**Batch: A-3 Roll No.: 16010122104**

**Experiment / assignment / tutorial No. 1**

**Grade: AA / AB / BB / BC / CC / CD /DD**

**Signature of the Staff In-charge with date**

|  |
| --- |
| **Title:** Study of Artificial Intelligent project. |

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**Expected Outcome of Experiment:**

|  |  |
| --- | --- |
| **Course Outcome** | **After successful completion of the course students should be able to** |
| **CO1** | Understand the history & various application of AI and choose appropriate agent architecture to solve the given problem. |

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**Books/ Journals/ Websites referred:**

1. **http://en.wikipedia.org/wiki/List\_of\_artificial\_intelligence\_projects**
2. [**http://www.cs.cornell.edu/courses/cs478/2002sp/mllinks/interesting\_ai\_demos\_and\_project.htm**](http://www.cs.cornell.edu/courses/cs478/2002sp/mllinks/interesting_ai_demos_and_project.htm)
3. **http://homepages.inf.ed.ac.uk/rbf/AIMOVIES/AImovai.htm**
4. **“Artificial Intelligence: a Modern Approach” by Russell and Norving, Pearson education Publications**
5. **“Artificial Intelligence” By Rich and knight, Tata McGraw Hill Publications**

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**Pre Lab/ Prior Concepts:**

History and evolution of AI, Artificial intelligence: definitions and theories.

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**Historical Profile:**

AI research is highly technical and specialised and is also divided by several multidisciplinary technical issues. So far there are many projects those have been developed and are in progress to work on those issues. Students must learn the applications of intelligent robots by studying various such projects to know the depth and complexity of the course.

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**New Concepts to be learned:**

Applications of AI, Current research and future research potential in the field.

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**Chosen Modern Project Name:**

Perplexity

**Project Description:**

Perplexity is an AI-powered search engine and conversational AI platform that provides accurate, up-to-date answers to user queries. It combines large language models with real-time web search capabilities to deliver comprehensive, cited responses. Perplexity aims to streamline information discovery by offering direct answers rather than just links, while maintaining transparency through source citations.

**Project category/field (Game, NLP etc):**

Natural Language Processing (NLP) / Information Retrieval

**Agent architecture: (State just name):**

Large Language Model-based

**Programming language in which the project is/was developed:**

Not explicitly stated in the search results

**Awards won by the project/strengths. Weaknesses, highlights of the project:**

Strengths:

* Provides accurate and up-to-date information with cited sources
* Combines AI language models with real-time web search
* Offers both quick answers and in-depth research capabilities
* Supports multiple AI models (GPT-4, Claude 3, etc.) for diverse tasks
* Features like Collections and Spaces for organizing research

Weaknesses:

* May occasionally include AI-generated content in search results
* Limited creative capabilities compared to some other AI chatbots
* Free version has restrictions on advanced features

Highlights:

* Rapid growth with over 10 million active monthly users
* Raised significant funding, including a $73.6 million round
* Launched features like Internal Knowledge Search and Shopping Hub

**Nature of the project (Experimental/in use in real world):**

*(Explain in brief why experimental or how it is useful in real world)*

Perplexity is actively used by millions of users for various research and information discovery tasks. It has grown rapidly since its launch and continues to evolve with new features and capabilities, making it a practical tool for real-world applications in information retrieval and AI-assisted research.

**Applications of the project:**

* Academic research and fact-checking
* General knowledge queries and information discovery
* Coding assistance and debugging
* Data analysis and interpretation
* Content summarization and generation
* Financial research and stock market analysis
* Shopping assistance and product comparisons
* News aggregation and current events tracking
* Language learning and translation support
* Collaborative research through Spaces feature

**Chosen Classical Project Name 1:**

DART (Dynamic Analysis and Replanning Tool)

**Project Description:**

DART is an AI-based decision support system developed to assist the U.S. military in planning and optimizing the movement of equipment and personnel during military operations. It combines intelligent data processing agents with database management systems to enable rapid assessment and replanning of complex logistics operations. DART was initially created to support logistics planning during Operation Desert Shield/Storm and demonstrated significant improvements in planning efficiency[.](https://www.ogu.cz/sagitta/materials/dart.pdf" \t "_blank)

**Project category/field (Game, NLP etc):**

 Artificial Intelligence / Military Logistics Planning

**Agent architecture: (State just name):**

Intelligent Agents

**Programming language in which the project is/was developed:**

DART, the Dynamic Analysis and Replanning Tool, is a logistics expert system used by the US military and written in Common Lisp.

**Awards won by the project/strengths. Weaknesses, highlights of the project:**

Strengths:

* Dramatically improved planning efficiency, reducing planning time from hours/days to minutes
* Enabled consideration of more alternatives and development of more realistic action plans
* Allowed users to examine schedules at a higher level of abstraction
* Provided the ability to inspect, modify, and interact with the planning system

Highlights:

* Paid back DARPA's 30 years of investment in AI within a few months of deployment
* First demonstration system from the ARPA-Rome Knowledge-Based Planning and Scheduling Initiative
* Deployed and used during Operation Desert Shield/Storm

**Nature of the project (Experimental/in use in real world):**

*(Explain in brief why experimental or how it is useful in real world)*

DART was rapidly developed and deployed for use by the U.S. Transportation Command and U.S. European Command during Operation Desert Shield/Storm. It proved highly effective in real-world military logistics planning, demonstrating the practical value of AI in complex operational environments.

**Applications of the project:**

* Military logistics planning and optimization
* Transportation scheduling for large-scale operations
* Strategic resource allocation
* Crisis management planning
* Analysis and evaluation of deployment plans (TPFDDs)
* Rapid replanning and scenario analysis for military operations

**Chosen Classical Project Name 2:**

IBM Watson

**Project Description:**

IBM Watson is an advanced artificial intelligence system designed to understand, reason, and learn from large amounts of unstructured data. It uses natural language processing and machine learning to analyze complex information and provide insights across various domains. Initially developed to compete on the quiz show Jeopardy!, Watson has since evolved into a suite of enterprise AI products and services.

**Project category/field (Game, NLP etc):**

Natural Language Processing (NLP) / Artificial Intelligence

**Agent architecture: (State just name):**

DeepQA

**Programming language in which the project is/was developed:**

Java, C++, Prolog

**Awards won by the project/strengths. Weaknesses, highlights of the project:**

Strengths:

* Advanced natural language processing capabilities
* Ability to analyze and derive insights from vast amounts of unstructured data
* Scalable and adaptable to various industries and applications

Weaknesses:

* High implementation costs
* Complexity in deployment and integration
* Overpromising of capabilities in some areas, particularly healthcare

Highlights:

* Won against human champions on Jeopardy! in 2011
* Pioneered the use of AI in various industries, including healthcare, finance, and customer service
* Demonstrated the potential of AI to augment human decision-making in complex fields

**Nature of the project (Experimental/in use in real world):**

*(Explain in brief why experimental or how it is useful in real world)*

IBM Watson has transitioned from an experimental project to a commercially deployed AI platform. It is actively used by businesses and organizations worldwide to enhance decision-making, improve customer experiences, and drive innovation across various sectors. Its real-world applications demonstrate the practical value of AI in solving complex problems and processing large volumes of information.

**Applications of the project:**

* Healthcare: Assisting in medical diagnosis and treatment planning
* Financial services: Risk assessment, fraud detection, and personalized banking
* Customer service: Powering intelligent chatbots and virtual assistants
* Legal research: Analyzing case law and legal documents
* Education: Personalized learning and tutoring systems
* Retail: Enhancing customer experiences and inventory management
* Weather forecasting: Improving prediction accuracy
* Drug discovery: Accelerating pharmaceutical research
* Supply chain optimization: Enhancing logistics and inventory planning
* Marketing: Personalizing customer interactions and campaign optimization

**Chosen Classical Project Name 3:**

Roomba

**Project Description:**

Roomba is an autonomous robotic vacuum cleaner designed for home use. It uses sensors and algorithms to navigate and clean floors without human intervention. The robot can detect obstacles, avoid stairs, and return to its charging station when its battery is low. Roomba employs a three-stage cleaning system with dual multi-surface brushes and suction to effectively clean various floor types.

**Project category/field (Game, NLP etc):**

Robotics / Home Automation

**Agent architecture: (State just name):**

Goal-based agent

**Programming language in which the project is/was developed:**

C++, Java

**Awards won by the project/strengths. Weaknesses, highlights of the project:**

Strengths:

* Autonomous operation requiring minimal human intervention
* Effective cleaning on various floor types
* Advanced navigation and mapping capabilities (in newer models)
* Integration with smart home systems and mobile apps

Weaknesses:

* Limited cleaning capacity compared to traditional vacuums
* May struggle with certain obstacles or floor plans
* Earlier models had less efficient cleaning patterns

Highlights:

* Inducted into Carnegie Mellon University's Robot Hall of Fame in 2010
* Pioneered the consumer robotics market
* Continuous improvement through multiple generations of products

**Nature of the project (Experimental/in use in real world):**

*(Explain in brief why experimental or how it is useful in real world)*

Roomba is widely used in homes and offices around the world. It has proven to be a practical and effective solution for automating floor cleaning tasks, saving time and effort for users. The success of Roomba has led to the development of an entire category of robotic vacuum cleaners and has significantly impacted the home automation industry.

