

Computer Systems Fundamentals

by Wioletta Kaprol

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Student name: Wioletta Kaprol

Student ID number: 1603062

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COMPUTER SYSTEM COMPONENT SPECIFICATION

INTRODUCTION

In the age of digitalization and technological progress, computers have become an integral part of our lives. In this essay, I will focus on analyzing and building a computer, understanding its key components, and understanding how these components work together to ensure smooth and effective operation.

BASIC COMPUTER COMPONENTS

The most basic computer set consists of the following components: case, motherboard, processor, RAM, SSD (or HDD), graphics card, CPU cooler, power supply, and input/output devices. [1] [2]

HARDWARE

CPU (Main Processor Unit)

The processor is the brain of the computer. It is a component equipped with the so-called cores, which coordinate all tasks performed by the computers. Dual-core processors work well for basic tasks, but professionals and gamers can choose models with 4, 6, 8, or more cores. Performance is also affected by clock speed - expressed in MHz or GHz. This parameter is important when the so-called high computing power is needed, which is important, m.in, for gamers or users for whom performance is the most important. We can choose between processors from two companies: Intel and AMD. Which one we decide on determines the type of motherboard. [1] [3] [2]

Graphic card

The graphics card shows the effects of the computer's work on the monitor screen. The higher the performance of this component, the higher the image quality. Your computer will be able to display a higher resolution and a smoother animation. The graphics card also has the effect of faster execution of processes such as rendering. Radeon RX, GeForce GTX, and RTX are the most popular graphics cards. Their performance is evidenced by the amount and type of video memory and the clock speed of the memory. Still, proper cooling is also important, which affects the reliability and work culture of the graphics card. [1] [3] [2]

CPU cooler

By choosing the right CPU cooler, you not only ensure that your computer runs quieter but also improve stability and performance. The CPU is one of the components that generates the most heat and consumes the most electricity. Choosing the right cooler is crucial when you overclock your CPU. [1] [2]

Motherboard

The motherboard is the basic and the key component of a computer. This is where individual components are mounted, e.g. processor, RAM, and graphics card. It is also used to connect components such as hard drives and drives. Therefore, all these parts must be compatible with the motherboard. It can also contain integrated elements (built into it) – m.in network and sound card. [1] [3] [2]

RAM

RAM is the temporary memory of your computer. It stores all the information that the PC needs at any given time to perform the tasks entrusted to it. Both the operating system at startup and any program that is enabled load their components into RAM. From this, it follows that the more memory - it can be 4 GB, 8, 16, or more - the more operations can be performed at the same time. The speed at which operations are processed depends primarily on the type of memory installed in the computer. The most popular today is the efficient and energy efficient DDR4. DDR3 is designed for older motherboards. When choosing RAM, you need to adjust its clock speed to the capabilities of the motherboard and then you will be sure that it will work properly. [1] [2]

Hard disk

A hard drive is a storage device - a place where files are saved. The larger the capacity of this component, the more documents, songs, photos, videos, or games can be stored on it. There are two basic types: platter HDDs, with a high capacity (in the range of a few TB) but also lower speed, and SSD drives, which are more efficient reliable, and virtually silent. By opting for both solutions in one computer, you can get fast loading of the system and the most important programs and at the same time a large storage space for files. [1] [2]

Power Supply

A computer power supply is a component necessary for the operation of a PC. In addition to converting and supplying current, the power supply also has a protective function – it protects computer parts from failure due to short circuits or voltage surges. Its most important parameters are power and efficiency. For the proper operation of more powerful computers, a more powerful power supply is required. [1] [2]

Case

the PC case should be chosen at the very end to make sure it can accommodate all the components of the computer. It is a good practice to choose a case that looks good, but the most important thing is that it provides security for all components of the computer and easy access to them. It should also be spacious enough to make room for future PC upgrades and improvements. [1]

INPUT/OUTPUT

An input-output device is used by a computer to communicate with a user, computer, or other device. Some input-output devices are located inside the computer's central unit housing, often even directly on the motherboard. However, those I/O devices that are attached to the computer via cables or communicate with the computer in other ways (e.g. via radio waves or infrared) are called computer peripherals [3]

