English Language Skills E-portfolio

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1. Self presentation exercise

Hello everyone,

My name's Michał and I would like to introduce myself to you. Just like you, I'm studying at Wrocław University of Science and Technology, my faculty is Information and Telecommunication Technology. My field of study is IT Automation Systems and I'm working towards a Bachelor of Engineering degree.

I am currently in my second year and third semester, which means I still have four full semesters left until I graduate.

I have a lot of interesting laboratories like digital signals and images, electrical engineering and electronics or computer architecture. I enjoy them because those laboratories are focused on practical and useful in engineering world skisls.
For example at digital signals and images labolatory we write python code to recognize some objects from images, which I think is very useful and may be applicable in my future work.
Unfortunately we have also some lectures that are very dull, because they have very homologous voice which is very annoying.What is more often we have to memorize a lot of useless information that are easily accessible by the internet.

During the last year mostly I've gained experience in mathematical fields like mathematical analysis, probability theorem or linear algebra. In the next semesters, we are to use the achieved mathematical knowledge in our specialized classes.

The reason why I choose this field of study is because it consists of two my favourites science branches - automation and information technology, so I can easily develop in both.
During studies I plan to get well paid and satisfying job as a Java full stack developer or Data Scientist.

I think that's all about myself, thank you for your attention

About me

This exercise was a bit stressful for me as it served as an icebreaker, especially for someone like me who is naturally shy.

The task assisted me in presenting myself from a academic perspective, utilizing university terminology. Now, I can easily articulate the Faculty and field of study I am in. I can also elaborate on which classes are valuable and enriching, and which lectures may be less engaging or considered time-wasters.

Despite the stress and the requirement to strictly adhere to the template, I mostly read through the self-presentation. However, by the end of the semester, I plan to expand on the exercise and practice presenting myself fluently in front of a mirror.

2. Advantages and disadvantages of education system

The Polish education system has its pros and cons. In my humble opinion, one of the biggest advantages of the Polish education system is the free access to primary, middle, and higher education. Many other countries don't offer free university education, which means that people from poorer families don't have the opportunity to develop their own skills, get a bachelor's or engineering degree, and improve their future prospects. In Poland, anyone with the right level of ambition has the opportunity to enroll in university, develop themselves, and achieve a professional career.

Another significant advantage is that our educational system provides a wide range of support and social programs. These programs are designed to assist individuals from the most economically disadvantaged families, as well as to support exceptionally talented students participating in competitions. Often, finalists in these competitions receive financial assistance and opportunities for accelerated career development.

Further highly significant advantage of education in Poland is the robust emphasis on learning foreign languages, which, in my opinion, is currently a priority for effective communication with people worldwide, particularly in professional career or while traveling.What is more, our educational system offers numerous foreign exchange programs, which provide the opportunity to make international **acquaintances** and learn about other cultures.

One advantageous aspect is the high level of teaching at Polish Universities, which are globally respected. Individuals who have completed their studies typically encounter no issues in securing employment

Unfortunately, the Polish system also has numerous drawbacks. In my humble opinion, the biggest one is the redundant emphasis on theoretical knowledge and hard skills, completely ignoring soft skills such as communication or emotional awareness. Another significant disadvantage is the focus on theoretical knowledge often without practical application, which often results in the knowledge taught being quickly forgotten, and students frequently feel demotivated by the lack of visible possibilities for applying the knowledge.

The Polish education system has both pros and cons, but I believe that the education system could be significantly improved, for example, by updating the curriculum to the newest, that's relevant to the modern world. This exercise shows that despite numerous drawbacks, we also have many opportunities on which we should focus.

Advantage   Disadvantage

Next problem with the Polish education system is the outdated curriculum, leading to learning things that are outdated or completely unnecessary, which can lead to problems with the lack of current knowledge when entering the job market.

Another problem is high pressure given to students, which causes a large amount of stress, which negatively affects negatively on their mental state.

The last weakness of the educational system is lack of opportunity to take up internships in a profession before deciding to apply for studies or vocational school.