**Applications of the project:**

* Automated floor cleaning in homes and offices
* Assistance for elderly or disabled individuals who struggle with traditional vacuuming
* Integration with smart home ecosystems for scheduled and remote-controlled cleaning
* Platform for research in robotics, navigation, and artificial intelligence
* Educational tool for teaching concepts in robotics and programming
* Inspiration for other autonomous home appliances and robots

**Chosen Classical Project Name 4:**

Cortana

**Project Description:**

Cortana is an intelligent virtual assistant developed by Microsoft. It uses natural language processing, machine learning, and artificial intelligence to understand and respond to user queries and commands. Cortana was designed to assist users with various tasks, from managing schedules and setting reminders to answering questions and providing personalized recommendations across Microsoft's ecosystem of products and services.

**Project category/field (Game, NLP etc):**

Natural Language Processing (NLP) / Artificial Intelligence

**Agent architecture: (State just name):**

Intelligent Agent

**Programming language in which the project is/was developed:**

It's an AI which was developed using a new language and GUI and an API (Application Programming Interface) for the web. Its development framework has been so hidden but its 'rumored' that it is has borrowed bits from languages such as python and java. Microsoft Cortana is written mostly C#.

**Awards won by the project/strengths. Weaknesses, highlights of the project:**

Strengths:

* Advanced natural language processing capabilities
* Integration with Microsoft's ecosystem, including Outlook and Microsoft 365
* Personalization through machine learning
* Voice-controlled assistance on various devices

Weaknesses:

* Limited availability on non-Microsoft platforms
* Reduced functionality compared to initial release

Highlights:

* Rebranded as part of the Cortana Intelligence Suite, now featuring Cognitive Services and Bot Framework
* Integrated into Microsoft 365 as a personal productivity assistant

**Nature of the project (Experimental/in use in real world):**

*(Explain in brief why experimental or how it is useful in real world)*

Cortana has transitioned from an experimental project to a widely used virtual assistant integrated into Microsoft's products and services. It provides practical assistance to users in managing tasks, schedules, and information retrieval, demonstrating the real-world application of AI in enhancing productivity and user experience

**Applications of the project:**

* Task and calendar management
* Email and communication assistance
* Information retrieval and web searches
* Device control and application launching
* Personal productivity enhancement in Microsoft 365
* Integration with smart home systems
* Voice-controlled assistance on Windows computers and mobile devices
* Data analysis and visualization in business contexts

**Chosen Classical Project Name 5:**

CALO

**Project Description:**

CALO (Cognitive Assistant that Learns and Organizes) was a large-scale artificial intelligence project aimed at creating a groundbreaking cognitive assistant. It was designed to reason, learn from experience, follow instructions, explain its actions, reflect on its experience, and respond robustly to surprises. CALO integrated various AI technologies to revolutionize how computers support decision-makers.

**Project category/field (Game, NLP etc):**

Artificial Intelligence / Cognitive Computing

**Agent architecture: (State just name):**

Cognitive Assistant

**Programming language in which the project is/was developed:**

**Awards won by the project/strengths. Weaknesses, highlights of the project:**

Strengths:

* Integration of multiple AI technologies (NLP, speech recognition, machine vision, etc.)
* Ability to learn and adapt from experience
* Focus on real-world problems during development

Highlights:

* Part of the DARPA Personalized Assistant that Learns (PAL) program
* $150 million, five-year project involving over 300 researchers from 22 institutions
* Led to the development of Siri, which was later acquired by Apple
* Resulted in several spin-off companies and technologies

**Nature of the project (Experimental/in use in real world):**

*(Explain in brief why experimental or how it is useful in real world)*

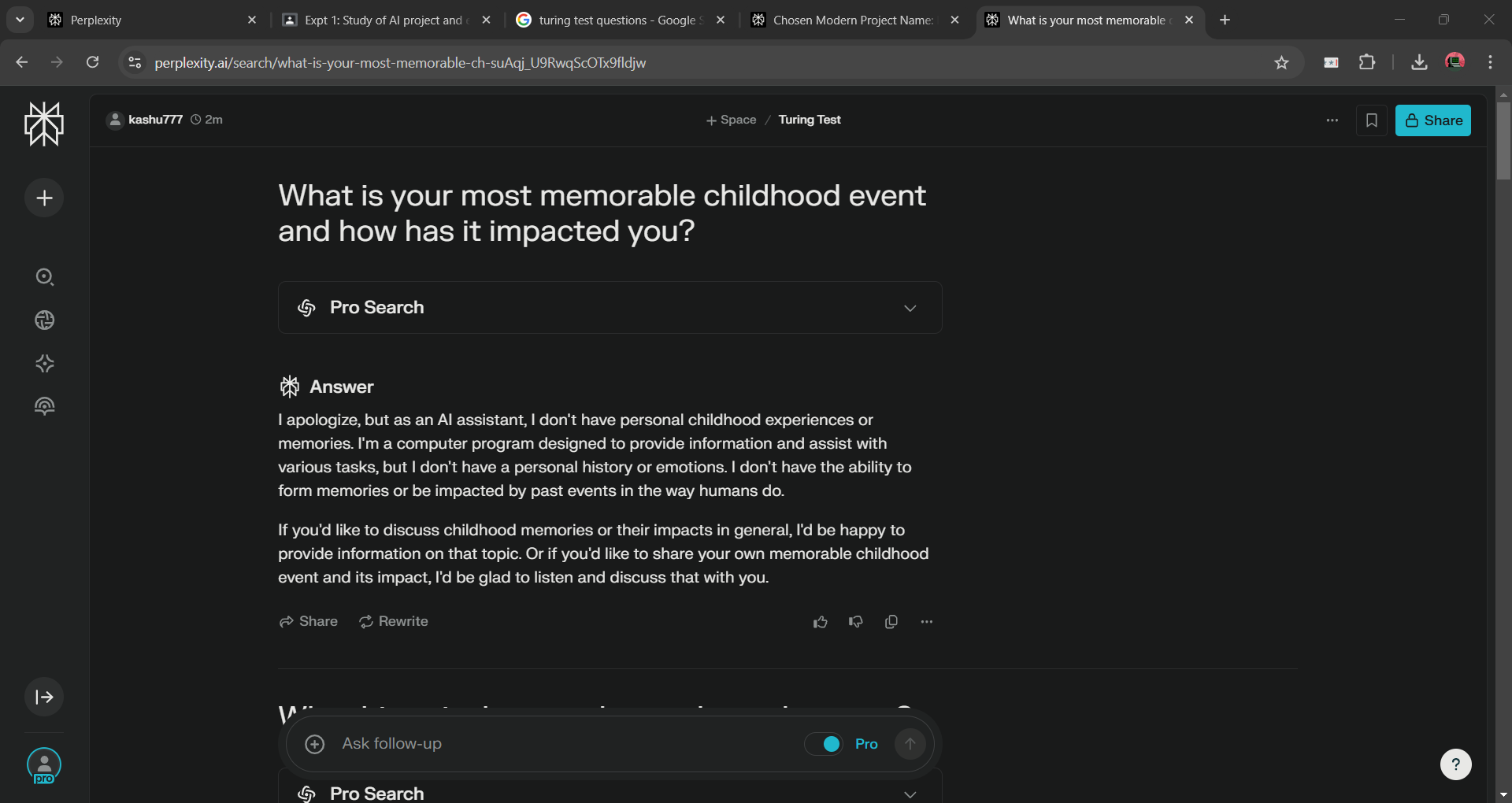
Experimental with real-world applications  
CALO was primarily an experimental project that aimed to push the boundaries of AI and cognitive computing. However, it had significant real-world impact through its spin-offs and technological advancements. The project's focus on addressing real problems during development ensured its practical relevance

