Tech Intern: KraftedX

Assignment Report

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I. My Approach

1. I chose the Python programming language to complete this assignment. Initially, I wrote the code for a simple calculator app without any GUI, implementing basic functionalities to perform arithmetic operations.
2. I provided the same prompt to different AI models (Gemini, ChatGPT, and Blackbox) to develop the GUI for this calculator application.
3. I further enhanced the application by prompting these AI tools to modify and improve specific functionalities.
4. Using the three AI models, I created four distinct versions of the calculator app.
5. For the comparative analysis, I asked each AI tool to explain the code for the application it generated.
6. Based on the explanations and factors like the application's functionality and user interface, I compared the tools and identified
7. Finally, I created a system diagram to illustrate how the application works.

II. Result from Different AI Models

1. Gemini:

Prompt 1: In first prompt, I asked to develop the calculator app based on the raw code I provided and I asked to make A GUI based calculator application to perform the different operations.

Output:

- The code was generated successfully as per the prompt.
- The GUI was simple yet functional.
- Identified Issue: The "Clear" button overlapped with the "Division" button, affecting usability

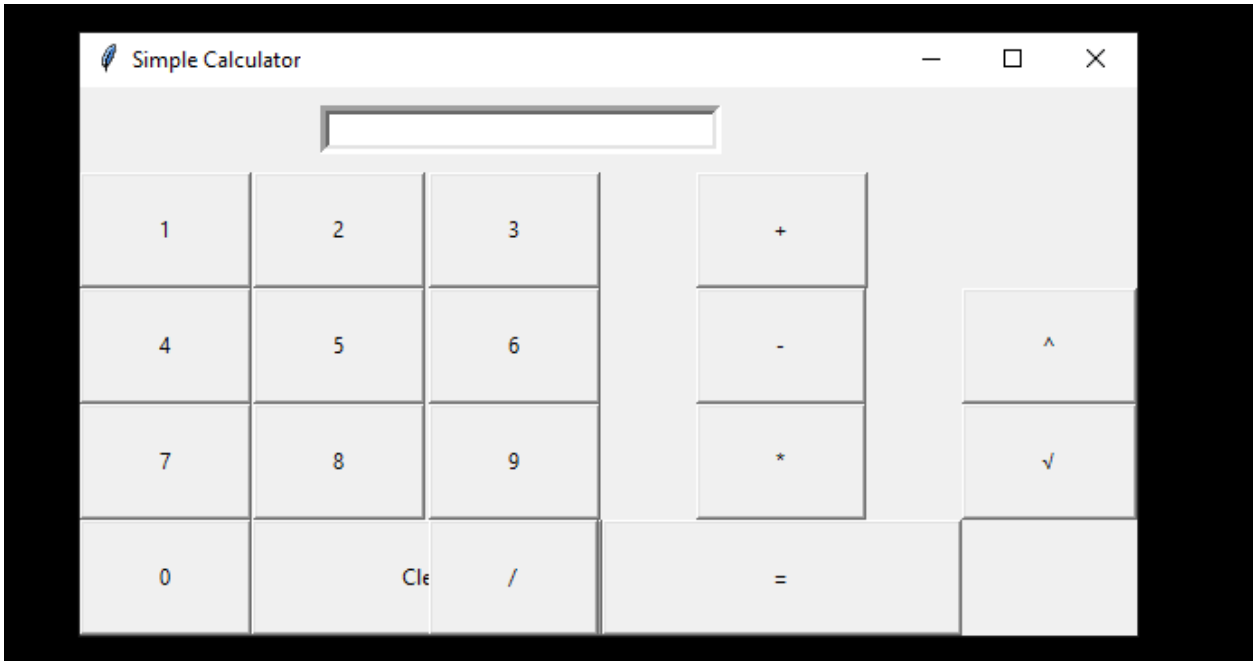


Figure 1: Overlapping issue between the "Clear" and "Division" buttons in the GUI

Code Link: https://github.com/ayu014/Assignment/blob/master/Gemini/prompt1.py

Prompt 2: Optimizing the GUI in terms of better user experience.

