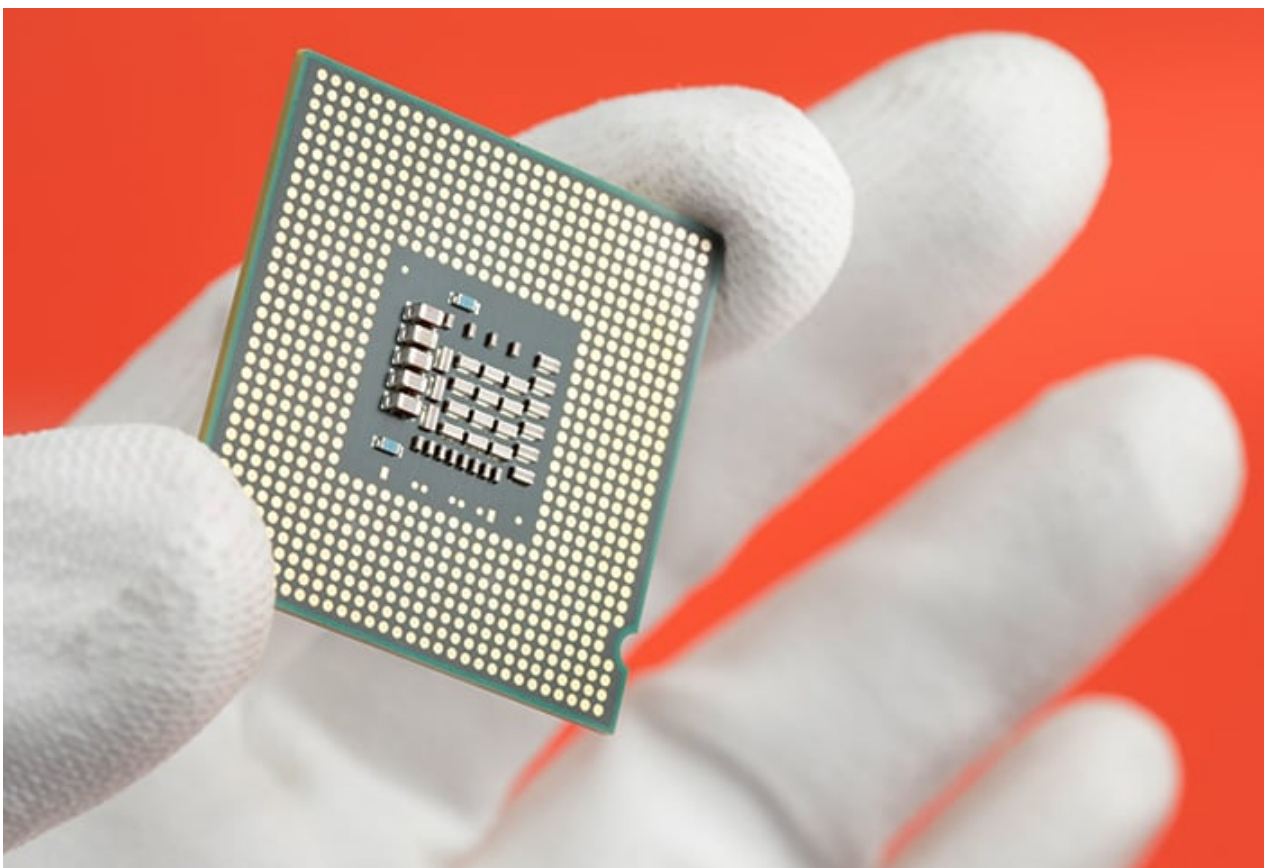
Homework:

👍

Memorize definitions

CPU

CPU - Central processing unit, aka brain of the computer. It consists of many many parts which are connected together through electricity. It performs a huge amount arithmetics with binary numbers which allow complex programs to emerge. One of the main CPUs are logic gates.

Modern CPUs have multiple cores which allow paralleism: ability to execute multiple tasks simultaneously. Moore Law of tech progress.

