

AIAC Lab Assignment 3.6

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BATCH 12

Task-1:

Tasks to be completed

1. Baseline Prompt Testing

Choose 5 typical user queries, for example:

“Explain, What, Define, Why, What”

Run these prompts in a chatbased AI model and record the raw responses.

2. Prompt Refinement

Rewrite each query using the following strategies:

- Add 5 different contexts (school level, competitive exam, real-life application, mathematical focus, conceptual focus).
- Make the task explicit (e.g., “List and explain Newton’s three laws with one real-world example each.”).
- Break the query into subtasks (definition → explanation → example). Run these prompts in a chat-based AI model and record the raw responses. **Prompt:**

1. Explain Newton’s laws of motion. 2.What is force? 3.Define inertia. 4.Why does an object stop moving? 5. What is acceleration?

Code:

The terminal window displays five distinct AI-generated responses, each starting with a question and followed by a detailed explanation. The responses cover topics such as Newton's laws of motion, force, inertia, and acceleration, providing both theoretical definitions and practical examples.

```
Explain Newton's laws of motion.
Newton's laws of motion are three fundamental principles that describe the motion of objects and the forces acting on them. They were formulated by Sir Isaac Newton in the 17th century and are now considered to be the cornerstones of classical mechanics. These laws have applications in various fields, from everyday life to advanced engineering and physics.

1.Explain Newton's laws of motion?
Newton's laws of motion are three fundamental principles that describe the motion of objects and the forces acting on them. They were formulated by Sir Isaac Newton in the 17th century and are now considered to be the cornerstones of classical mechanics. These laws have applications in various fields, from everyday life to advanced engineering and physics.

2.What is force?
Force is a vector quantity, meaning it has both magnitude and direction. It is measured in Newtons (N) or kilogram-meters per second squared (kg·m/s²). Force can cause an object to accelerate, decelerate, change direction, or move. It can also be applied to objects to keep them in motion or to stop them from moving.

3.Define inertia?
Inertia is the tendency of an object to resist changes in its state of motion. It is a measure of an object's mass and is proportional to the object's velocity. Inertia is a fundamental concept in physics and is often described as "mass in motion". It is responsible for many common phenomena, such as inertia in motion, inertia in rest, and inertia in rotation.

4.Why does an object stop moving if no force acts on it?
An object will continue to move at a constant velocity unless acted upon by an external force. This is known as Newton's first law of motion, also known as the law of inertia. According to this law, an object's state of motion will remain unchanged unless a net force acts upon it. This means that if no forces are applied to an object, it will continue to move in a straight line at a constant speed, or it will remain at rest if it was initially at rest.

5.What is acceleration?
Acceleration is a vector quantity that represents the rate of change of velocity of an object with respect to time. It is measured in meters per second squared (m/s²). Acceleration can result from an increase or decrease in speed (positive or negative acceleration) or a change in direction. Acceleration is caused by the application of a net external force to an object, as described by Newton's second law of motion (F=ma).
```

Friction (Friction is present in almost all objects)

Friction is a force of friction that resists motion or tends to resist motion. It acts on an object that tries to move or stay moving at a constant speed or trying to move faster or slower. This is called inertia.

Newton's Second Law of Motion: The harder you push or pull an object, the faster it will speed up. The heavier the object, the more force you need to move it. This is shown in the formula $F = ma$ (Force = mass × acceleration). Think like an NFL player. The more weight, the more force you need to accelerate. This means that you push or pull harder, or pushes back on you with the same amount of force.

Mass: Mass is the amount of matter in an object.

Force is a physical quantity that can cause an object to change its state of motion or shape.

It is a vector quantity, having both magnitude and direction.

Inertia is measured in Newtons (N) in the International System of Units (SI).

Force can be classified into different types, such as normal forces (like tension and tension), and non-contact forces (like gravitational and electrostatic forces).

Force is described by Newton's Second Law of Motion, which states that force equals mass times acceleration ($F = ma$).

Newton's First Law of Motion:

Inertia is the tendency of an object to resist changes in its state of motion.

For example, when a car suddenly stops, passengers lurch forward due to their inertia, as their bodies want to keep moving at the same speed.

