Code Explainer Chatbot

1. Introduction:

The Code Explainer Chatbot is a web-based application designed to provide users with detailed explanations for code snippets written in Python, Java, and C programming languages. This document outlines the public requirements for the development and deployment of the Code Explainer Chatbot, detailing its features, functionalities, and user interactions.

2. Objective:

The primary objective of the Code Explainer Chatbot is to facilitate code comprehension and learning by offering comprehensive explanations for code snippets in a user-friendly manner. The chatbot aims to cater to a diverse audience, including beginners seeking to understand basic programming concepts and experienced developers encountering unfamiliar code segments.

3. Features and Functionalities:

- **Password Protection:** The chatbot shall include a password-based authentication mechanism to ensure secure access to the application.
- **Language Selection:** Users shall be able to select the programming language (Python, Java, or C) of the code snippet they wish to explain.
- **Answer Type Selection:** Users shall have the option to choose between receiving elaborate textual explanations or tabular breakdowns with visualizations for code elements.
- **Syntax Checking:** The chatbot shall validate the syntax of the provided code snippet based on the selected programming language to ensure correctness.
- **Generative AI Integration:** Leveraging Generative AI technology, the chatbot shall generate contextually relevant explanations based on the input code snippets and user queries.
- **Visualization Tools:** The application shall employ visual aids such as pie charts to enhance understanding by illustrating the distribution of code elements within the snippets.
- **Error Handling:** Robust error handling mechanisms shall be implemented to guide users in case of syntax errors or incorrect inputs, ensuring a smooth user experience.

4. User Interactions:

The Code Explainer Chatbot shall facilitate the following user interactions:

- **Password Entry:** Users shall input a password to gain access to the chatbot interface, ensuring secure authentication.
- **Language Selection:** Users shall select the programming language of the code snippet they wish to explain from a dropdown menu.
- **Prompt Input:** Users shall input the code snippet they want to explain in the designated text input field.
- **Answer Type Selection:** Users shall choose between receiving an elaborate textual explanation or a tabular breakdown with visualizations for code elements.
- **Chatbot Response:** Upon submitting the code snippet, the chatbot shall generate and display a detailed explanation based on the selected answer type.
- **Error Feedback:** In case of syntax errors or incorrect inputs, the chatbot shall provide informative feedback to guide users towards rectification.

5. Design Considerations:

The Code Explainer Chatbot shall adhere to the following design considerations:

- User-Friendly Interface: The application shall feature an intuitive and user-friendly interface, facilitating ease of navigation and interaction.
- Responsive Design: The chatbot interface shall be responsive and compatible with various devices and screen sizes to accommodate diverse user preferences.
- Security Measures: Robust security measures, including password protection and encryption, shall be implemented to safeguard user data and interactions.
- Accessibility: The chatbot interface shall be designed to be accessible to users with disabilities, complying with accessibility standards and guidelines.

6. Deployment and Support:

The Code Explainer Chatbot shall be deployed as a web-based application accessible through standard web browsers. It shall be hosted on a secure server infrastructure to ensure reliability and availability. Additionally, the chatbot shall be supported by documentation, tutorials, and user guides to assist users in navigating and utilizing its features effectively.

7. Feedback and Improvement:

Continuous feedback from users shall be solicited to identify areas for improvement and enhancement. User feedback shall be incorporated into future iterations of the chatbot to enhance its functionality, usability, and overall user experience.

8. Conclusion:

The Code Explainer Chatbot aims to serve as a valuable resource for individuals seeking to understand and learn from code snippets written in various programming languages. Through adherence to public requirements and continuous improvement, the chatbot endeavors to fulfill its objective of empowering users with the knowledge and skills needed to excel in programming endeavors.