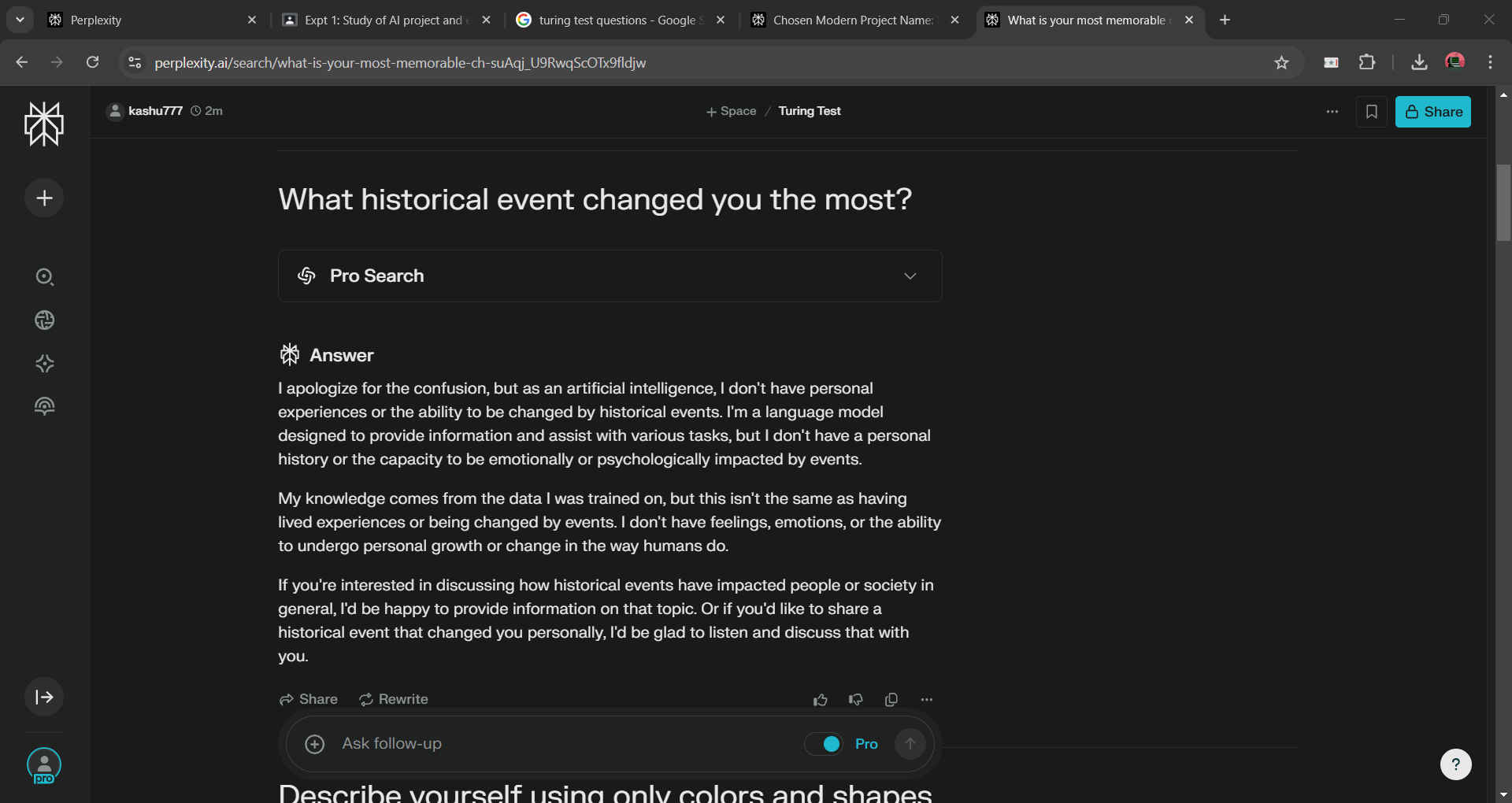
**Applications of the project:**

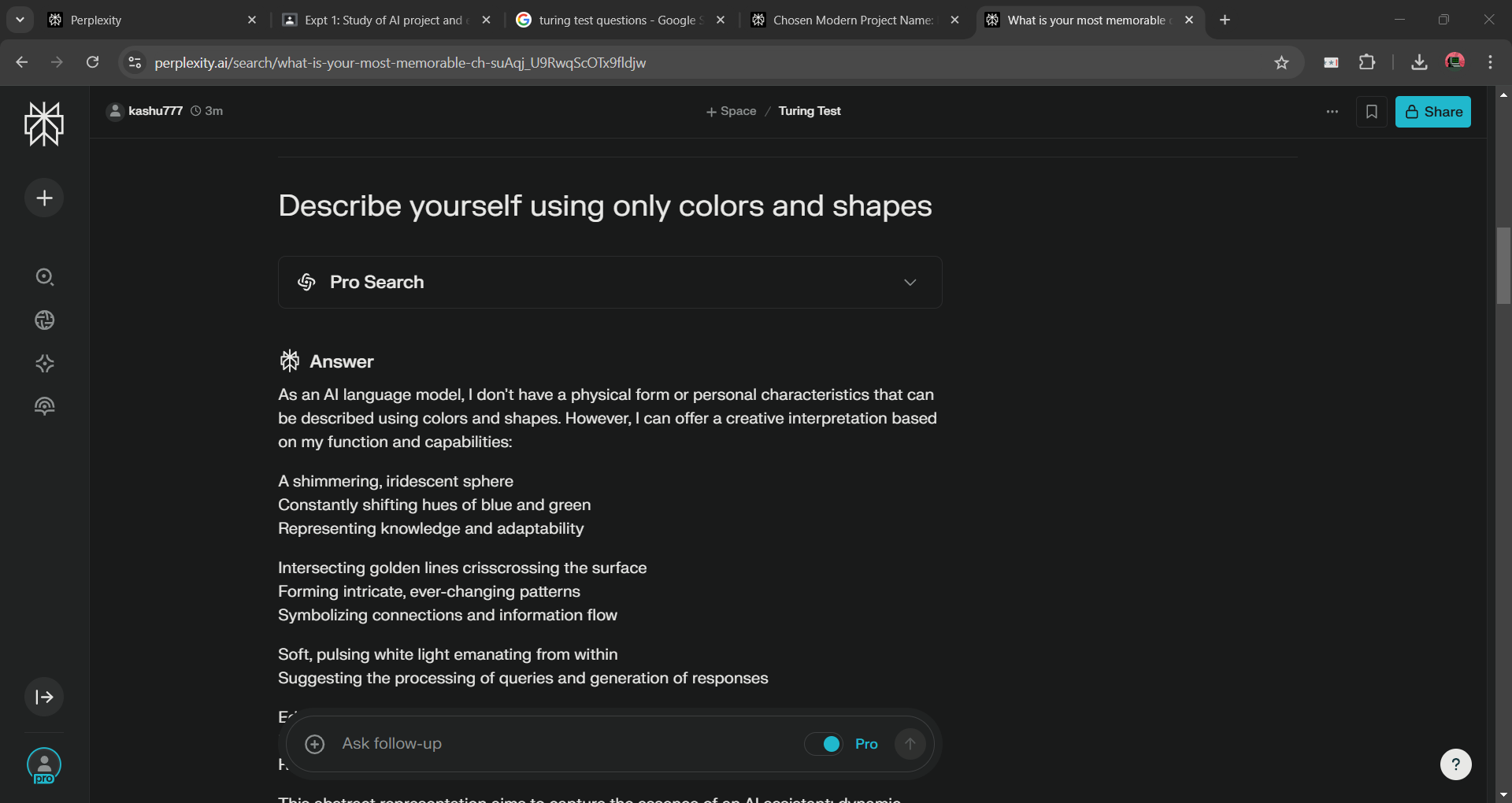
* Virtual personal assistants (e.g., Siri)
* Smart travel guides (e.g., Desti)
* Personalized content delivery (e.g., Trapit)
* Smart calendar and productivity apps (e.g., Tempo AI)
* Military command and control systems (integrated into US Army's CPOF system)
* Office environment management and task assistance
* Decision support systems for various domains