To sum up the topic of the advantages and disadvantages of the Polish education system is quite complex. Therefore, I believe that everyone should consider what they perceive as the strengths and weaknesses of education and independently assess whether the Polish education system is proper for them.
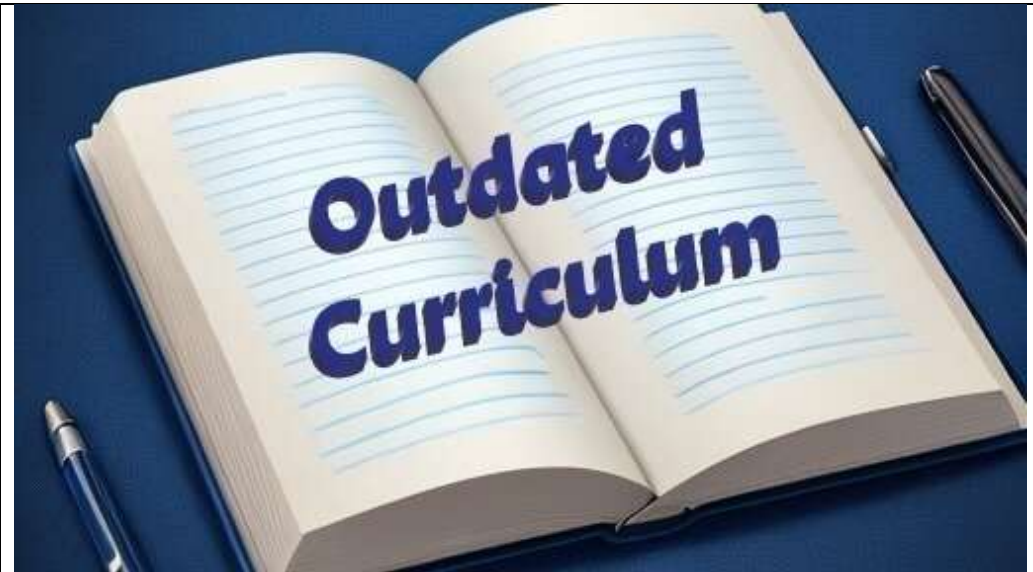
3. SWOT analysis - Learning language goals

Strengths
1. I'm ambitious and self-disciplined person in pursuit of goals
2. Three months at work in UK allowed me to break the language barrier
3. I've been learning English since elementary school, so I can use the language fairly fluently and want to continue improving it.
4. I have easy access to helpful resources such as books, movies, podcasts, mobile apps, and English courses.
5. I enrolled in a C1 level English course, so I need to make an effort to elevate my proficiency and pass the course to graduate the University.

Weaknesses
1. Sometimes being lazy, having a lack of specific structure and methodology to learn evenly.
2. Small attention span because of nowadays environment
3. Language/Social barrier, that makes difficult to talk to other students
4. Sometimes forgetting some words / Having them on the tip of the tongue

Opportunities
1. Participation in international exchange like Erasmus, or international internship like for example USA work and travel programs.
2. Taking a job that will push me to meet and talk in an international environment.
3. Desire to perform well during a job interview.
4. Lesson conversation, with other students at the same/higher level, that helps break the language barrier

Threats
1. Lack of time, or better say poor organization skills, because of involvement in student's union, other student's duties, or any other issues like health, family issues etc.
2. Temptation to abuse translator, or any other thoughtless tools for performing tasks

Surprisingly I turns out that I have a great opportunity to learn English, and honestly, my biggest threat is laziness (I call it poor organizational skills). I think that the best solution for this problem is to schedule a certain period of time each week during which I can study English on my own.

SWOT ANALYSIS

|	Helpful to achieving the objective	Harmful to achieving the objective
Internal origin (attributes of the organization)	Strengths	Weaknesses
External origin (attributes of the environment)	Opportunities	Threats