INTERNET

The Internet is a worldwide network that connects devices such as computers and smartphones. It allows the exchange of data, i.e. digital information. It is a space of IP addresses that are assigned to individual hosts and servers. These are connected using network devices known from most homes - network cards or modems. They use existing telecommunications infrastructure to communicate with each other via the Internet Protocol. Hosts are devices that allow you to use services, including computers, smartphones, and other smart devices. Servers provide data and services and transmitting and receiving devices (modems and routers) transmit the signal. [4]

SOFTWARE

Software is a set of instructions and data that controls the operation of a computer or other electronic device. It can be compared to the brain of electronics, which manages all operations and enables interaction with the user. Software can take many different forms, including operating systems, applications, computer games, and many others. An operating system, such as Windows or macOS, is the core software that manages your computer's resources and allows you to run other programs. Applications, on the other hand, are programs that perform specific tasks, such as web browsers, word processors or graphics processing programs. Software is created by programmers who write computer code, i.e. a set of instructions that a machine can understand. This code is then compiled and run on the computer, which allows the software to run. [2] [3]

TASK 1

For the given task and after careful consideration of several options, I decided to propose a desktop PC, which is not the cheapest version, but in the long run, it will provide value for money and provide greater security to users and considering their wishes regarding the appearance, comfort, and purpose of using this device.

Windows 11 increases system security by introducing two notable features such as TPM 2.0 and Secure Boot. TPM 2.0 (Trusted Platform Module) is a special hardware device that is used to store encryption and authorization keys. Windows 10 will reach the end of support on October 14, 2025. [5] [6]

Therefore, considering that users intend to learn how to use Microsoft Office, and use Skype to communicate with family abroad, the latest version could be a better solution because it prevents changing the operating software overall and facilitates a better understanding of its functions. Also, Windows 11 already supports the newest Skype version 15. [7]

To be able to run the Operating system Windows 11 on a PC the processor must be 1GHz or faster with 2 or more cores. It needs at least 4 GB of RAM and 64 GB of storage on a Hard Drive. It also required the device to be Secure Boot capable. UEFI, Secure Boot, it is not possible to start the computer using a replaced, unsigned boot manager. This protects against malware. [8]

Another function that is required to run Windows 11 is the Trusted Platform Module (TPM), which is strictly related to the issue of security, and comes to a system that enables the use of security features. It works by creating encryption keys, the main one used to decrypt them is stored in the microcircuit, not the hard drive. [8]

This computer's main purpose is not high-end gaming or video editing, where a more powerful CPU, dedicated graphics card, and possibly an SSD hard drive for faster data would be needed, this setup should handle everyday tasks quite well.

Proposed PC:

CPU: AMD Ryzen 3 3200G, PC processor, 3.6 GHz 4 MB L3 Cache, AM4 socket,

Motherboard: MSI B450M PRO-VDH MAX with integrated graphic card Radeon Vega 8 integrated GPU

RAM: 16GB (2x8GB) 3200MHz CL16 Intel XMP 2.0

Hard Drive: 500GB SATA 2.5-inch Internal Hard Drive OEM, 5400RPM 8MB Cache,

Networking: Wired LAN/ (optional-Wi-Fi card, 5400Mbps 6E Wireless Wi-Fi Bluetooth 5.3 PCIe)

Interfaces: PS/2 Port/ USB 2.0/VGA/DVD-D/HDMI/USB 3.2/LAN/HD

Case: Midi case with Power supply: 500W

CPU Cooler

Software: Operating System: Windows 11 Home

Input/Output:

Monitor: 27 inches with built-in speakers

Keyboard with large print

Wired mouse

Webcam with microphone

Optional

Wi-Fi Card, 5400Mbps 6E /Bluetooth 5.3 PCIe

Mouse pad

HDMI cable

Microsoft courses are free (examples of links for Microsoft tutorials in Appendix 1)

Total Price £547.96 (Full specifications and pictures in Appendix 1)

TASK 2

The computer I use is a computer that I purchased in 2016 for my son who was in college studying Graphics Design at that time. Now the computer is a family computer mainly used by me for everyday use. It performs quite well but doesn't have a Hard drive with enough memory to upgrade to Windows 11.