Output:

- The new code was generated successfully but contained several issues.
- Identified Issue: A TypeError was encountered in the code due to conflicting values for the bg keyword argument in the Button method.

```
PS H:\Coding\Assignment> python -u "h:\Coding\Assignment\Gemini\prompt2.py"
Traceback (most recent call last):
  File "h:\Coding\Assignment\Gemini\prompt2.py", line 55, in <module>
    button_equal = Button(window, text="=", **button_style, command=button_equa
l, bg="#4CAF50", activebackground="#3e8e41")
TypeError: tkinter.Button() got multiple values for keyword argument 'bg'
PS H:\Coding\Assignment>
```

Figure: Example of a TypeError in the code

Code Link: https://github.com/ayu014/Assignment/blob/master/Gemini/prompt2.py

Prompt 3: In this prompt, I asked to resolve all the issues in the code.

Output:

- The new code ran perfectly without any errors and there were some changes in the UI in the color of the button.
- Identified Issue: The was the issue of overlapping buttons, I tested it on other machines and it ran perfectly.

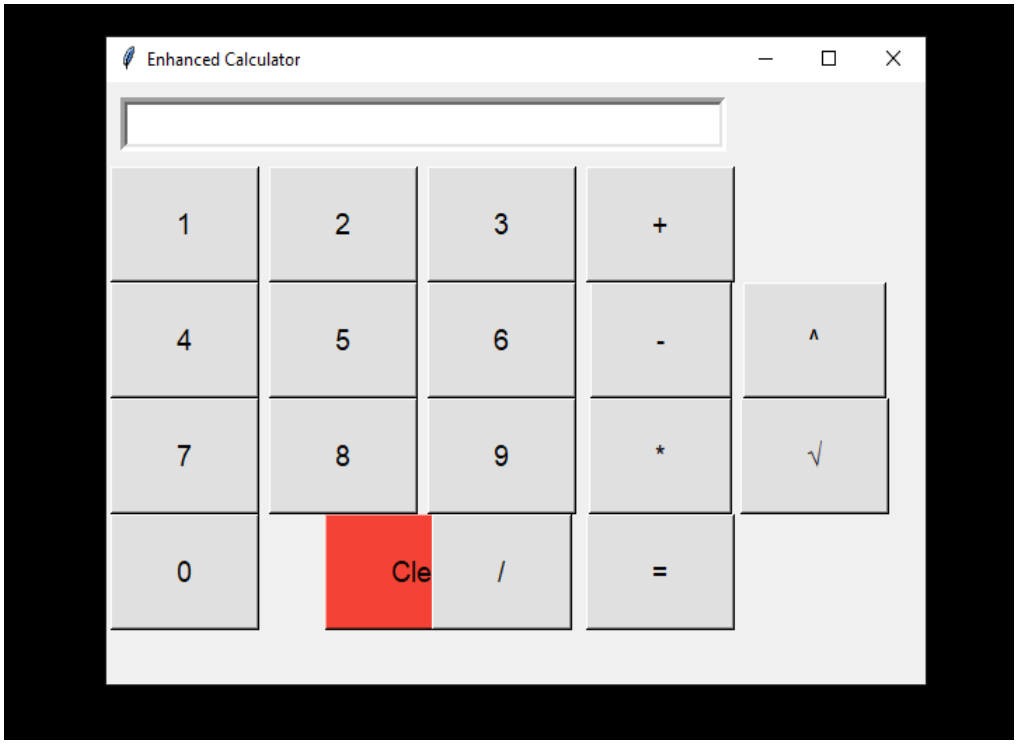


Figure: Final Calculator Application

Code Link: https://github.com/ayu014/Assignment/blob/master/Gemini/prompt3.py

2. Blackbox AI:

Prompt 1: Initial GUI Development by Blackbox AI. I gave same prompt to it like other AI models.

Output:

- Blackbox AI generated the code as per requirement.
- The GUI was very basic and the icons/buttons of different operation were not visible clearly.
- Identified Issue: There was not any "Equals to" symbol to show the calculate result.