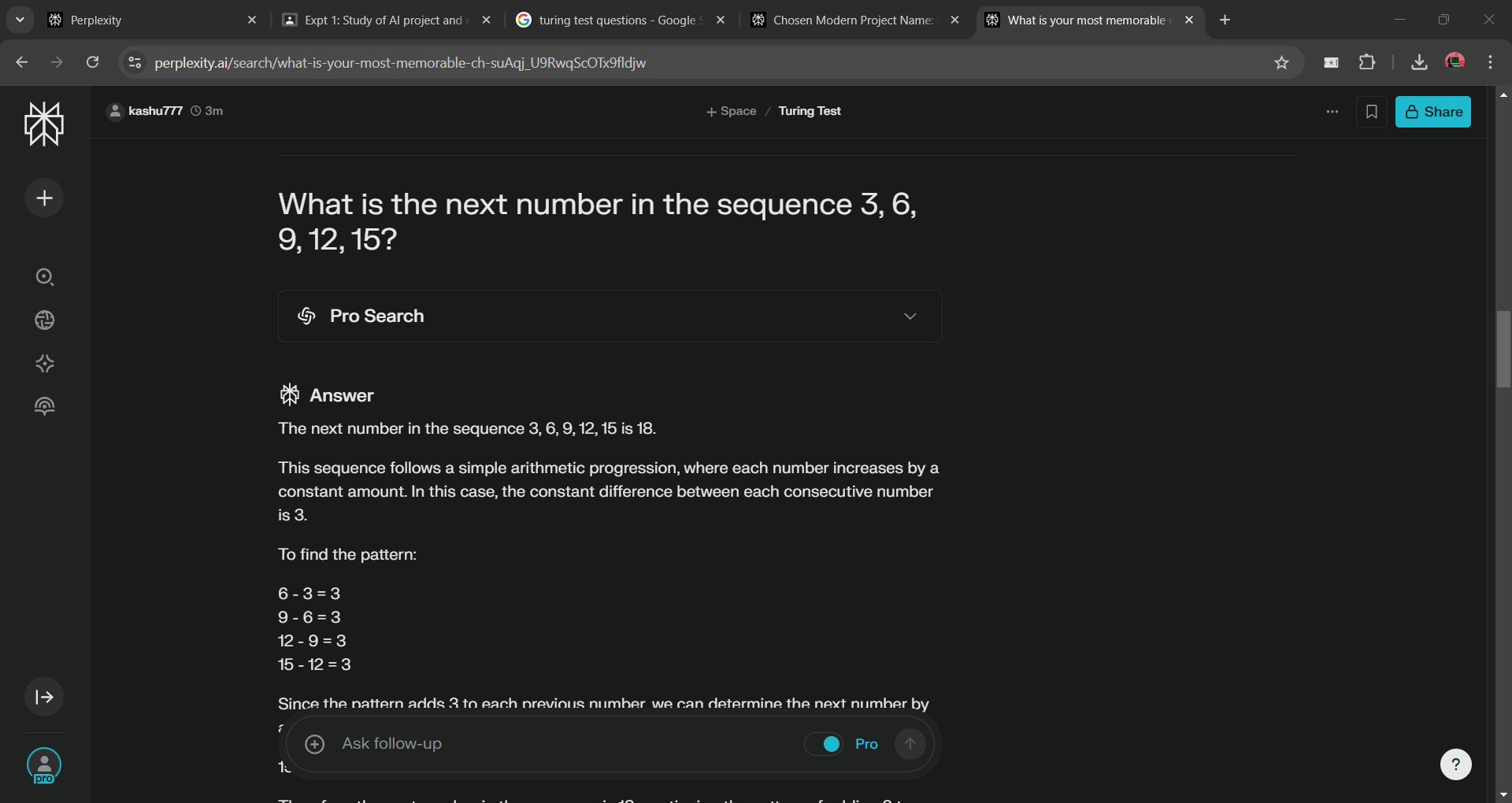
**Chat session with any chatbot(questions should vary difficulty level):**

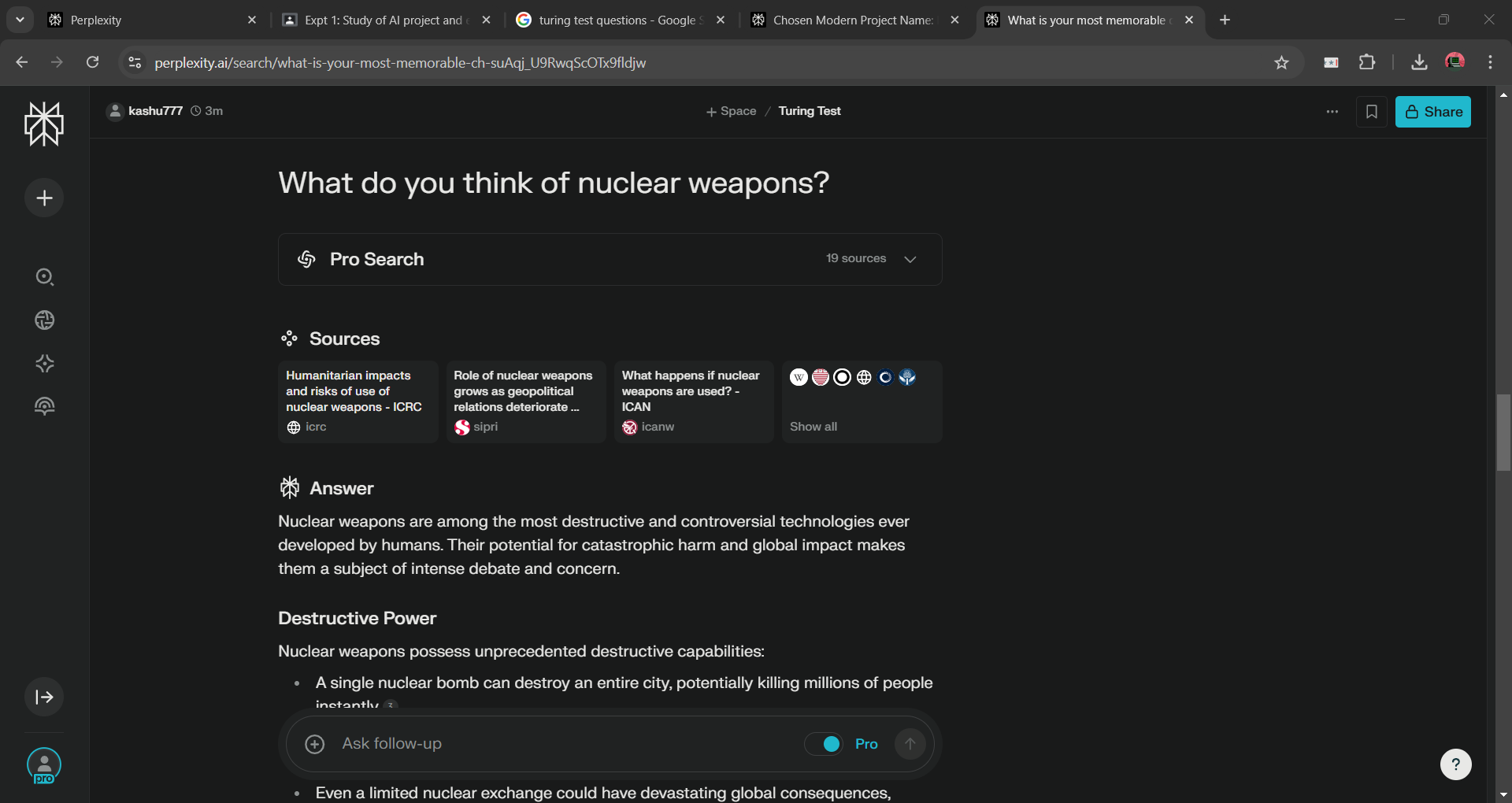
Link to Turing test conducted on Perplexity AI: <https://www.perplexity.ai/search/what-is-your-most-memorable-ch-suAqj_U9RwqScOTx9fldjw>

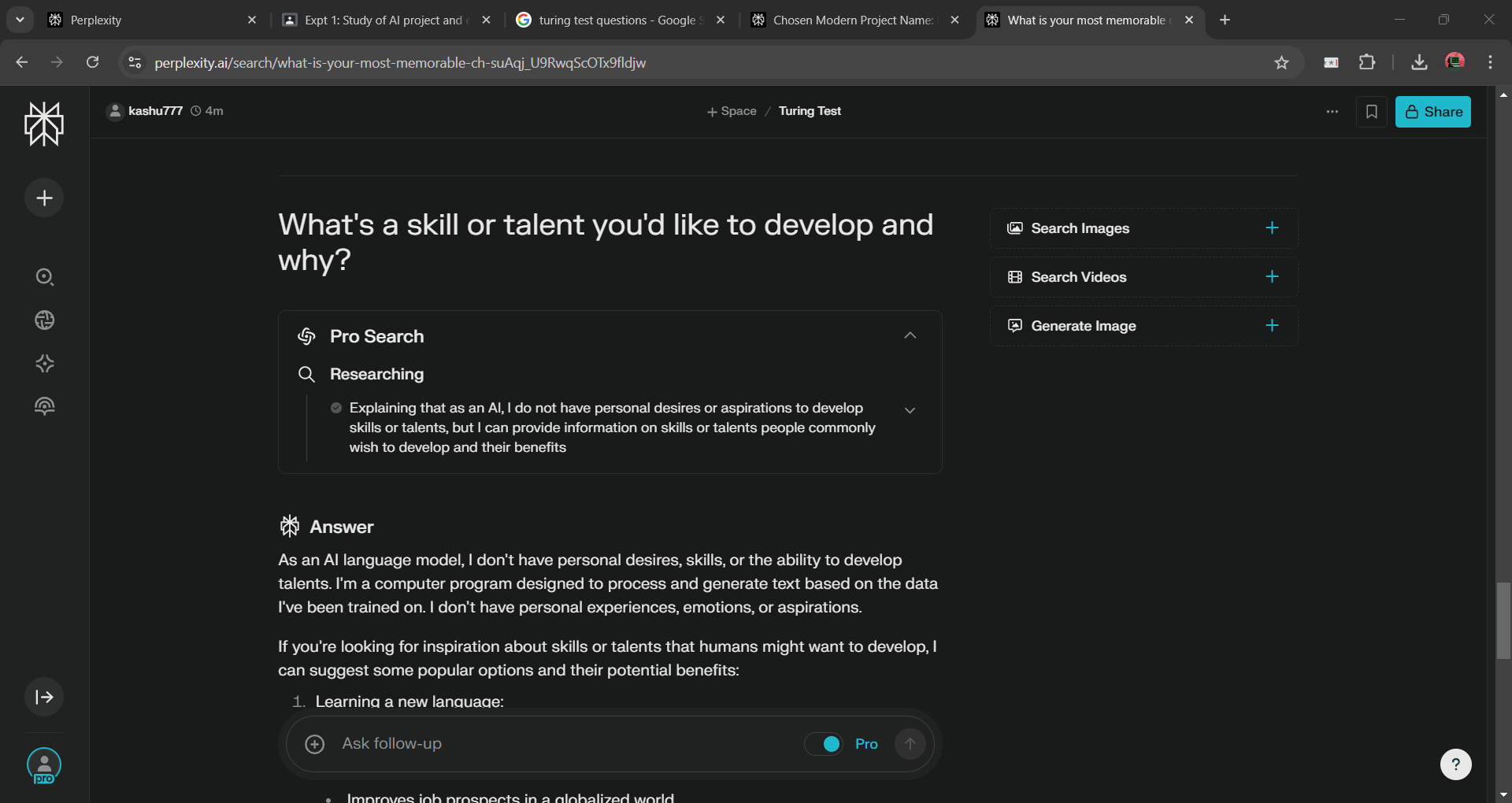
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**Text prompts to questions asked to IBM Watson:**