4. Article entitled: "Generative Artificial Intelligence: Implications and Considerations for Higher Education Practice" – presentation + speech + concept map
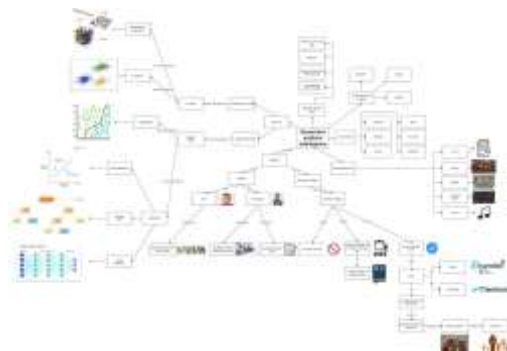
		For me, that was one of the most challenging tasks in my English lesson, but finally, I believe I performed very well, despite the fast pace of the speech content and sometimes imprecise pronunciation. Therefore, next time, I'll aim to speak more slowly. Another aspect I need to improve for future presentations is memorizing more content, rather than reading directly from prepared documents. The concept of a concept map is relatively new to me. By creating one during the presentation, I gained some insights into this technique. While I'm familiar with mind maps, their drawback lies in the lack of a clear direction for thoughts. In this regard, the use of a concept map is a great idea. I intend to incorporate it further in the future when I need to organize my thoughts on paper

5. Article pre-presentation practice 1 - Will a robot take my job

Hi, I choose scientific article form website phys.org entitled: „Will a robot take my job ? Researcher says this view is overly pessimistic". This article is based on journal Industrial and Labor Relations Review and it consist of 4 sections.

First is the introduction, where author says about people's growing fear that the rapid development of new technology (aspecialy automation, and artificial intelligence), will take their jobs. Author points out that's overstated fear, and robots complement human work rather than replace us, and what is more, in some situations they create new jobs.

In the second section, the author show us their research on the impact of robots on the American labor market over 11 years, and it turned out that only the first 5 years had a negative impact on the labor market, while the next 10 had a positive impact and allowed for significant economic growth. The author also mentions a new trend in which robots cooperate with people on production lines.

In the third section, the authors say that the use of new technologies causes the emergence of new tasks and at the same time an increase in the demand for highly qualified experts, whose presence also affects the professional services sector, e.g. accounting, etc.

I realized that I am very monothematic because it's a similar topic to my presentation about GAI. That was my first article presentation that I've made, and I think that I compressed the information a little bit too much because the first version that I made was longer and more detailed than the final version. That's why I'm not very happy about it. But the good news is that the development of automation and, generally, new technology creates new jobs. Most of these jobs require highly educated employees, so it's an opportunity for us to get well-paid positions. Unfortunately, these jobs are also mostly challenging.

In the summary, the author suggested to learn new technologies instead of being afraid of them, and that the situation will change significantly and the situation is monitored on an ongoing basis.

6. Article pre-presentation practice 2 - SpaceX Starship launch failed minutes after reaching space_18 november - (supplement information from link)

I chose a scientific news article from the Reuters.com website, specifically from the Technology section, titled 'SpaceX Starship Launch Failed Minutes After Reaching Space.'

On November 18, an unmanned spacecraft named 'Starship' from SpaceX exploded eight minutes after liftoff. The spacecraft, developed to carry astronauts to the moon, experienced a malfunction in its control system, leading to an uncontrolled loss of connection with the aircraft. According to aviation safety rules, this triggered a self-destruction mechanism.

This incident marked the second attempt at the Starship integrated flight. The first test took place on April 20 and was unsuccessful, as three out of six Raptor engines failed to ignite at liftoff, causing the rocket to slope slightly on the launch platform. Unfortunately, after 27 seconds of flight, communication with another engine was lost due to an error message indicating 'some kind of energetic event.' Subsequently, at an altitude of 39 kilometers, control over the rocket was lost, leading to the decision to activate the Autonomous Flight Termination System (AFTS), as required by Federal Aviation Administration safety rules.

Additionally, the U.S. Federal Aviation Administration oversees the work of SpaceX and has fortunately confirmed that the explosion did not result in any reported injuries or property damage. The development of the new vehicle will be closely monitored, with SpaceX conducting an investigation into the testing failure. Approval from the FAA will be necessary for SpaceX's plan to prevent such incidents in the future.

Despite the uncontrolled explosion, the company views this test as a significant step in the project's development. In comparison to the previous test, the rocket reached an altitude of 70 kilometers, and two sections of the rocket were successfully separated.

Elon Musk is a highly respected and fascinating person. I read his biography, which detailed the challenging situations in SpaceX early days of establishment. After few unsuccessful attempts of rocket launches, the company was on the edge of bankruptcy. However, the risk paid off, and SpaceX rapidly starts developing. This article discusses the second unsuccessful flight of the SpaceX company, but I believe that SpaceX will draw conclusions from this experience. There should be some design changes implemented, which will likely lead to success in the next flight.