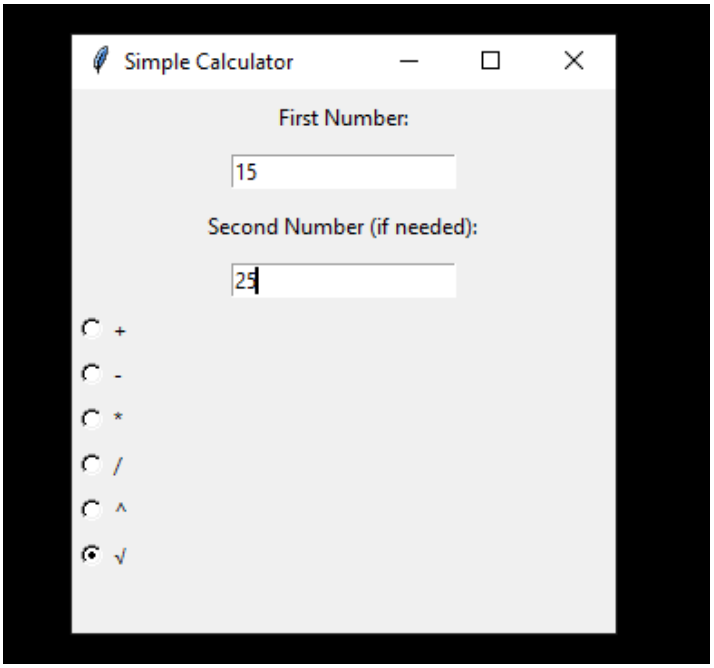


Figure: Initial GUI developed by Blackbox AI, showing missing 'Equals to' symbol.

Code Link: https://github.com/ayu014/Assignment/blob/master/Blackbox/prompt1.py

Prompt 2: Adding a Result Field and Equals Button to the GUI

Output:

- In the new code, there was proper button to perform the calculation.
- Identified Issue: Despite having the button to calculate, there was no field in the GUI to display the result.

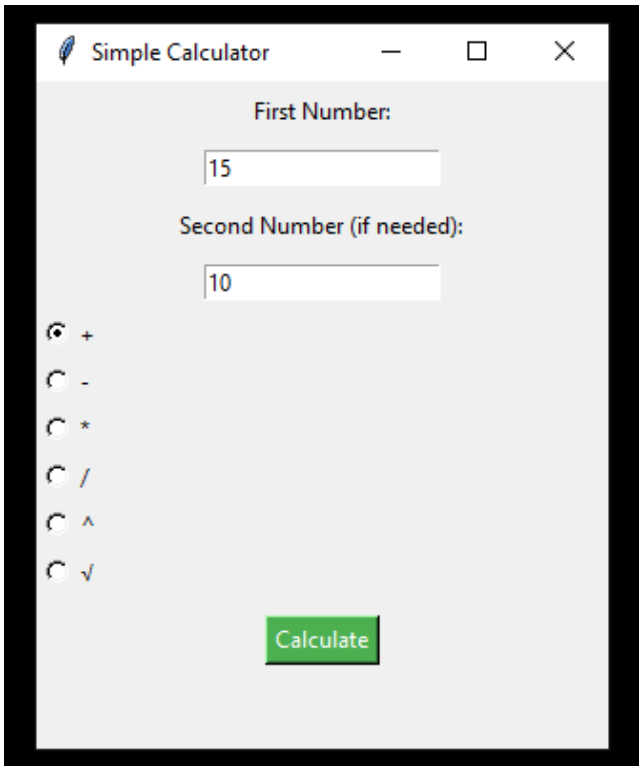


Figure: Added "Calculate" button

Code Link: https://github.com/ayu014/Assignment/blob/master/Blackbox/prompt2.py

Prompt 3: The goal of this prompt was to enhance the GUI by adding a specific field to display the result of the calculations

Output:

- Blackbox designed only the front-end of the application, focusing on the GUI layout, but did not include an option to display the output of the performed operations.
- Identified Issue: Blackbox was unable to develop a fully functional application, as it lacked the ability to integrate a working result display

3. Chat GPT:

Prompt 1: Similar to other AI models, I provided the same prompt to Chat GPT to develop a calculator application.