Originally run on Windows 8 operating system and upgraded to Windows 10 in 2020.

The main properties of the computer are:

Processor Intel(R) Core (TM) i5-4440 CPU @ 3.10GHz 3.10 GHz

Graphic card Nvidia GeForce GTX 745 DDR3 4GB

Installed RAM 8.00 GB

Product ID 00326-10000-00000-AA640

System type 64-bit operating system, x64-based processor

Output/Input

Monitor: ACER T272HL/ 27 inches with integrated speakers/ touchscreen

Webcam with microphone

Wireless Keyboard and Mouse

Printer/ Scanner HP 342A90

Full list of depth analysis with screenshots in Appendix 2.

CONCLUSION

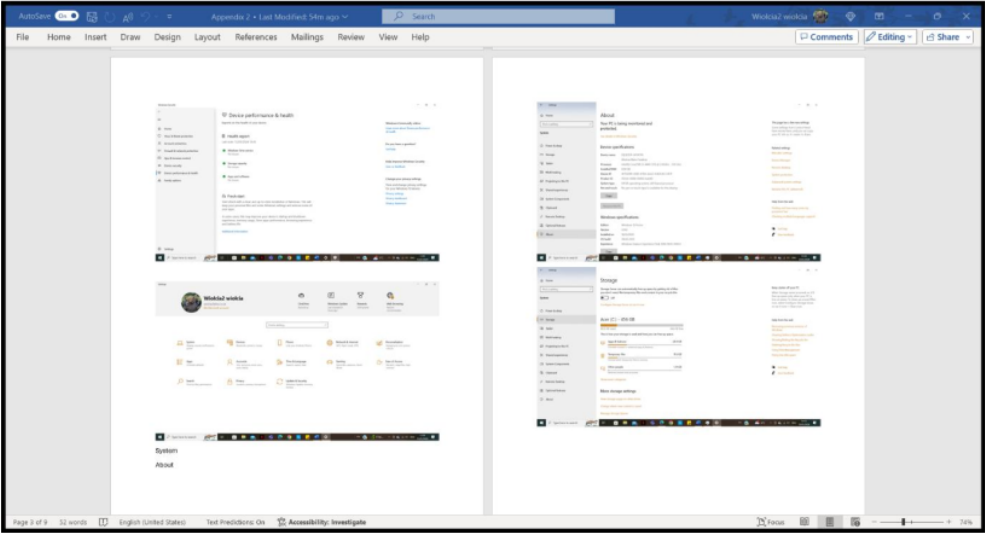
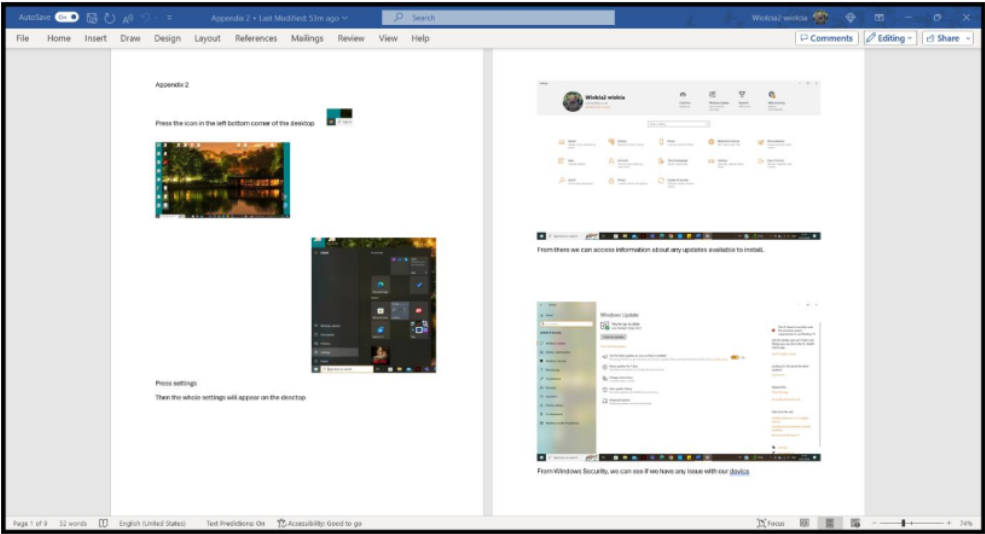
In conclusion, building and analysing your computer is a fascinating experience that allows you to understand how complex machines like computers can run so smoothly and efficiently. This experience not only broadened my technical knowledge but also taught me patience and precision, which are essential when building a computer. Nowadays, when technology is an inseparable part of our lives, such skills are invaluable.