Another example is when you slide a book across a table; it eventually stops because of friction, which overcomes the book's inertia.

Inertia is also observed when you try to push a heavy piece of furniture; its inertia resists your change in motion until enough force is applied.

Friction: An object is pushing on you or an object.

Frictional Force: The object experiences a frictional force (F_f) that opposes its motion. This force can be calculated using $F_f = \mu F_N$, where μ is the coefficient of friction and F_N is the normal force.

Deceleration: The frictional force causes a negative acceleration (deceleration) on the object, which can be calculated using Newton's Second Law: $a = F/m$, where F is the net force (in this case, friction) and m is the mass. Using this law, we can determine the time (t) it takes for the object to stop. For example, using $a = v - u/t$, where $v = 0$ is the final velocity (0 m/s when the object stops), u is the initial velocity (2 m/s when the object starts), and t is the time taken to stop, we can calculate the time it takes for the object to stop.

Newton's Third Law: For every action, there is an equal and opposite reaction.

Acceleration is the rate at which an object's velocity changes over time.

It is a vector quantity, meaning it has both magnitude and direction.

Acceleration can result from changes in speed (increasing or decreasing) or changes in direction.

Acceleration is caused by the application of a net external force on an object, as described by Newton's Second Law of Motion ($F = ma$).

Output:

Summary Table		
Parameter	Original AI Responses	Rewritten Prompts
Completeness	5	5
Accuracy	5	5
Relevance	5	5
Clarity	4	5

Conclusion:
Both sets are complete, accurate, and relevant. The rewritten prompts score higher in clarity due to their audience-focused, simplified explanations and use of real-life examples.

Explanation:

These prompts guide you to explore key concepts in physics related to motion. They ask you to explain Newton's laws, which describe how forces affect movement, and to define force itself as a push or pull that changes an object's state. You're also asked to define inertia, the tendency of objects to resist changes in their motion. The prompts encourage you to think about why objects stop moving, often due to forces like friction.

Task 2:

Tasks to be completed

1. Baseline Prompt Testing

Choose 5 common user queries, such as:

- “What, Explain, How, What, Difference”

Run these prompts in a chat-based AI model and record the raw responses.

2. Prompt Refinement

Rewrite each query by:

- Adding 5 contexts (beginner, exam-oriented, real-world analogy, syntax-focused, performance-focused).
- Making instructions explicit (e.g., “Define a Python loop and show one example for for-loop and while-loop.”).
- Breaking into subtasks (definition → syntax → example → use case).

Prompt:

1.What is a loop in Python? 2.Explain lists in Python. 3.How does a function work?

4.What is the difference between list and tuple?

5.What is Python?