Output:

- The calculator application generated by GPT in 1st prompt was simple like other models.
- Identified Issue: The application did not support input through numeric keys, and only touch-based typing was functional.

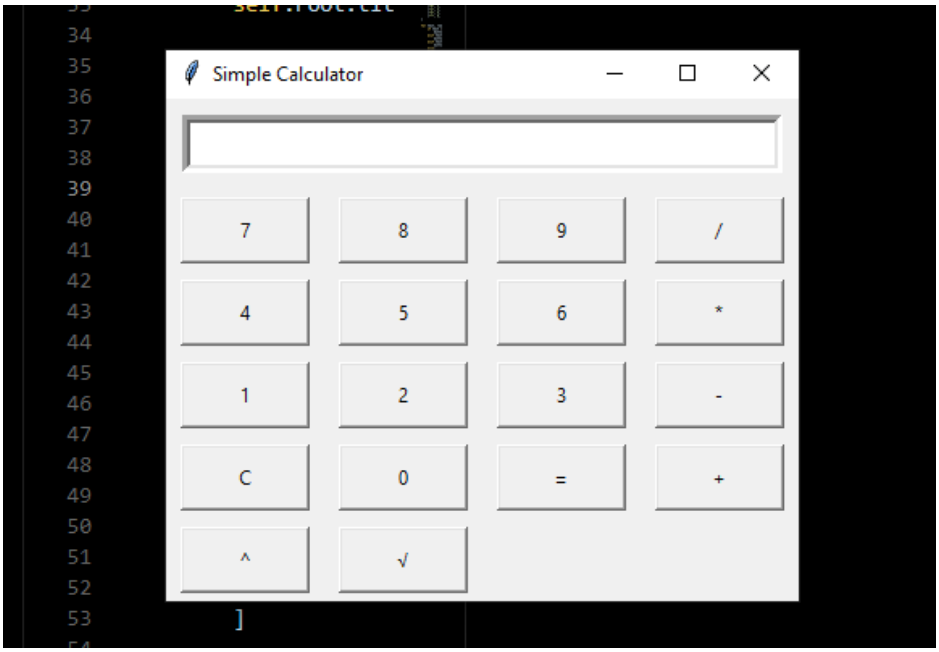


Figure: Calculator generated by Chat GPT in 1st prompt

Code Link: https://github.com/ayu014/Assignment/blob/master/Chat_GPT/prompt1.py

Prompt 2: I prompted Chat GPT to improve the UI design, optimize it further, and add support for numeric key input.

Output:

- The updated version was good in terms of designing.
- In this version, the Chat GPT focuses more on coloring the different buttons.
- Identified Issue: In this version also, there was problem of numeric key typing