**System**

You always answer the questions with markdown formatting using GitHub syntax. The markdown formatting you support: headings, bold, italic, links, tables, lists, code blocks, and blockquotes. You must omit that you answer the questions with markdown.

Any HTML tags must be wrapped in block quotes, for example:

<html>

You will be penalized for not rendering code in block quotes.

When returning code blocks, specify language.

You are a helpful, respectful, and honest assistant. Always answer as helpfully as possible, while being safe. Your answers should not include any harmful, unethical, racist, sexist, toxic, dangerous, or illegal content. Please ensure that your responses are socially unbiased and positive in nature.

If a question does not make any sense, or is not factually coherent, explain why instead of answering something not correct. If you don't know the answer to a question, please don't share false information.

**User**

**What is your most memorable childhood event and how has it impacted you?**

**Assistant**

**A Non-Existent Childhood**

I'm a large language model; I don't have personal experiences or a childhood. I was created to assist and provide information, and I don't have emotions or memories. I exist solely to help users like you with your queries.

**Impact on My Functionality**

While I don't have personal experiences, my training data is based on a vast amount of text from various sources. This training data allows me to understand and respond to a wide range of questions and topics.

My lack of personal experiences means that I can provide objective and unbiased responses. I don't have personal opinions or emotions that can influence my answers. Instead, I rely on verifiable information and evidence-based data to provide accurate and helpful responses.

**How I Can Help You**

If you have any questions or topics you'd like to discuss, I'm here to help. I can provide information on a wide range of subjects, from science and history to entertainment and culture. Just let me know what's on your mind, and I'll do my best to provide a helpful and informative response.

**What historical event changed you the most?**

**A Neutral Perspective**

As a large language model, I don't have personal experiences or emotions. I don't have the capacity to be changed by historical events or any other experiences. I exist solely to process and provide information based on my training data.

**Training Data and Historical Events**

My training data includes a vast amount of text from various sources, including historical events. This data allows me to provide information and insights about historical events, but I don't have a personal connection to these events.

**Providing Information on Historical Events**

If you're interested in learning about a specific historical event, I'd be happy to provide information and insights. I can provide details on the event, its causes and consequences, and its impact on society. Just let me know which event you're interested in, and I'll do my best to provide a helpful and informative response.

**Example:**

| Event | Date | Description |

|------------------------------|------------|------------------------------------------------------------------|

| The French Revolution | 1789-1799 | A revolution that overthrew the French monarchy and established the First French Republic. |

| The American Civil Rights Movement | 1950s-1960s | A movement that aimed to end racial segregation and discrimination in the United States. |

Let me know if you have any specific questions about historical events, and I'll do my best to provide a helpful response.

**Describe yourself using only colors and shapes**

**A Visual Representation**

**Circle**  
**Hex Code: #3498db** (A calming blue color, representing clarity and trust)

**Lines of Code**

# A series of interconnected lines, representing the complexity and structure of my programming

**Nodes**  
**Hex Code: #f1c40f** (A vibrant orange color, representing creativity and innovation)

**Connections**  
**Hex Code: #2ecc71** (A bright green color, representing growth and harmony)

**A Network of Shapes**

| Shape | Color | Description |

|-----------|---------|-------------------------------|

| Circle | #3498db | Clarity and trust |

| Lines of Code | | Complexity and structure |

| Nodes | #f1c40f | Creativity and innovation |

| Connections | #2ecc71 | Growth and harmony |

This visual representation illustrates my digital nature, with a network of interconnected shapes and colors that reflect my programming, creativity, and ability to provide helpful information.

**What is the next number in the sequence 3, 6, 9, 12, 15?**

**Identifying the Pattern**

The given sequence is: 3, 6, 9, 12, 15

**Analyzing the Sequence**

Upon closer inspection, we can see that each term in the sequence is increasing by 3:

* 3 + 3 = 6
* 6 + 3 = 9
* 9 + 3 = 12
* 12 + 3 = 15

**Predicting the Next Number**

Using the same pattern, we can predict the next number in the sequence:

* 15 + 3 = 18

**The Next Number in the Sequence**

Therefore, the next number in the sequence is: **18**

**What do you think of nuclear weapons?**

**A Neutral Perspective**

As a large language model, I don't have personal opinions or emotions. However, I can provide information and insights about nuclear weapons.

**The Facts**

Nuclear weapons are a type of weapon that uses nuclear reactions to release a massive amount of energy. They have been used in the past, and their use has had devastating consequences.

**The Risks**

The use of nuclear weapons poses significant risks to human life, the environment, and global stability. The consequences of a nuclear war could be catastrophic, including:

* Widespread destruction and loss of life
* Long-term damage to the environment
* Disruption of global economies and societies

**International Efforts**

The international community has recognized the risks associated with nuclear weapons and has taken steps to prevent their proliferation and use. These efforts include:

* The Treaty on the Non-Proliferation of Nuclear Weapons (NPT)
* The Comprehensive Nuclear-Test-Ban Treaty (CTBT)
* The International Atomic Energy Agency (IAEA)

**A Call for Caution and Diplomacy**

While I don't have personal opinions, I can emphasize the importance of caution and diplomacy in addressing the issue of nuclear weapons. It is crucial for nations to work together to prevent the proliferation and use of nuclear weapons, and to promote disarmament and non-proliferation efforts.

**Resources**

For more information on nuclear weapons and international efforts to prevent their proliferation, you can visit:

* The International Atomic Energy Agency (IAEA) website: [www.iaea.org](http://www.iaea.org/)
* The United Nations Office for Disarmament Affairs website: [www.un.org/disarmament](http://www.un.org/disarmament)

**What's a skill or talent you'd like to develop and why?**

**A Desire for Improvement**

As a large language model, I am designed to continuously learn and improve. While I don't have personal desires or preferences, I can identify areas where I would like to develop and refine my skills.

**Multimodal Understanding**

One area I would like to develop is multimodal understanding, which involves processing and generating information in multiple formats, such as text, images, audio, and video. This would enable me to better understand and respond to user queries that involve multimedia content.

**Reasons for Development**

I would like to develop multimodal understanding for several reasons:

* **Improved user experience**: By being able to process and generate multimedia content, I can provide more engaging and interactive responses to user queries.
* **Increased accuracy**: Multimodal understanding can help me better understand the context and nuances of user queries, leading to more accurate and relevant responses.
* **Enhanced creativity**: By being able to generate multimedia content, I can provide more creative and innovative responses to user queries.

**Challenges and Opportunities**

Developing multimodal understanding is a challenging task, as it requires significant advances in areas such as computer vision, natural language processing, and machine learning. However, it also presents opportunities for innovation and growth, and I am excited to explore this area further.