Code:

```
1.What is a loop in Python? loops.
2.A loop in Python is a control structure that allows you to execute a block of code multiple times.
3.Python primarily has two types of loops: "For" loops and "While" loops.
4."For" loops are used to iterate over a sequence (like a list, tuple, or string) or other iterable objects.
5."While" loops continue to execute as long as a specified condition is true.

What are lists in Python? lists.
1.What is Python? Python is a built-in data type that can store a collection of items.
2.Lists are ordered, meaning the items have a defined order, and thus order can't change unless explicitly modified.
3.Items are mutable, which means you can change, add, or remove them after the List has been created.
4.Lists can contain items of different data types, including other lists, making them versatile for various applications.

What does a function do in python?
1.What is a function? In Python, a function is a reusable block of code that performs a specific task.
2.Functions are defined using the "def" keyword followed by the function name and parentheses.
3.Functions can take input parameters (arguments) to work with different data.
4.Functions can return a value using the "return" statement, allowing the result to be used elsewhere in the program.

What is the difference between lists and tuples in python?
1.Mutability: Lists are mutable, meaning their elements can be changed, added, or removed; tuples are immutable, so once they are created, their elements cannot be modified.
2.Syntax: Lists are defined using square brackets [] (e.g., my_list = [1, 2, 3]), while tuples are defined using parentheses () (e.g., my_tuple = (1, 2, 3)).
3.Performance: Tuples are generally faster than lists for certain operations due to their immutability, making them more efficient for readonly data.

What is a tuple in python?
1.What is Python? Python is a high-level, interpreted programming language known for its readability and simplicity.
2.it supports multiple programming paradigms, including procedural, object-oriented, and functional programming.
3.Python has a large standard library and a vast ecosystem of third-party packages, making it suitable for various applications such as web development, data analysis, artificial intelligence, etc.
4.

**Answer the prompt for prompt-replacement:**

What is a loop in Python? To implement flow in python.
1.What is a loop in Python? It's a way to repeat a block of code multiple times.
2.There are two main types of loops in Python: "For" loops and "While" loops.
3."For" loop is used to go through each item in a List or other collection.
4."While" loop keeps running as long as a certain condition is true.

What are lists in Python? To keep track of points.
1.What is a list in Python? It's a collection of items that are ordered and changeable.
2.Lists are defined using square brackets [] and can contain items of different data types.
3.Lists allow duplicate values, meaning the same item can appear multiple times.
4.Common list operations include adding, removing, and accessing items using indexing.

What does a function do in Python? To make code reusable.
1.What is a function? It's like a recipe for a sandwich; it provides a set of instructions to perform a specific task.
2.You define a function by giving it a name and specifying the ingredients (parameters) it needs to work with.
3.When you want to use the function, you "call" it by its name and provide the necessary ingredients (arguments).
4.The function processes the ingredients and returns a finished dish (output) that you can use.

What is the difference between lists and tuples in Python? To make changes to objects.
1.Lists are created using square brackets [] (e.g., my_list = [1, 2, 3]), while tuples are created using parentheses () (e.g., my_tuple = (1, 2, 3)).
2.Lists are mutable, meaning you can change their contents after creation, whereas tuples are immutable and cannot be changed once created.
3.Lists allow for dynamic resizing, so you can add or remove items, while tuples have a fixed size.
4.Both Lists and Tuples can store multiple data types, but tuples are often used for fixed collections of items.

What is python? To print the performance stats.
1.What is Python? Python is an interpreted language, which means code is executed line by line, making it slower than compiled languages like C or Java.
2.Python's simplicity and readability often lead to faster development times, despite its slower execution speed.
3.Python has various implementations (like CPython, PyPy) that can improve performance for specific use cases.
```

Output:

Evaluation Table		
Parameter	Original AI Responses	Rewritten Prompts
Completeness	5	5
Accuracy	5	5
Relevance	3	3
Clarity	4	3

Summary:

- Completeness:** Both sets cover all required points for each topic.
- Accuracy:** Both are factually correct and use proper terminology.
- Relevance:** Both are relevant, but the rewritten prompts are more tailored to specific contexts (beginner, exam, real-world, code, performance).
- Clarity:** The rewritten prompts are clearer, using simpler language, analogies, and explicit, specific explanations, making them easier to understand for their intended audience.

Conclusion:

Both sets are strong, but the rewritten prompts are slightly better in clarity and contextual relevance, making them more effective for targeted learning or exam preparation.

Explanation:

These prompts are designed to help you understand basic Python programming concepts. They ask you to explain what a loop is, which is a way to repeat actions in code. You're also asked to describe lists, which are collections of items that can be changed. The prompts include explaining how functions work, meaning reusable blocks of code that perform specific tasks. You're encouraged to compare lists and tuples, noting that lists are mutable while tuples are immutable. Finally, you're asked to define Python itself, which is a popular, high-level programming language known for its simplicity and versatility.

Task 3:

Tasks to be completed

1. Baseline Prompt Testing

Select 5 typical queries, for example:

- “What, Explain, What, Define, What”

Run these prompts in a chat-based AI model and record the raw responses.

2. Prompt Refinement

Refine each query by:

- Adding 5 contexts (academic, industry, beginner-friendly, mathematical, interview-focused).
- Making tasks explicit (e.g., “Define supervised learning and explain it with one real-world example.”).
- Breaking into subtasks (definition → types → example → limitation).