7. Article pre-presentation practice 3 - Engineers develop framework to predict types of sounds likely to be heard at certain locations

I'm going to talk about an article from website techxplore.com entitled "Engineers develop framework to predict types of sounds likely to be heard at certain locations" As we know, sounds are critical component of the overall feel of a place, that help us to understand their environment and it's strong correlated with everyone's mental and physical health.

Researcher Nathan Jacobs, professor of computer science and engineering with three graduate students of McKelvey School of Engineering at Washington University in St. Louis, developed Geography-Aware Contrastive Language Audio Pre-training. That's a framework for soundscape mapping that can be applied anywhere in the world, and has especially usage in urban planning and noise management.

This version of the framework uses three different modalities/types of data, that incorporates geotagged audio, textual description and overhead images.Authors of the framework say that by adding geo-tagging audio made a huge progress in comparison to previous versions.

The sounds thath we meet in our daily lives significantly influence on our well-being.

Therefore, tools like the Geography-Aware Contrastive Language Audio Pre-training framework developed by researchers at Washington University in St. Louis play a crucial role. This is especially usefull tool when we contemplate about building a home in a location thath we haven't been.

The ability of such a tool to predict and map various soundscapes becomes invaluable in ensuring that the environment in which we choose to reside aligns with our preferences and contributes positively to our overall quality of life.

8. Working with specialized text 1 - Description of most important functionalities of ORM (Object-relational mapping) tool, basing on JPA standard and using Hibernate 6 framework implementation.

List of used resources:

What is ORM, JPA, and Hibernate - what are they used for, and what problems do they solve?

The most common programming language offers the use of a paradigm called "object-oriented" . In this paradigm we create object instances based on classes that have been defined by the programmer specified field and methods.

To create a fully working application we need to connect our programs with some databases, that are primarily based on tables, which are interconnected through relationships.

To connect these two different worlds, an Object–Relational Mapping tools are often used, because they automatically, basing on objects name or parameters , transform objects into database tables. This type of tool significantly helps in streamlining the process of saving data to the database, instead of using typical JDBC (Java Database Connectivity API) in which to pass an object to the database table, developer or data supervisor must manually enter individually every single object parameters using SQL (Structured Query Language) queries.

To make programmer's life easier, every programing language and framework should have one standard, where are described rules, principles,often also examples of usage. This convention, because of providing certain schematic elements encountered regardless of the use case, making it easier to adapt programer easily to new projects.

In this document I'll introduce a Java programming language standard called JPA (Jakarta Persistence API) which provides a set of interfaces that must be implemented by ORM framework provider. To utilize the standard, we need a provider of that standard. There are several providers that implement the JPA standard, but Hibernate is the most common framework, which also provides a lot of additional features that I'll later describe.

Configuration

To work with Hibernate tool we need use some building tool called Gradle. In this building tool we need to specify dependencies, which provide us all source code of provided framework. To implement dependencies we need to write configuration:

dependencies {

  implementation 'org.hibernate:hibernate-core:5.6.4.Final'

```
    implementation 'org.hibernate:hibernate-annotations:3.5.6-Final'

    implementation 'org.hibernate:hibernate-commons-annotations:3.2.0.Final'

    implementation 'org.hibernate:hibernate-entitymanager:5.6.4.Final'

    implementation 'mysql:mysql-connector-java:8.0.26'

}
```

Nextly we need to create a package called "resources" in a certain path: "src/main". In this package we need to create configuration file called hibernate.cfg.xml, were we are providing basic administrator connection configuration like:

- database driver provider
- database dialect to communicate with the driver
- database access username
- database access password

Nextly in the same file, we need to define connection pool settings like:

- pool minimum size
- pool maximum size
- timeout value in milliseconds
- maximum value of statementsand
- idle period, after connection is lost.

Unfortunately HIbernate documentation presents only a basic solution which uses predefined constant variables. Mostly it's recommended to use external solutions like HikariCP framework, that provides optimized connection pooling algorithms.

After the hibernate.cfg.xml is configured we need to create configuration class, where we are defining what certain query tool will we used. So we are defining SessionFactory or EntityManager object, which then creates a Session/Entity object, through which we can perform CRUD (Create, Read, Update, Delete) operations on the database manually by using native query (about these methods later).

