For the **elementary chatbot for investment suggestions** problem statement, here are some expected questions and answers that could be asked in the viva, along with related basic questions on Natural Language Processing (NLP):

**Expected Questions Based on Code and Problem Statement**

**1. What is a Chatbot?**

**Answer:**  
A **chatbot** is a software application designed to simulate human conversation through text or voice interactions. It can either be rule-based or powered by artificial intelligence (AI) and natural language processing (NLP) techniques. Chatbots can answer questions, provide recommendations, and perform tasks like scheduling or ordering. In this context, the chatbot would provide investment suggestions based on customer input.

* **Rule-based Chatbot**: These operate based on pre-defined rules and keywords, providing responses based on exact matches.
* **AI-powered Chatbot**: Uses machine learning and NLP to understand and respond to user queries more naturally, learning over time.

**2. How does your chatbot suggest investments?**

**Answer:**  
The elementary chatbot for suggesting investments will typically interact with users to understand their financial goals, risk tolerance, and preferences. It then uses predefined logic or rules (in simpler cases) or AI-powered decision models (for more advanced systems) to suggest investment options such as stocks, bonds, mutual funds, or other assets based on their responses. The chatbot can ask users questions like:

* “What is your investment goal?”
* “What is your risk tolerance?”
* “What is your investment horizon?”

It processes these inputs, analyzes the user's needs, and then responds with investment options that fit those criteria.

**3. What are the main components of an AI-powered chatbot for customer interaction?**

**Answer:**  
The main components of an AI-powered chatbot for customer interaction include:

* **User Interface**: The platform where the user interacts with the chatbot (e.g., web chat, mobile app, voice assistant).
* **Natural Language Understanding (NLU)**: This component interprets and understands the user’s input, converting text into actionable data (e.g., identifying keywords and intent).
* **Dialog Management**: This component determines the flow of conversation. It decides the next action the chatbot should take based on the user's inputs and context.
* **Response Generation**: The system generates responses that are appropriate to the user's queries.
* **Backend Integration**: The chatbot can connect to databases, APIs, or other services to provide accurate, up-to-date information (e.g., stock market data, investment suggestions).

**Basic Questions on Natural Language Processing (NLP)**

**4. What is NLP?**

**Answer:**  
**Natural Language Processing (NLP)** is a subfield of artificial intelligence (AI) that focuses on enabling computers to understand, interpret, and generate human language in a way that is both meaningful and useful. NLP involves a range of tasks, including:

* **Text classification** (e.g., categorizing text into predefined labels)
* **Sentiment analysis** (e.g., determining if a piece of text is positive, negative, or neutral)
* **Named entity recognition** (e.g., identifying names of people, locations, dates)
* **Part-of-speech tagging** (e.g., identifying nouns, verbs, adjectives)
* **Machine translation** (e.g., translating text from one language to another)

NLP enables chatbots to process and understand customer queries in natural language.

**5. Explain any one real-time application of NLP.**

**Answer:**  
One real-time application of **NLP** is **Sentiment Analysis**. In sentiment analysis, NLP is used to analyze and classify the sentiment expressed in a piece of text (e.g., a product review or social media post) as positive, negative, or neutral. This is widely used in:

* **Customer feedback analysis**: Businesses use sentiment analysis to understand how customers feel about their products or services.
* **Brand monitoring**: Sentiment analysis helps track brand perception online by analyzing social media conversations.

By using NLP techniques like tokenization, part-of-speech tagging, and word embeddings, the system can accurately gauge the sentiment of the text.

**6. What is Tokenization in NLP?**

**Answer:**  
**Tokenization** is the process of splitting a string of text into smaller units called **tokens** (words, phrases, or symbols). This is one of the first steps in NLP tasks like text processing or sentiment analysis. It helps convert text into a structured form for analysis.

For example:

* Input: “I want to invest in mutual funds.”
* After tokenization: ["I", "want", "to", "invest", "in", "mutual", "funds"]

These tokens are then analyzed further, such as by identifying the parts of speech, extracting meaning, or feeding them into machine learning models.

**7. Explain any 2 applications of NLP.**

**Answer:**

1. **Chatbots and Virtual Assistants**: NLP enables chatbots and virtual assistants (like Siri, Alexa, or Google Assistant) to understand and respond to user queries in natural language. It helps the system recognize the user's intent and entities, such as time, place, or actions, to provide relevant responses.
2. **Machine Translation**: NLP is used in automatic translation tools like Google Translate to translate text from one language to another. The system understands the source language's syntax and semantics and produces an accurate translation in the target language.

**Advanced/Context-Specific Questions**

**8. What algorithms are commonly used for NLP tasks?**

**Answer:**  
Common algorithms used in NLP include:

* **Naive Bayes Classifier**: Often used for text classification tasks like spam filtering.
* **Support Vector Machines (SVM)**: Used in classification tasks such as sentiment analysis or named entity recognition.
* **Recurrent Neural Networks (RNNs)**: These are used for sequence-based tasks like language modeling, text generation, and translation.
* **Transformers (BERT, GPT)**: These advanced models are the foundation of modern NLP applications like Google Search and GPT-based chatbots, leveraging self-attention mechanisms to understand context better.

**9. How does your chatbot understand user inputs using NLP?**

**Answer:**  
The chatbot uses NLP techniques like **Intent Recognition** and **Entity Extraction** to understand user inputs.

* **Intent Recognition**: Identifies the user's goal or query, such as "invest in stocks" or "get financial advice."
* **Entity Extraction**: Extracts key entities from the input, such as financial products (stocks, bonds), amounts, or risk preferences.

For example, if a user says, "I want to invest in high-risk stocks," the system would identify the **intent** ("invest") and the **entity** ("high-risk stocks").

**Summary of Questions and Answers**

1. **What is a Chatbot?**
   * A software that simulates human conversation to automate customer interactions.
2. **Explain any one real-time Chatbot.**
   * **Siri**: A virtual assistant that uses NLP to interpret voice commands and provide responses.
3. **What is NLP?**
   * A subfield of AI that enables computers to understand and process human language.
4. **Explain any 2 applications of NLP.**
   * **Sentiment Analysis**: Understanding sentiment from text.
   * **Machine Translation**: Translating text from one language to another.
5. **What is Tokenization in NLP?**
   * The process of breaking text into individual words or tokens for further analysis.
6. **How does your chatbot understand user inputs using NLP?**
   * By using techniques like **Intent Recognition** and **Entity Extraction** to understand the purpose and key information in the user's input.

These are some of the questions and answers you can expect for a **chatbot for investment suggestions** based on NLP. You can prepare for related concepts as well, such as how the chatbot uses AI/ML algorithms for improvement or learning over time.