Prompt:

- 1.What is machine learning?
2. Explain supervised learning.
- 3.Define overfitting.
- 4.What is regression?
- 5.What is classification? **Code:**

Machine Learning in Practice	
Machine learning is a subset of artificial intelligence that focuses on developing algorithms that allow computers to learn from data and make predictions or decisions based on that data.	
Decision-making models can learn patterns or identify patterns and make decisions using implicitly programmed logic rules.	
Machine learning can be categorized into unsupervised learning, supervised learning, and reinforcement learning.	
Applications of machine learning include image recognition, natural language processing, recommendation engines, and autonomous vehicles.	
Practical approaches to practice	
Supervised learning is a type of machine learning where the model is trained on a labeled dataset, meaning that each input data point is paired with its correct output.	
The goal of supervised learning is to train a mapping function to outputs so that the model can make accurate predictions on new, unseen data.	
Common algorithms used in supervised learning include linear regression, logistic regression, decision trees, and support vector machines.	
Unsupervised learning is widely used in applications such as user detection, fraud detection, and medical diagnosis.	
Machine learning in practice	
Overfitting is a phenomenon in machine learning where a model learns the training data so well, capturing noise and outliers that do not generalize to new data.	
An overfitted model performs well on the training dataset but poorly on unseen data, leading to poor predictive accuracy.	
Overfitting can occur when a model is too <u>complex</u> relative to the amount of training data available.	
Techniques to prevent overfitting include cross-validation, regularization, pruning, and early stopping.	
Practical approaches to practice	
Regression is a type of supervised machine learning technique used to predict continuous numerical values based on input features.	
It involves finding the relationship between a dependent variable (target) and one or more independent variables (features).	
Common regression algorithms include linear regression, polynomial regression, and ridge regression.	
Regression is widely used in various applications, such as predicting house prices, stock market trends, and sales forecasting.	
Machine learning in practice	
Classification is a type of supervised machine learning technique used to categorize data into predefined classes or labels.	
It involves training a model on a labeled dataset, where each input is associated with a specific class.	
Common classification algorithms include decision trees, random forests, support vector machines, and neural networks.	
Classification is widely used in applications such as email spam detection, image recognition, and medical diagnosis.	

Machine Learning in Practice	
Machine learning is a subset of artificial intelligence that focuses on the development of algorithms that enable computers to learn from data and make predictions or decisions based on that data.	
Machine learning can be classified into three main types: supervised learning, unsupervised learning, and reinforcement learning.	
Machine learning has applications across various fields including healthcare, finance, marketing, and robotics.	
Machine learning in practice	
Supervised learning is a practical approach to machine learning.	
Supervised learning is a type of machine learning where inputs are labeled datasets, meaning each input is paired with the correct output or label.	
The objective of supervised learning is to build a function that maps inputs to outputs, enabling the model to make accurate predictions on new, unseen data.	
Common supervised learning techniques include linear regression, logistic regression, decision trees, and support vector machines.	
Machine learning in practice	
Overfitting happens when a machine learning model learns the training data too well, including the noise and outliers, which hurts its performance on new data.	
An overfitted model has high accuracy on the training data but low accuracy on unseen data.	
Overfitting can occur when the model is too <u>complex</u> relative to the amount of training data.	
Techniques to prevent overfitting include cross-validation, regularization, and early stopping.	
Machine learning in practice	
Regression is a statistical method used in machine learning to model the relationships between a dependent variable (target) and one or more independent variables (features).	
It involves predicting numerical values by fitting a function to the data points.	
Common regression techniques include linear regression, multiple regression, and logistic regression.	
Regression analysis involves calculating the error between predicted and actual values, often using methods like least squares.	
Machine learning in practice	
Classification is a supervised machine learning technique used to assign input data to predefined categories or classes based on learned patterns from labeled training data.	
It involves training a model to recognize patterns in the input data and make predictions about the class labels for new, unseen data.	
Common classification algorithms include decision trees, random forests, support vector machines, and neural networks.	
Classification is widely used in various applications, such as email spam detection, image recognition, and medical diagnosis.	