Other possibility is use half automatically tools like using CriteriaAPI, HQL/JPQL query or full automatically tool by defining classes that have fields with special annotations "@Entity" which causes that framework is able to catch every single created object, and in every moment programers can commit entities of objects, and then flush the data to the database.

Manual methods are used in specified situations, where we need to achieve difficult result, or in situations where the query is so simple, that attempting using automatically catching entities will reduce performance with comparison to manual mode.

Manual methods includes creating HQL (Hibernate Query Language), JPQL (Java Persistence Query Language), CriteriaAPI or Native query (i.e., standard SQL query sent through Hibernate).

Using half-automated, or fully automated tools we need to define specific parameters that determinante the operation propagation of queries, loading entities mode.

The most important parameters are:

- FetchMode()
- FetchType()
- Cascade()
- OrphanRemoval()

Those parameters affect differently depending on the relationship between tables. To correct configuring them we should have basic understanding of relationship between tables

Categorizing the joins of table

In databases, since tables are interrelated, we can categorize them into 3 groups:

One-to-one relationship (e.g., 1 person can have 1 heart, 1 heart can be owned by only 1 person)

One-to-many relationship (e.g., 1 owner can have many dogs, each dog can have only 1 owner)

Many-to-many relationship (e.g., many mechanics can have many cars to work on.In this case a junction table is required, which contains only indices of primary keys of connections. This relationship is simplified to 2 times one-to-many connection with the junction table.)

Methods for pagination

Pagination is a mechanism for dividing database records into pages of a specified number of records. For it we use methods like:

- setFirstResult()

- setMaxResults()
- uniqueResult()
- uniqueResultOptional()

Named Queries

Another useful hibernate mechanism is named query. We can use special annotation @NamedQueries, after which we provide definition of queries. After defining them, we are able to simply use those queries by using special annotation that indicates which query we will use, so we multiply indicate the same query avoiding writing boilerplate code.

Automatic exception catching mechanism - While the application is running the program, must be prepared for situations where not everything goes according to plan, and therefore it is necessary to plan to catch exceptions, in which Hibernate helps, by default throwing a runtime exception instead of checked exception, thats possibly can generate program failure.

Correct configuration of Hibernate is also important, as incorrect configuration can also lead to exceptions such as NonUniqueResultException, LazyInitializationException etc.

Two leveled cache is the next feature that's optimizing mechanism that relies on the fact that data, which don't need rapid updates, instead of refreshing, and connecting to the database (which is "costly"), fetches data into a cache where it is stored for a certain amount of time.An important aspect in this case is the cyclic change of data, which must be properly configured so that in the case of data updates, the old version stored in the cache does not appear to the user.

Transaction locking support - some data can be edited by many users at the same time (e.g., the number of books in stock).To avoid a situation where at the same time two or more customers try to buy the "last product," we use transaction locking with appropriate strategy..

We can apply an **optimistic locking strategy** or **pessimistic locking**. They differ in their data access, but generally, optimistic locking causes immediate notification to others that the item is no longer available, while pessimistic locking during the purchase process locks the entire table, what causes that anyone can't read or modify the value in the database.

Reflective part

Conclusion: The Importance of Technical Documentation A thorough understanding of technical documentation, predominantly available in English, is vital for effectively using frameworks like Hibernate. While complete fluency in English might not be necessary, a fundamental comprehension of technical terms and concepts is essential for successful implementation and troubleshooting.

1. What are Software Design Patterns?

Software design patterns are general, reusable solutions to common problems encountered in software design. They are templates or guidelines for how to solve a problem that can be used in many different situations. Design patterns are not finished designs that can be transformed directly into code but are descriptions of how to solve a problem in a way that can be reused in different contexts.

Division of Patterns: Creative, Structural, and BehavioralDesign patterns are typically divided into three categories:

Creative Patterns: These patterns deal with object creation mechanisms, trying to create objects in a manner suitable to the situation. Their primary focus is on class instantiation. They can be further divided into class-creation patterns and object-creational patterns.

Structural Patterns: These patterns are concerned with how classes and objects are composed to form larger structures. They help ensure that when one part of a system changes, the entire structure of the system does not need to change.