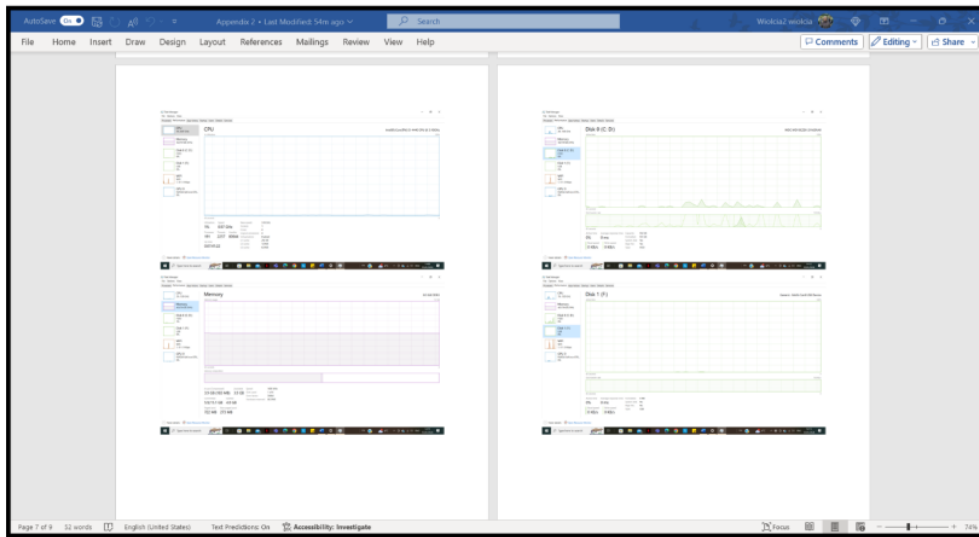
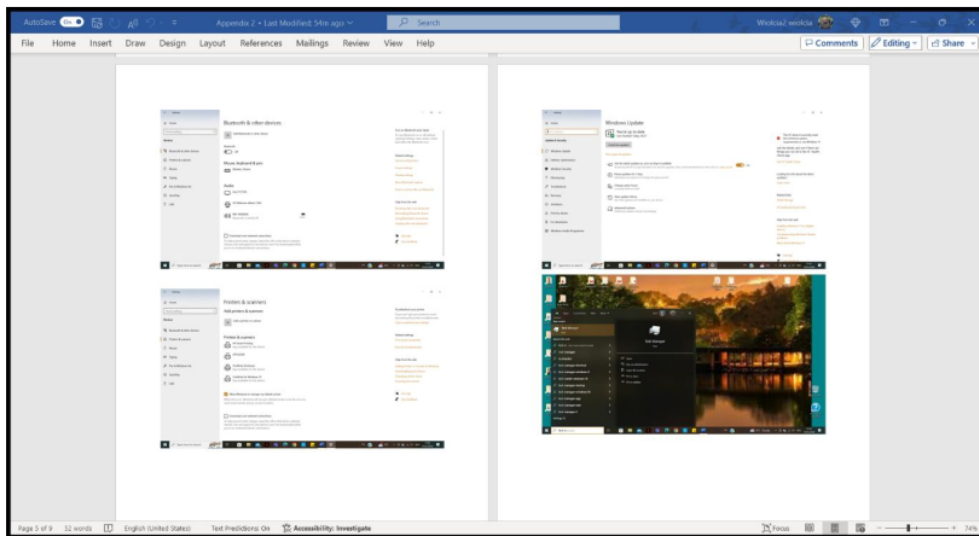
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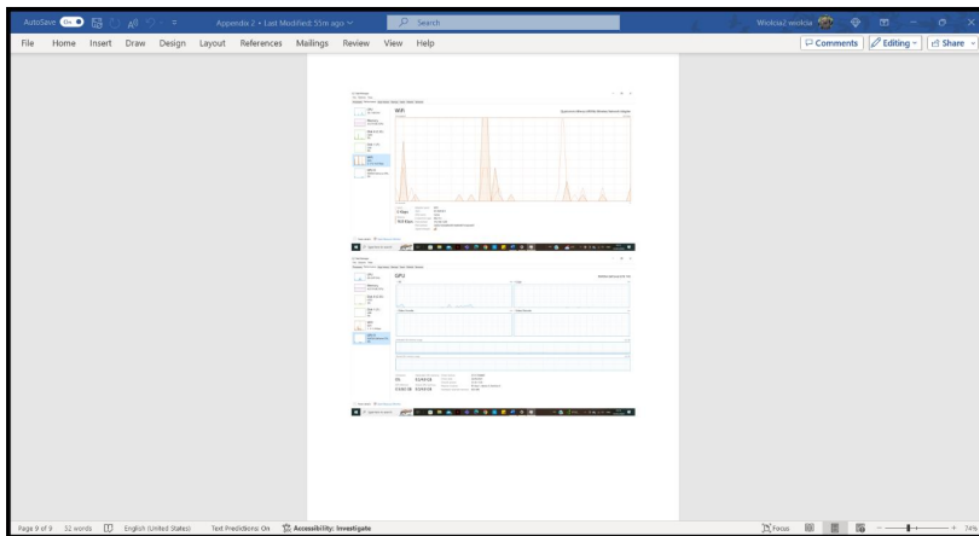
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APPENDIX2