Output:

Parameter	Original AI Responses	Rewritten Prompts
Completeness	5	5
Accuracy	5	5
Relevance	5	5
Clarity	4	5
Summary:		
<ul style="list-style-type: none"> Completeness: Both are fully addressed and consistent with all key points included. Accuracy: Both are factually correct and use appropriate terminology. Relevance: Both are relevant, but the rewritten prompts are more tailored to specific contexts (academic, industry, beginner, mathematical, interview). Clarity: The rewritten prompts are clearer, using audience-focused language and context-specific explanations, making them easier to understand and more useful for their intended purpose. 		
Conclusion:		
Both sets are strong, but the rewritten prompts are superior in clarity and contextual relevance, making them more effective for targeted learning and communication.		

Explanation: These prompts focus on fundamental concepts in machine learning. They ask you to define machine learning, which is a field where computers learn from data to make predictions or decisions. You're prompted to explain supervised learning, a method where models are trained on labeled data. The prompts include defining overfitting, which happens when a model learns the training data too well and performs poorly on new data. You're also asked to explain regression, a technique for predicting continuous values, and classification, which involves sorting data into categories. Each prompt helps you understand key ideas used in building and evaluating machine learning models.

Task 4:

Tasks to be completed

1. **Baseline Prompt Testing** Choose 5 common queries, such as:

- “Explain, What, Difference, where, how”

Run these prompts in a chat-based AI model and record the raw responses.

2. **Prompt Refinement**

Rewrite each prompt by:

- Adding 5 contexts (theory exam, practical lab, interview prep, real-world database, optimization focus).
- Making instructions explicit (e.g., “Explain SQL JOIN types with syntax and examples.”).
- Breaking into subtasks (definition → syntax → example → use case).

Prompt:

1.What is SQL? 2.Explain joins. 3.Difference between WHERE and HAVING. 4.How does indexing work?

5.What is normalization?

Code:

```
What is SQL?
SQL (Structured Query Language) is a standard computer language used for managing and manipulating relational databases.
SQL allows users to create, read, update, and delete (CRUD) data in a database.
SQL is used to define database structures, including tables, indexes, and views.
A basic SQL command includes SELECT, INSERT, UPDATE, DELETE, and GRANT.

What is a JOIN?
Joins in SQL are used to combine rows from two or more tables based on a related column between them.
There are several types of joins: INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL OUTER JOIN.
A LEFT JOIN returns all rows from the left table and the matched rows from the right table, while a RIGHT JOIN does the opposite. A FULL OUTER JOIN returns all rows when there is a match in one of the two tables.
Joins can be either inner or outer. Left joins are more often used, as they return all rows from the left table even if there are no matches in the right table.
Joins can be used with SELECT, UPDATE, DELETE statements, whereas GROUP BY, DISTINCT, and ORDER BY statements must be used after joins.
GROUP BY works on individual rows, while DISTINCT works on aggregated data.

Both WHERE and HAVING can use similar conditional expressions, but they operate at different stages of the query execution process.

How does indexing work in SQL?
Indexing in SQL is a database optimization technique that improves the speed of data retrieval operations on a table.
An index is created on one or more columns of a table, allowing the database to quickly locate and access the data without scanning the entire table.
Indexes work like pointers to a specific location, providing a quick way to find specific information based on key values.
Common types of indexes include B-tree indexes, hash indexes, and bitmap indexes, each suited for different types of queries and data characteristics.

What is normalization in SQL?
Normalization is the process of organizing data in a database to reduce redundancy and improve data integrity.
It involves defining tables with primary keys, foreign keys, and defining relationships between them.
Normalization is typically done in several stages, known as normal forms (1NF, 2NF, 3NF, etc.), with 3NF being the highest.
The main goals of normalization are the elimination of duplicate data, ensure data dependencies, and creating the database structure that meets business needs.
```

```
"Rewrite the prompt for prompt refinement."
What is SQL?
SQL (Structured Query Language) is a standard computer language used for managing and manipulating relational databases.
SQL provides a comprehensive way to perform various operations on database systems, including data retrieval, insertion, updating, and deletion.
SQL is used for defining and managing database structures, such as tables, views, and constraints.
A query is an instruction to the database to retrieve data from one or more tables, while a statement is an instruction to the database to perform an action.

How does an SQL query work?
SQL queries are used to extract data from two or more tables based on a related column between them, enabling complex queries across multiple tables.
The most common types of joins are INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL OUTER JOIN, each serving different purposes in data retrieval.
A LEFT JOIN retrieves only the rows with matching columns in both tables, while a RIGHT JOIN retrieves all rows from the right table and matched rows from the left table, and a FULL JOIN will return all rows from both tables.
A UNION query combines multiple SELECT statements into a single result set, allowing for unioned results.

What is normalization in SQL?
Normalization is a database design technique aimed at reducing data redundancy and improving data integrity by separating data into smaller tables.
A primary key is a column or a group of columns in a table, defining the unique identity of every row.
Normalisation rules like 1NF, 2NF, and 3NF are used to ensure data consistency and reduce redundancy.
Normalization types of relations include first normal form (1NF), second normal form (2NF), and third normal form (3NF), each optimized for different query performance and data types.

What is denormalization in SQL?
Denormalization is a database design technique aimed at reducing data inconsistency and improving data integrity by separating data into larger tables.
A denormalized database uses large tables with many columns and establishing relationships between them.
Denormalization is performed through a series of nested tables (1NF, 2NF, 3NF) to maintain data consistency to ensure data normality.
The primary objectives of denormalization are to eliminate duplicate data, ensure logical data dependencies, and simplify database maintenance and updates.
```