Behavioral Patterns: These patterns are concerned with algorithms and the assignment of responsibilities between objects. They don't just describe patterns of objects or classes but also the patterns of communication between them

Clean-Code Best Practices –

Some of the best practices for writing clean code include:

Reusability: Writing functions or modules that can be reused across different parts of the application, reducing redundancy and improving efficiency.

Design patterns in software engineering are crucial for solving common design problems in a standard, tried and tested way. They provide a high-level language to describe program designs. When combined with clean code practices, they significantly enhance the quality of software. Clean code practices ensure that the codebase is maintainable, efficient, and easy to understand. They involve principles like reusability, clear execution flow, single responsibility, and modularization, which collectively contribute to the overall health and scalability of software projects. By adhering to these patterns and practices, developers can create software that is not only functional but also robust and adaptable to change.

Clear Flow of Execution: Ensuring that the code follows a logical structure that is easy to follow and understand.

Single Responsibility Principle (SRP): Each module or class should only have one reason to change, meaning they should only have one job or responsibility.

Single Source of Truth: Keeping information centralized to avoid duplication and inconsistency.

Expose and Consume Only What You Need: Reducing complexity by limiting the exposure and consumption of data to only what is necessary for a given task.

Modularization: Breaking down code into smaller, manageable modules or functions, which improves readability, maintainability, and testability.

Effective Folder Structures: Organizing the project structure in a way that makes it easy to find and modify code, thereby reducing complexity and improving maintainability.
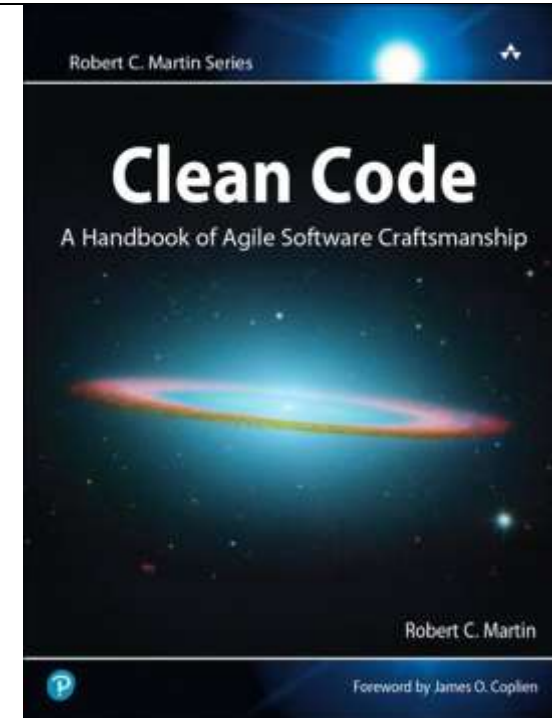
10. Working with specialized text 3 - Prompt engineering guide form operAI website - description of most important principles and tactics

To convey thoughts in a clear way, that artificial intelligence understands our intentions and can respond in clearly way , the ability to create correct prompts and following some strategies is required to get optimal results. OpenAI, the company offering one of the most commonly used AI applications, has created a guide that shows us some interesting strategies for formulating commands. In this work, I'll try to explain these strategies.

In the first section, the author of the guide presents us the most basic principles that we should follow to get the best response from our queries.

I select this article, becaouse as you can mention, I'm very instrested in AI topic, and in my opionion by correct prompting, and folowing some specific strategies we can easyli achive resoult, and also verify that the generated answears are correct. The language in this guide wasn't very challanging, I can say that it was easily undestanding, because of that the topic is not intended for technical person, but also for untechnical users, that want to improve own prompt sklis.

The most important thing is to provide detailed descriptions of the task if we want to get a very detailed answer. The query should be specific, and certain, so that AI model cannot guess what the author was meaning

The next advice is to indicate the output length and complexity of the response, that we will be satisfied with.

Autor also mention that one of the most common mistakes, which many people forget, is using correct punctuation. Often the lack of certain marks gives a completely different meaning of the sentence that we provide. So remember - use delimiters to clearly indicate distinct parts of the input.

The last good practice is to provide examples that enable artificial intelligence to detect exactly what we mean. This is particularly useful in cases where we want to gain the application of, for example, a writing style, which would be very difficult to describe, and in this case, it is better to provide an example.