> Projection that number of transistors in an integrated circuit doubles every two years
> -- *Moore's Law*

Current size of transistors is 5 nm

Intel, AMD, Apple, Qualcom - manufactures

Quests:

👍

Tell an exact model of CPU on your computer

🏅

Tell its technical characteristics

Homework:

👍

Select a model of CPU and write about it

GPU

GPUs - Graphical Processing Unit, used for rendering to the screen.

Rendering - applying colors in realistic/stylistic way.

The main difference with CPUs is huge amount of parallel computations. When CPU contains 20 cores, GPU contain thousands of them. So this is the reason of its existence.

Factors for increasing price of GPUs

1. Games
2. Films, Architecture design
3. Cryptocurrency
4. AI (ChatGPT, AI art)

Quests:

👍

Tell an exact model of the GPU on your computer

🏅

What was the top limit of quality for computer without the GPU

Homework:

👍

Find the cheapest GPU in today's market

Memory

Generally, there are two types of computer memory: volatile and nonvolatile.
RAM - a volatile type of memory (lost with the power), that computer uses to operate.
HDD/SSD - storage memory, that is much slower than the RAM.

The term "memory" is used because application needs to store data. When one types into digital notepad, the text is saved in RAM, that is why apps ask you to save the file.

The memory is measured in bytes, where 1 byte is 8 bits

```
10101010 = byte (each zero and one is individual bit)


1000 bytes     = 1 kilobyte kB   1024 bytes     = 1 kibibyte KB
1000 kilobytes = 1 megabyte kB   1024 kibibytes = 1 mebibyte MB
1000 megabytes = 1 gigabyte gB   1024 mebibytes = 1 gibibyte GB
1000 gigabytes = 1 terabyte tB   1024 gibibytes = 1 tebibyte TB
```

Quests:

👍

What RAM, HDD, SSD stand for? What's the difference between them?

🏅

Why traditionally the memory is measured using 1024 as a base for the next notation?
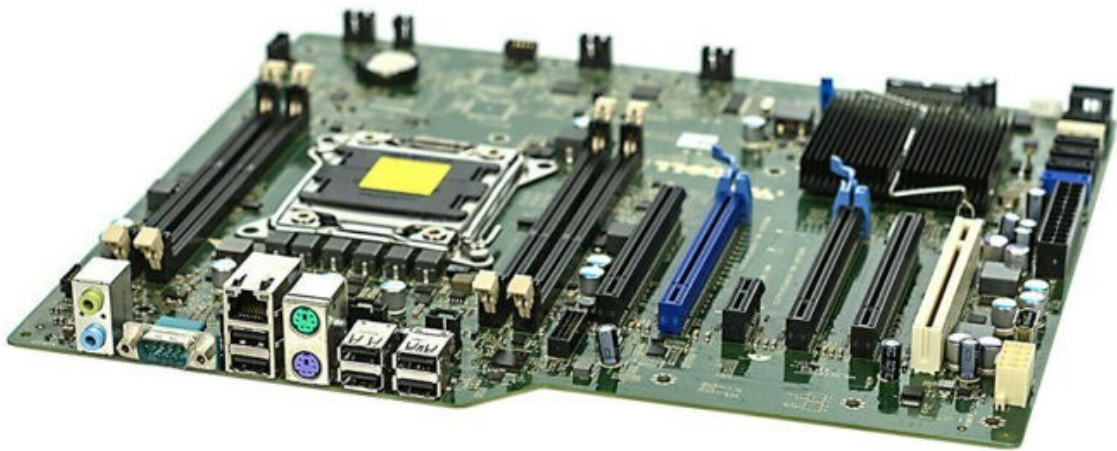
Homework:

👍

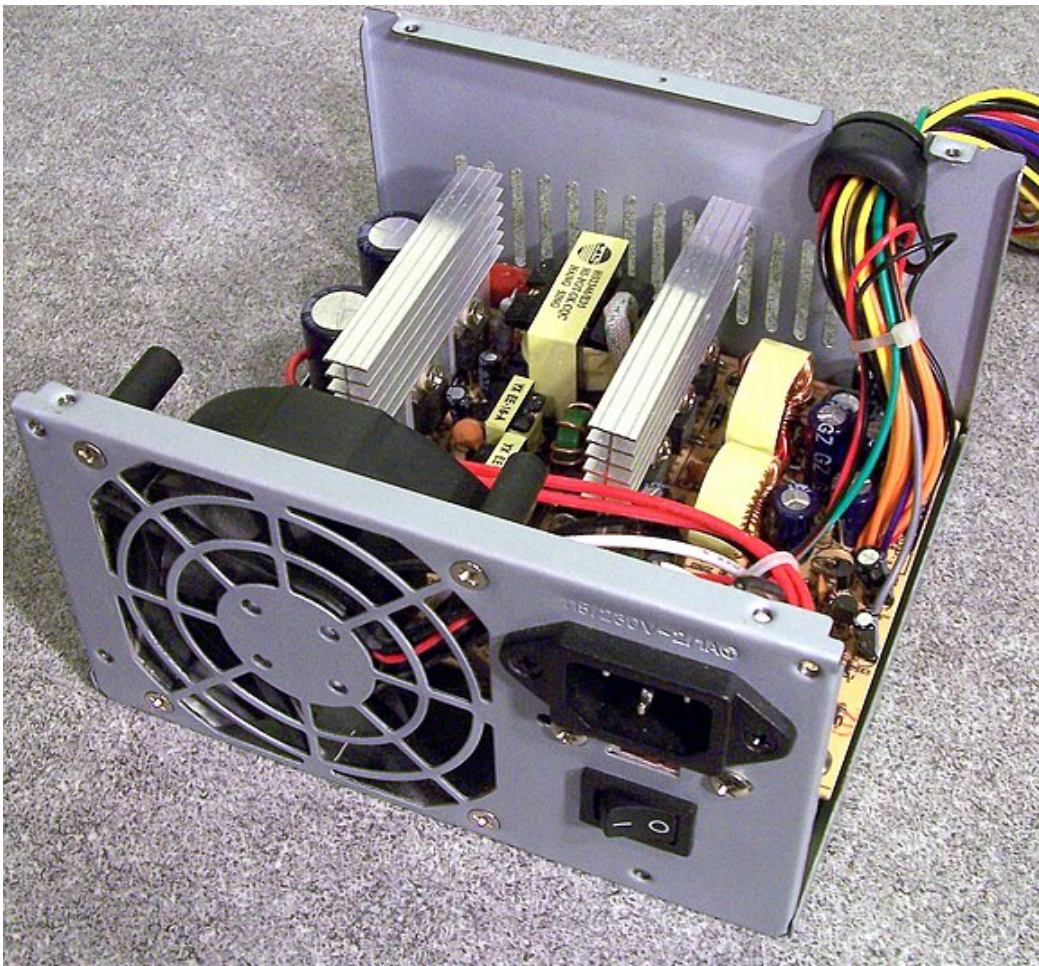Research in the lowest and hightest amount of memories in the components.

Motherboard

> *Motherboard* means specifically a PCB with expansion capabilities. As the name suggests, this board is often referred to as the *mother* of all components attached to it, which often include peripherals, interface cards, and [daughterboards](): [sound cards](), [video cards](), [network cards](), [host bus adapters](), [TV tuner cards](), [IEEE 1394]() cards, and a variety of other custom components.
>
> -- *[Wikipedia]()*

`Motherboard` is a component that *connects* all computer parts together, and provides connection ports for the peripherals.

`power supply unit`

Quests:

👍

List at least 7 hardware components that are connected to the motherboard

🏅

Should the motherboard be cleaned? What is the correct way to clean it?

Homework:

👍

Prepare for the Final Exam