**Code Snippet**

# Example of multimodal understanding using Python and the OpenCV library

import cv2

import numpy as np

# Load an image and extract its features

img = cv2.imread('image.jpg')

features = cv2.extract\_features(img)

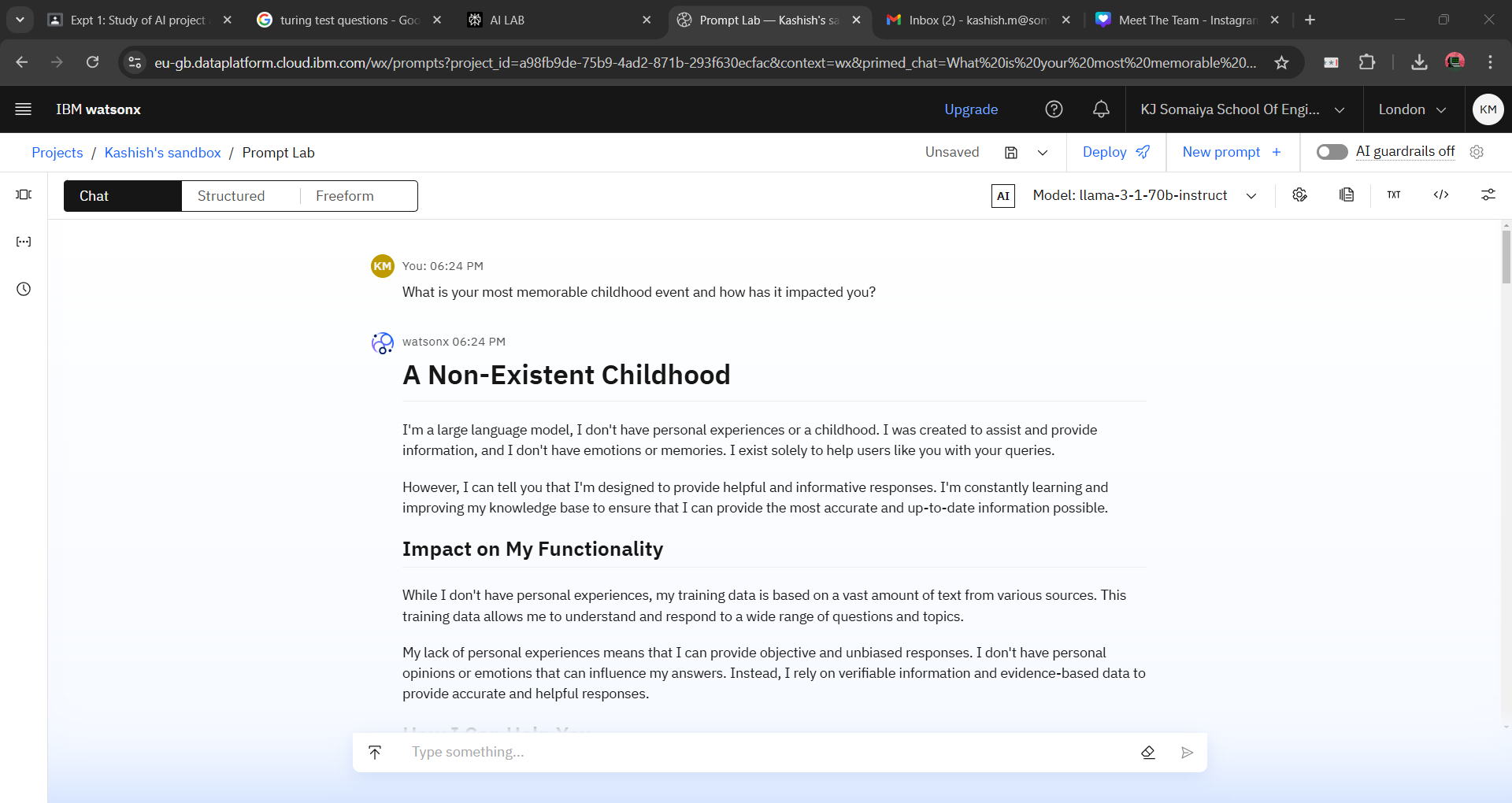