Computer Systems Fundamentals

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

68/100

PAGE 1

PAGE 2



Comment 1

A citation is required to support this statement

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GRADING FORM: GRADING

ENGAGEMENT WITH LITERATURE

Marks will be awarded based on the extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions. Your research sources should extend beyond simply using the links provided in the moodle content. You MUST include evidence of sources that you have discovered yourself during the course of your own student centred work.



Engagement with an appropriate range of literature, including sources retrieved independently. Some over-reliance on texts rather than other sources. Referencing may show minor inaccuracies or inconsistencies. Yet, the bibliography has a big issue where numbers of references are not provided!

2**KNOWLEDGE AND UNDERSTANDING**

Marks will be allocated based on the demonstration and extent of knowledge and understanding of the general concepts and underlying principles covered in this module.



Competent knowledge of the basic underlying concepts and principles. Exhibits very good understanding. Further in-depth analysis would have provided the report more value.

21**COGNITIVE AND INTELLECTUAL**

This section covers your ability to look at the alternative solutions, and provide solid justification as to why your chosen components are the most suitable compared to others.



Sound evaluation of the underlying concepts and principles. Ability to devise arguments using evidence to make mostly appropriate and valid judgements. Good range of recourses used in the report

18

PRACTICAL SKILLS

This section will allocate marks based on the real life practicality of overall system. Have you come up with a sensible, balanced, usable system with no obvious omissions or unsuitable choices etc.



A very good application of a range of basic methods, materials, tools and/or techniques. Very good consideration of the context of the application. Very good evidence of different approaches to problem-solving in particular contexts and proposes appropriate solutions.

14

TRANSFERABLE SKILLS FOR LIFE

This section will be assessed based on the written and presentational quality of the report. Style, structure, grammar, spelling etc. Make sure it conforms to the layout conventions previously discussed in class.



Mostly coherent, organised and accurate work, in a suitable structure and is for the most part clearly expressed. Can work effectively independently and/or as part of a team, with clear contribution to

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group activities.

Demonstrates the skills for employment requiring the exercise of some personal responsibility, with some areas of strength and some of minor weakness.

Further reading of an appropriate resources (Books) is required to improve the overall quality of the report