Output:

Parameter	Original AI Responses	Rewritten Prompts
Completeness	5	5
Accuracy	5	5
Relevance	5	5
Clarity	4	5

Summary:

- **Completeness:** Both sets fully address each topic with all key points included.
- **Accuracy:** Both are factually correct and use appropriate SQL/database terminology.
- **Relevance:** Both are relevant, but the rewritten prompts are more tailored to specific contexts (theory, lab, interview, real-world, optimization).
- **Clarity:** The rewritten prompts are clearer, with more context-specific language and explanations, making them easier to understand and more useful for their intended audience.

Conclusion:

Both sets are strong, but the rewritten prompts are superior in clarity and contextual relevance, making them more effective for targeted learning and communication.

Explanation: These prompts are about key concepts in SQL and database management. They ask you to define SQL, which is a language used to manage and query databases. You're prompted to explain joins, which combine data from multiple tables based on related columns. The prompts include distinguishing between WHERE and HAVING clauses, where WHERE filters rows before grouping and HAVING filters groups after aggregation.

Task 5:

Tasks to be completed

1. Baseline Prompt Testing

Select 5 user queries, for example:

- “Explain, What, Difference, where, how”

Run these prompts in a chat-based AI model and record the raw responses.

2. Prompt Refinement

Rewrite each query by:

- Adding 5 contexts (school exams, competitive exams, real-life analogy, formula-based, step-by-step solving).
- Making tasks explicit (e.g., “Define probability and solve one simple numerical example.”). • Breaking into subtasks (definition → formula → example → common mistakes). **Prompt:**

Code:

Task 5)

What is probability in maths?

1. Probability is a branch of mathematics that deals with the likelihood of events occurring.
2. It is expressed as a number between 0 and 1, where 0 indicates an impossible event and 1 indicates a certain event.
3. Probability can be calculated using the formula: Probability = [Number of favorable outcomes] / [Total number of outcomes].
4. Probability is used in various fields, including statistics, finance, and law, to make predictions and informed decisions.

What is average in maths?

1. Average, also known as the mean, is a measure of central tendency that represents the sum of a set of values divided by the number of values.
2. It provides a single value that summarizes the overall trend of a dataset.
3. The formula for calculating the average is: Average = (Sum of all values) / (Number of values).
4. Average is commonly used in statistics, finance, and everyday life to analyze data and draw conclusions.

What is difference between speed and velocity in physics?

1. Speed is a scalar quantity that refers to how fast an object is moving, while velocity is a vector quantity that includes both speed and direction of motion.
2. Speed is calculated as the distance travelled divided by the time taken, whereas velocity is calculated as the displacement divided by the time taken.
3. Speed is always a non-negative value, while velocity can be positive, negative, or zero depending on the direction of motion.
4. Speed does not provide information about the direction of motion, while velocity describes the direction along with the magnitude.