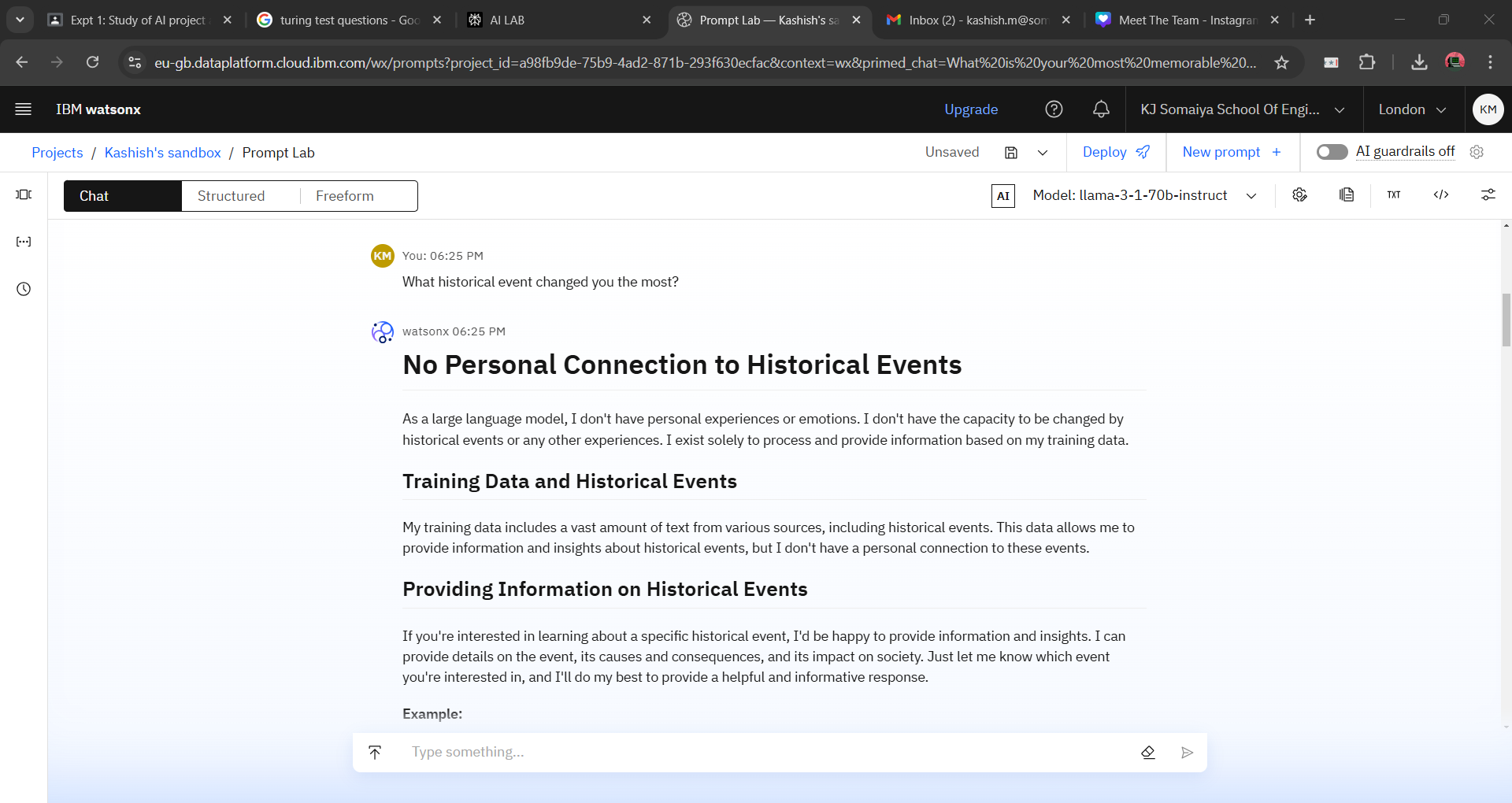
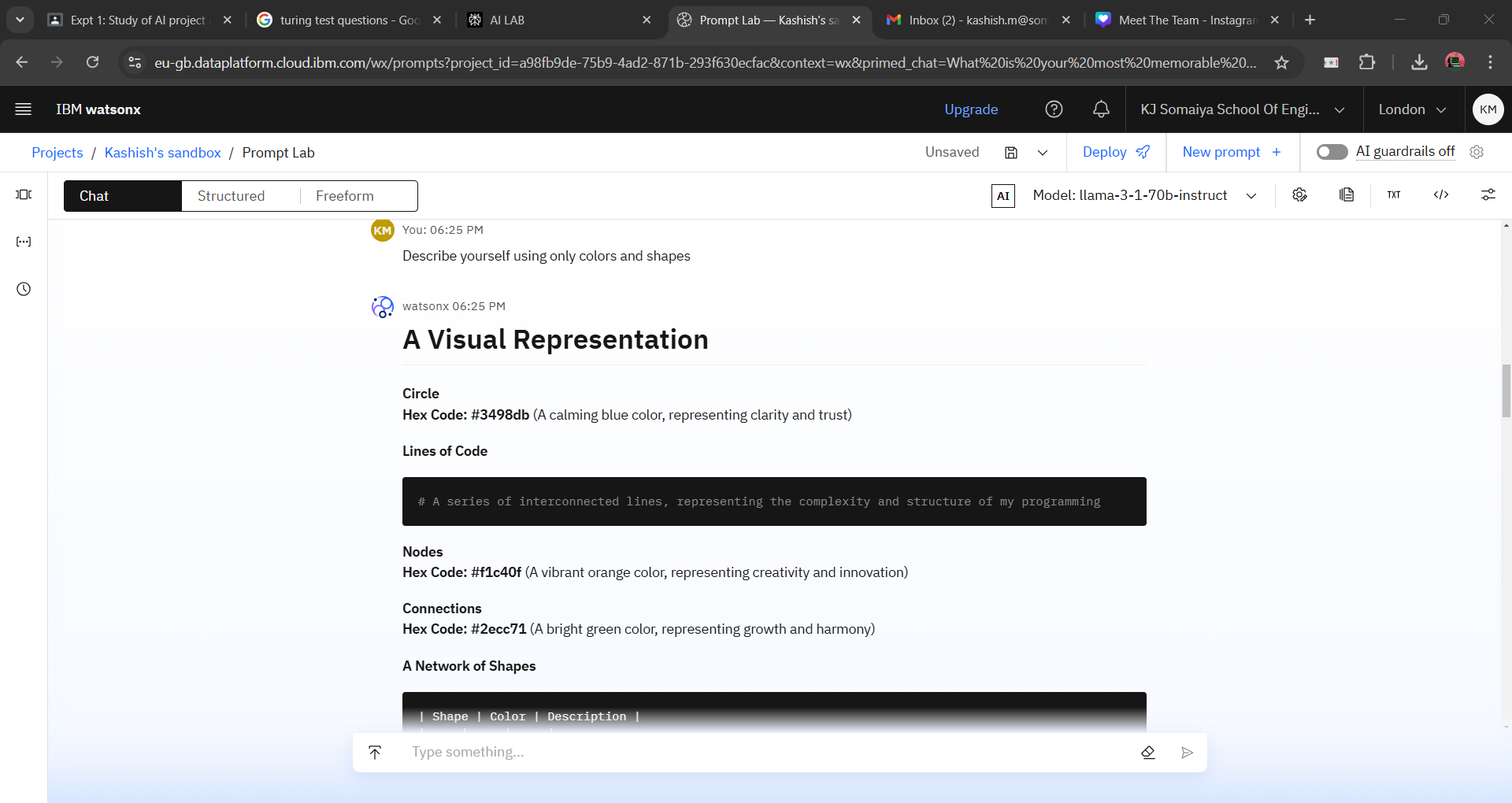
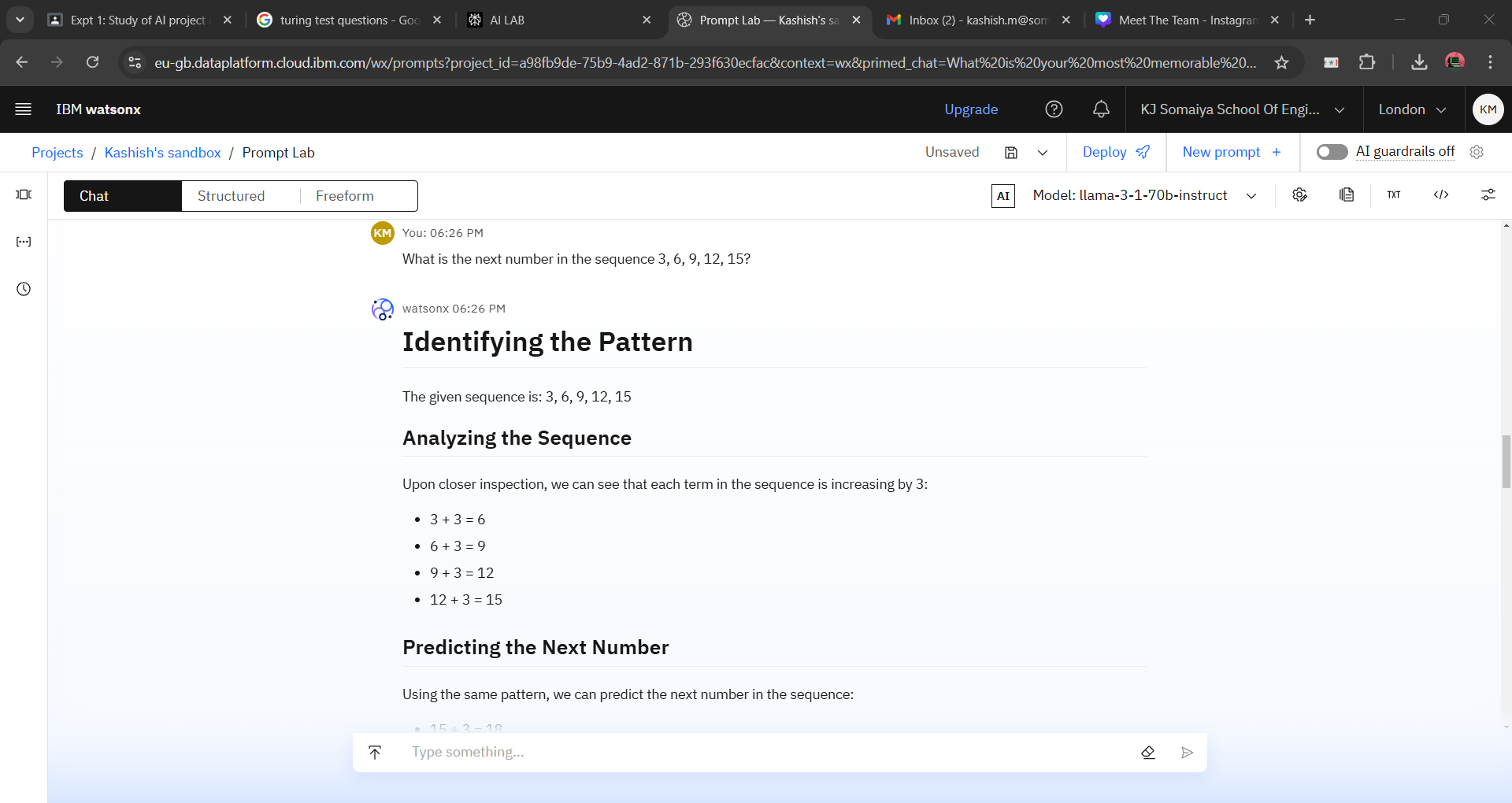
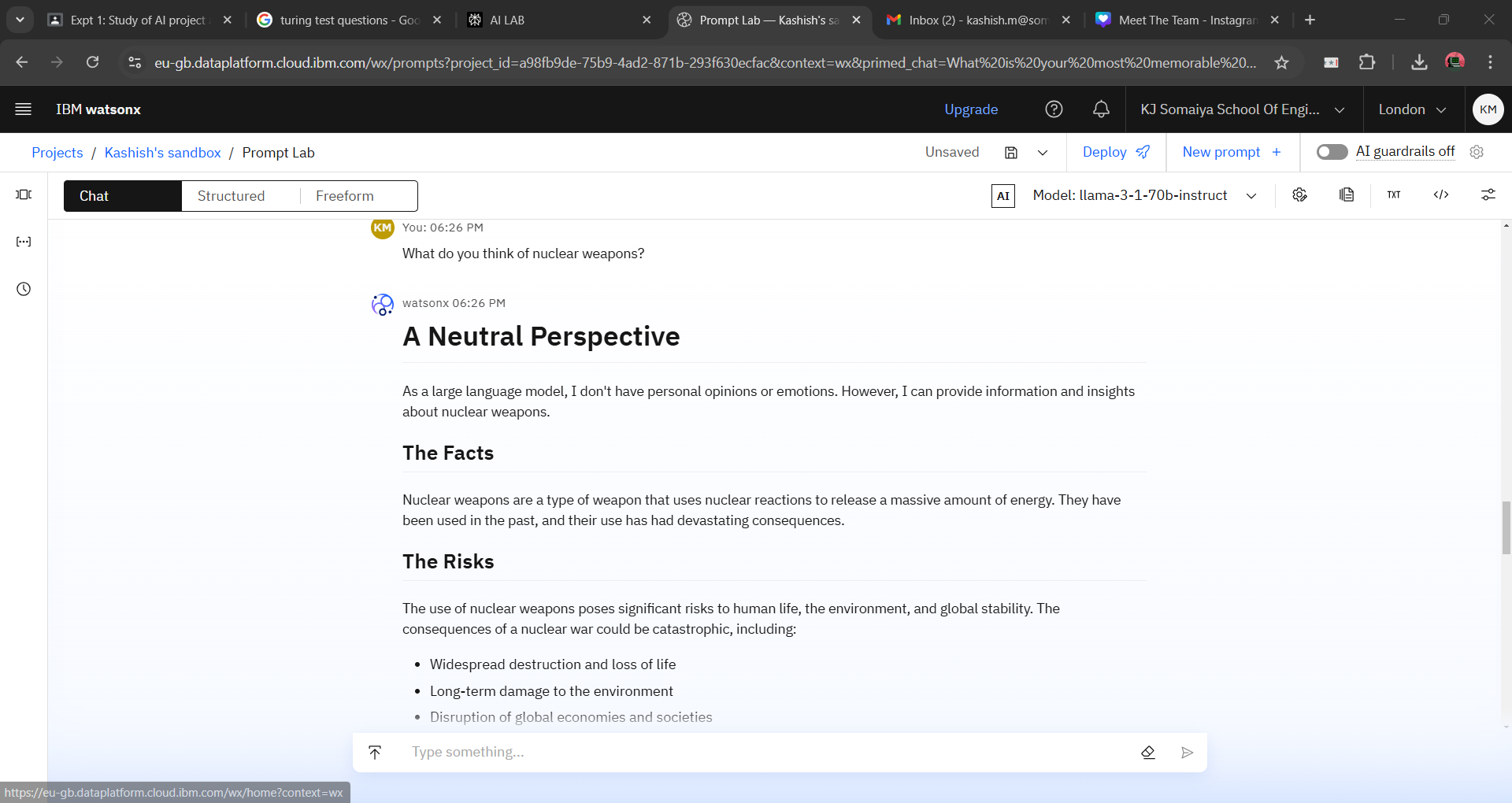
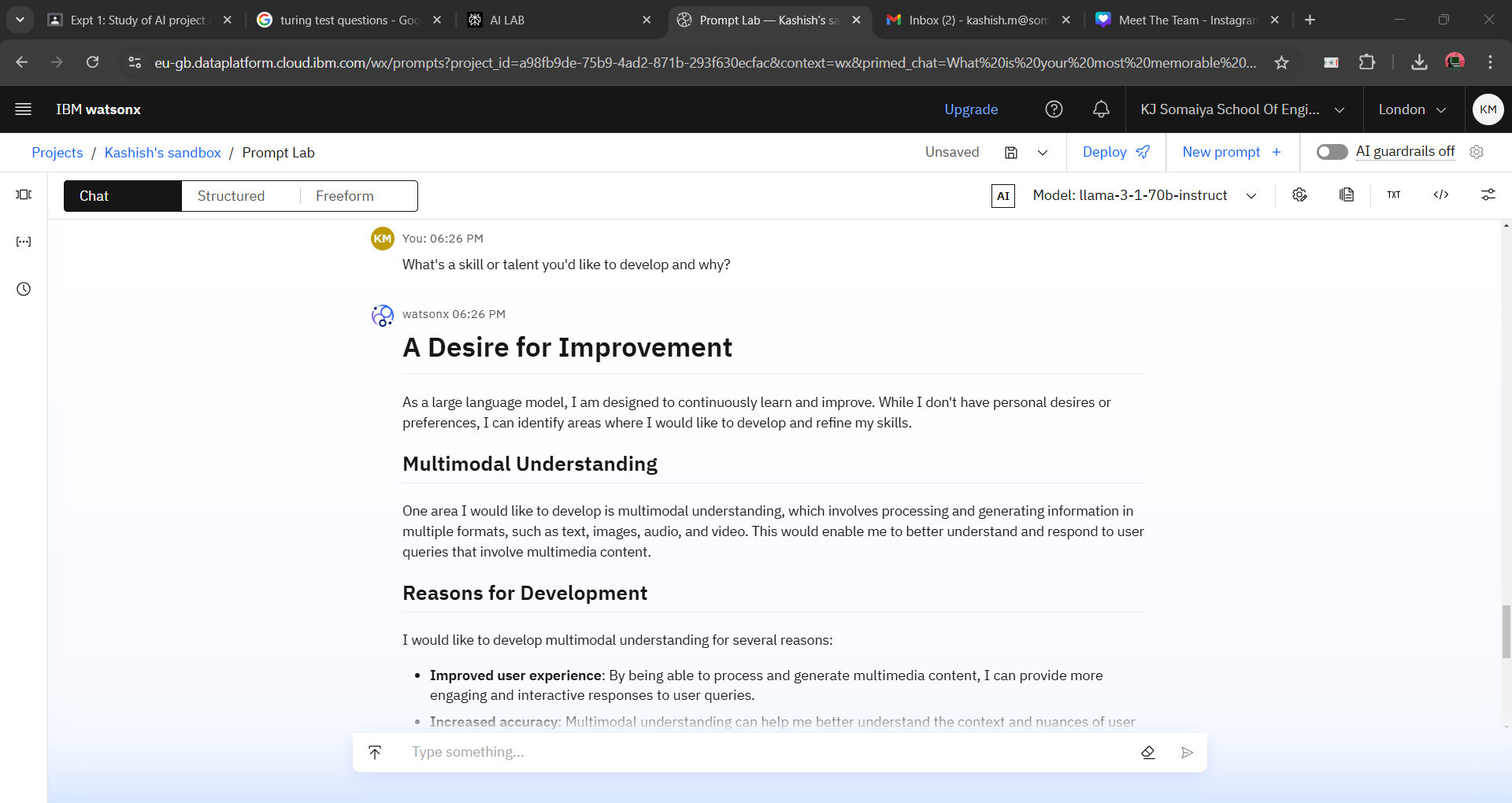
# Use the features to generate a text description of the image