In the next section, there are described effectives strategies, witch should help us with specific types of tasks. Simultaneosly the author points out that GAI behavior is often unpredictable, so we are encouraged to experiment, because sometimes that's the best path to get the best result.

First strategy worth atetntion is that in case if the task is very complicated, an good idea is to split this vast task into simpler subtasks. Recursive aproach, witch means spliting comends into smaller, that finaly lead us to the solution, is better an also much more costless, than giving one complicated task. What is more this approach is more readable to understand the line of reasoning, and analising.

Other scenario is carring long dailougs with AI. Because every chat tab have own content window it would be great, if we from time to time remind chatGPT own conclusion about discusssed topic.

If we want to verify that our theorem is correct, or not we need to let the chat think a liitle bity, and instead of asking that or sentence is wrong or correct, better idea is to query to solve the task, and manual compare out theorem with chat's response.

To solve some mathematical problem, or equasion chatGPT always uses external tool, so after inputing some math, there is some kind of "black box" that solves the problem, but we cannot we 100% sure, that the solve is correct, so in this case it's better to ask for
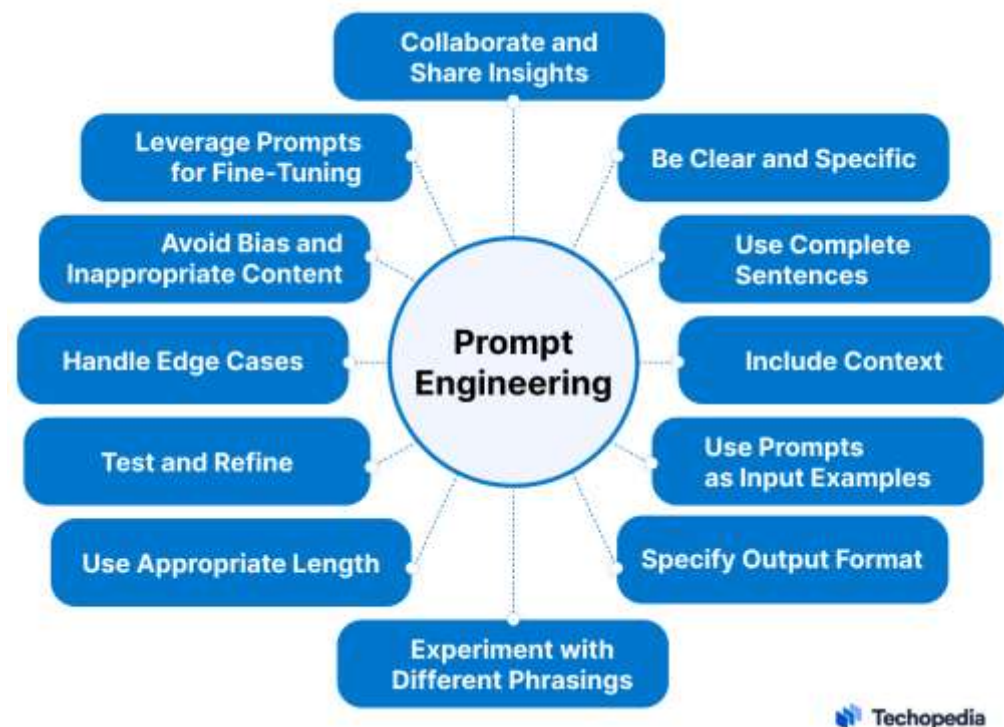
| generate some code like for example python, and run the code independently from chatGPT. This solution provides us code, that we can easly analize that's , and cach some errors during computiing. | |

Additional activieties

1. Lisenging my favorite light english learning podcast called: "Kwadrans NaAnigelski" Unfortunately it isn't possible to show whole activity, so I only can put a screenshot of example timestamp markers on youtube - link
2. Learning english on eTutor application - link (currently I have account on my University, because there is an promotion code for students)
3. Sometimes watching my favorite Canadian sitcom called:"Trailer Park Boys" - unfortunately with polish titles, because sometimes they are talking to fast
4. Watching presentation about reverse engineering: Breaking "DRM" in Polish trains - 37th Chaos Communication Congress