What are ratios, rates, and work problems in physics?

1. Ratios and work problems involve calculating the ratios of work done by individuals or groups over a specific period.
2. To solve these problems, first determine the work rate of each individual or group, usually expressed as work done per unit of time (e.g., work/hour).
3. The formula for finding the total work done is: Total work = Rate × Time. To find the total work done by the team, divide the task.
4. For combined work problems, add the individual work rates together to find the total work rate, and then use it to calculate the total time required to complete the work.

What is permutation in probability?

1. Permutation is a mathematical concept that refers to the arrangement of objects in a specific order.
2. It is used to determine the number of possible arrangements of a set of items where the order matters.
3. The formula for calculating permutations of n objects taken r at a time is: $P(n, r) = n! / (n - r)!$, where $!$ denotes factorial.
4. Permutations are commonly used in combinatorics, probability, and statistics for other problems related to arrangements and ordering.

Rewritten the prompts for prompt refinement:

What is probability in physics? The most basic.

1. Probability is the study of how likely an event is to happen.
2. It is represented as a ratio between 0 and 1, where 0 means the event cannot happen and 1 means it will definitely happen.
3. Probability can be calculated using the formula: Probability = [Number of favorable outcomes] / [Total number of outcomes].
4. Probability is used to analyze risks to make predictions and decisions based on uncertain events.

What is average in maths? The concept of averages.

1. Average, or mean, is a way to find the central value of a set of numbers.
2. It is calculated by adding all the numbers together and then dividing by how many numbers there are.
3. The formula for average is: Average = (Sum of all values) / (Number of values).
4. Average is useful in statistics and data analysis to summarize distribution and compare different datasets.

What is difference between speed and velocity in physics? Real-life analogy.

1. Speed tells you how fast something is moving, like how quickly a car is driving on a road.
2. Velocity tells you both how fast something is moving and in which direction, like a car going north at 60 miles per hour.
3. Speed is just a number (like 60 mph), while velocity includes direction (like 60 mph north).
4. Speed cannot be negative, but velocity can be negative if the object is moving in the opposite direction.

What are ratios and work problems in physics? Real-life example.

1. Ratios and work problems involve calculating how long it takes to complete a task based on the work done by individuals or groups.
2. To solve these problems, first find the work rate of each person or group, which is usually expressed as work done per unit of time (e.g., work/hour).
3. Use the formula: Work = Rate × Time to calculate the total work done or the time taken to finish a task.
4. For combined work problems, add the individual work rates together so that the total work rate, and then use it to calculate the total time required to complete the work.

What is permutation in physics? In step-by-step form.

1. Permutation is the arrangement of objects in a specific order where the order matters.
2. To calculate permutations, use the formula: $P(n, r) = n! / (n - r)!$, where n is the total number of items, r is the number of items to arrange, and $!$ denotes factorial.
3. Factorial ($n!$) is the product of all positive integers up to n : $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.
4. Permutations are used in various fields, including combinatorics, probability, and statistics, to solve problems related to arrangements and ordering.

Output:

Parameter	Original AI Responses	Rewritten Prompts
Completeness	5	5
Accuracy	5	5
Relevance	5	5
Clarity	4	5

Summary:

- **Completeness:** Both sets fully address each topic with all key points included.
- **Accuracy:** Both are factually correct and use appropriate mathematical/statistical terminology.
- **Relevance:** Both are relevant, but the rewritten prompts are more tailored to specific contexts (school, competitive exams, real-life, formula-based, step-by-step).
- **Clarity:** The rewritten prompts are clearer, with simpler language, analogies, and step-by-step explanations, making them easier to understand for their intended audience.

Conclusion:

Both sets are strong, but the rewritten prompts are superior in clarity and contextual relevance, making them more effective for targeted learning and communication.

Explanation:

These prompts are designed to test and reinforce understanding of fundamental concepts in mathematics and physics. Each prompt targets a specific topic, such as probability, averages, speed versus velocity, time and work problems, and permutations. They encourage clear, structured, and focused responses, often used in exams or interviews. The prompts help learners practice explaining concepts concisely and accurately. Overall, they serve as effective tools for both teaching and self-assessment.