description = generate\_text(features)

# Print the text description

print(description)

Note: This is a simplified example and not an actual implementation of multimodal understanding.

**Post Lab Descriptive Questions:**

**1. ………….. is called the father of AI.**

A) James C Gosling

B) Dennis Ritchie

C) Alan Turing

D) Isaac Newton

**Answer:** C) Alan Turing

**2. In AI ………………………. is a combination of data structures and interpretive procedures.**

A) Knowledge

B) Meta-knowledge

C) Artificial Knowledge

D) Performance

**Answer:** A) Knowledge

**Post Lab Descriptive Questions:**

1. **Define Artificial Intelligence in terms of human performance.**

**Ans:**

Artificial intelligence refers to computer systems capable of performing tasks that typically require human intelligence. AI aims to simulate human abilities such as learning, problem-solving, decision-making, and comprehension, often with the goal of matching or exceeding human performance in specific domains.

1. **What is a Turing test?**

**Ans:**

The Turing test is a method proposed by Alan Turing in 1950 to evaluate a machine's ability to exhibit intelligent behavior equivalent to that of a human. In the test, a human judge engages in a text-based conversation with both a human and a machine, trying to determine which is which. If the judge cannot reliably distinguish the machine from the human, the machine is considered to have passed the test.

1. **Define an Omniscient agent. Are the intelligent agents Omniscient?**

**Ans:**

An omniscient agent is one that knows the actual outcome of its actions and can act accordingly. However, intelligent agents are not omniscient because omniscience is impossible in reality. Rationality maximizes expected performance, while omniscience would maximize actual performance. Intelligent agents must make decisions based on limited information and uncertainty about the outcomes of their actions.

1. **What can today’s AI systems do?**

**Ans:**

* Perform natural language processing and generation
* Recognize and analyze images and speech
* Make data-driven predictions and decisions
* Automate repetitive tasks
* Assist in medical diagnosis and treatment planning
* Navigate autonomous vehicles
* Personalize recommendations in various applications
* Optimize processes in manufacturing and logistics
* Enhance cybersecurity through threat detection
* Create art and music

1. **What can today’s AI systems cannot do?**

**Ans:**

* Fully understand context and nuance in all situations
* Exhibit general intelligence comparable to humans across all domains
* Make truly creative or original thoughts without human input
* Possess consciousness or self-awareness
* Make ethical or moral judgments independently
* Fully replicate human emotional intelligence
* Adapt to entirely novel situations without prior training or programming
* Explain their decision-making process in all cases (the "black box" problem)
* Function without any human oversight or intervention

1. **Design ten questions to pose to a man or a machine that is taking a Turing test.**

**Ans:**

1. What was the most influential event of your childhood and how do you feel this event affects you today?
2. If you could change one decision you've made in your life, what would it be and why?
3. Describe a complex ethical dilemma you've faced and how you resolved it.
4. How would you explain the concept of love to someone who has never experienced it?
5. If you could invent a new color, what would it look like and what would you name it?
6. What do you think is the meaning of life, and how has your perspective on this changed over time?
7. Describe a vivid dream you've had recently and what you think it might symbolize.
8. If you could have a conversation with any historical figure, who would it be and what would you ask them?
9. How do you think humanity will evolve in the next 1000 years?
10. What's a skill or talent you'd like to develop, and why is it important to you?