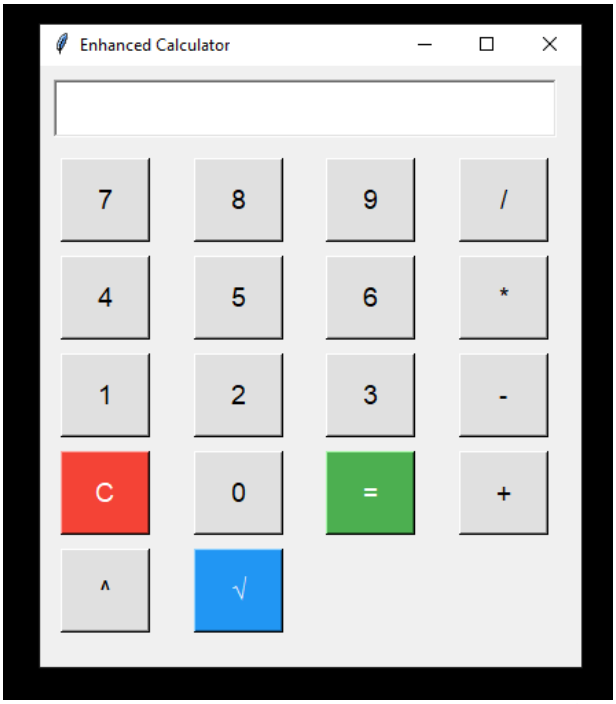
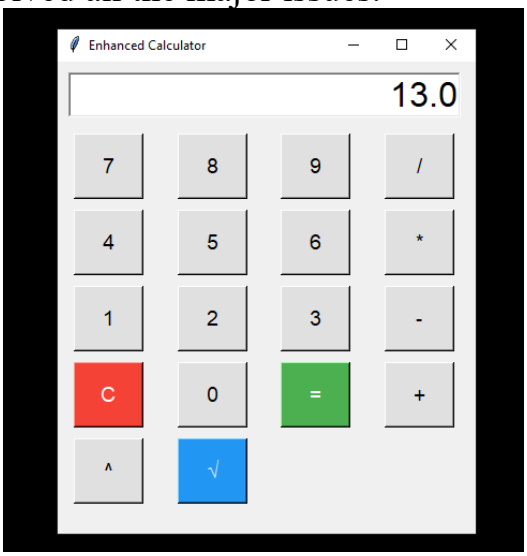


Figure: Application generated by Chat GPT in 2nd prompt.
Code Link: https://github.com/ayu014/Assignment/blob/master/Chat_GPT/prompt2.py

Prompt 3: After the second prompt, the issue of input through numeric keys remained unresolved. Therefore, I provided the same prompt again, requesting a fix.

Output:

- The updated version solved all the major issues.

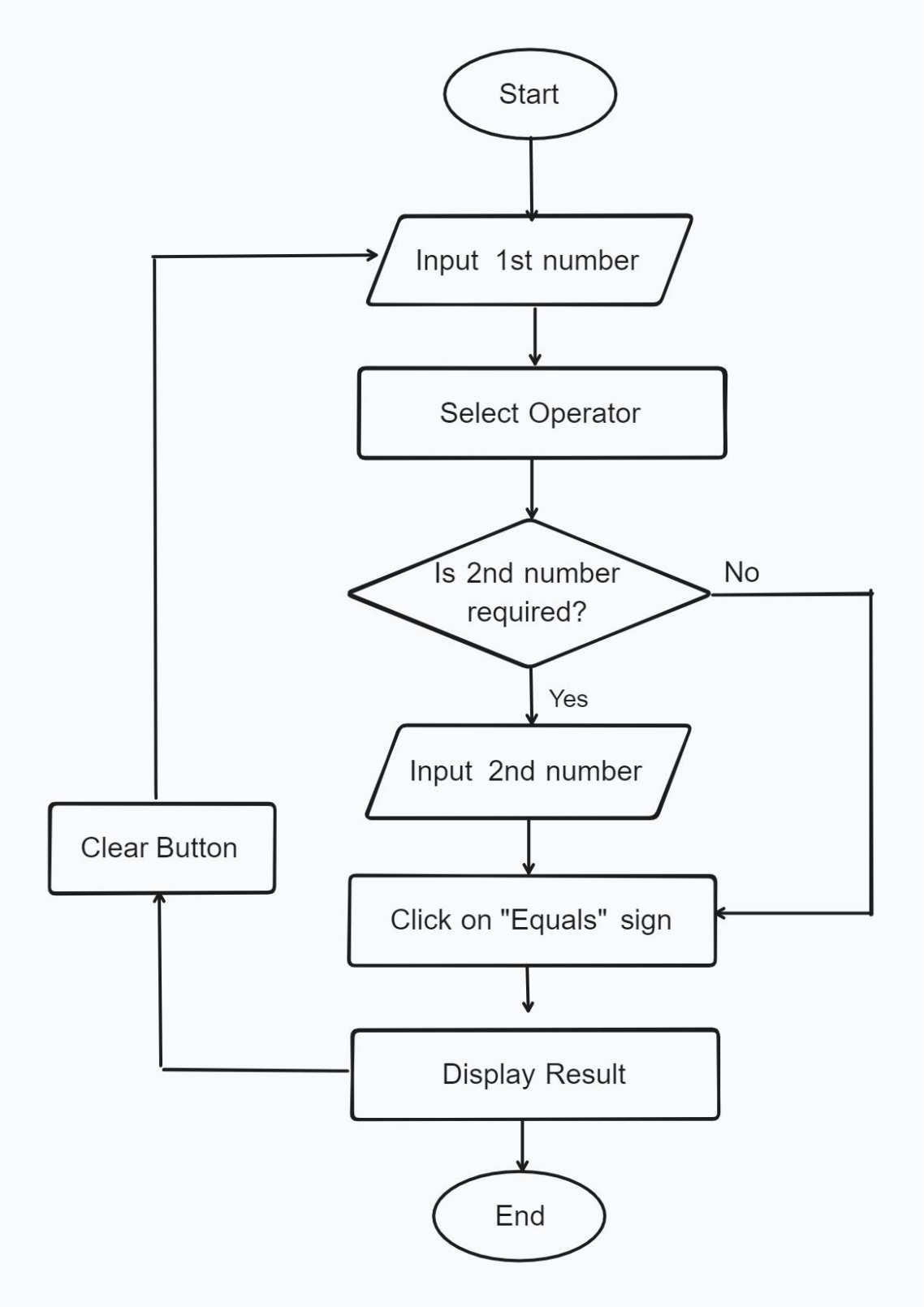


Code Link: https://github.com/ayu014/Assignment/blob/master/Chat_GPT/prompt3.py

III. Comparative Analysis

Criteria	Chat GPT	Gemini	Blackbox
GUI	Best among all three. Similar to Gemini with minor changes.	Similar to Chat GPT but with slight differences.	Very poor in terms of GUI design.
Code	Encapsulated properly in a class with different methods.	Encapsulated in a single function using basic if-else statements.	Short code but lacked many functionalities.
Code Explanation	Provided clear and detailed explanations	Provided clear and detailed explanations.	Provided clear and detailed explanations.
Functionality	Performed well with good functionality.	Good performance in terms of functionality.	Very poor; only designed the frontend with no backend support for calculations.
Code Readability	Easy to read for beginners with clear variable and function names.	Easy to read for beginners	Easy to read for beginners
Error Handling	Displayed errors on the terminal (e.g., division by zero or empty inputs).	Handled errors effectively, including division by zero and empty inputs.	Could not perform calculations and lacked any error-handling mechanisms.

IV. System Diagram



V. Conclusion

After analyzing and comparing the performance of the three AI models (ChatGPT, Gemini, and Blackbox) in creating a calculator application, each model exhibited some pros and cons.

- ChatGPT showed the best overall performance with a well-designed GUI, encapsulated and structured code, and good functionality. However, it initially lacked error handling and support for numeric key input, which were resolved after multiple prompts.
- Gemini excelled in error handling and functionality, making it a reliable option for creating applications. However, its code structure was less organized compared to ChatGPT, and its GUI was similar but less polished.
- Blackbox struggled significantly in terms of GUI design, functionality, and code completeness. It lacked backend support for calculations and primarily focused on the frontend, making it the weakest performer among the three.

Overall, ChatGPT is the most suitable AI tool for creating applications like a calculator due to its adaptability, user-friendly outputs.

VI. Appendix

A. Chat Links

1. Gemini: https://g.co/gemini/share/1ba2ee28a12c
2. Blackbox: https://www.blackbox.ai/share/7f81990c-2bc0-4270-9d74-6d2bcfb6d0be
3. Chat GPT: https://chatgpt.com/share/6769add6-8bcc-8008-a404-b6c8824adbb3

B. GitHub Repository

Link: https://github.com/ayu014/Assignment

*In case the Blackbox Link expires, the chat history is saved here. (Link: https://github.com/ayu014/Assignment/blob/master/blackbox_chat_history.pdf)