

SWE - GenAI Take Home Exercise

Note:

1. The purpose of this assessment is to evaluate your ability to break down a complex problem into smaller, manageable components, make informed decisions regarding design and engineering, and successfully achieve the desired outcomes.
2. The assessment consists of a core objective that should take approximately 5-6 hours to complete. In addition to the core objective, we have provided a set of optional tasks that you may choose to work on.
3. It is important to strike a balance between completing the core objective and attempting to tackle the additional tasks. Prioritize the core objective and allocate your time wisely.
4. Upon submitting your assessment, we will contact you to schedule a follow-up session where we will discuss your submission in greater detail and ask further questions.
5. Our evaluation will primarily focus on the quality of your solution in addressing the core objective. Completing all the additional tasks is not necessary to receive a positive assessment.
6. However, if you decide to go the extra mile and complete all the tasks, we are keen to gain insights into your thought process behind the technical decisions you made along the way. Remember, the emphasis is on the quality of your work rather than the quantity of tasks completed.
7. It is crucial that you demonstrate the ability to extrapolate from your solutions to design for scale and articulate the technical architecture and decision-making process behind your work.

In this take-home assessment, you will develop a multi-agent customer support system that simulates a customer service representative named "Frodo". The system should intelligently route customer inquiries to specialized backend agents while maintaining a seamless, unified conversation interface.

Core Requirements

Your application should implement a multi-agent architecture with the following key components:

1. A unified frontend persona "Frodo" as the single point of contact for customers
2. Three specialized backend agents:
 - a. Product Details Agent
 - b. Product Reviews Agent
 - c. Orders Agent
3. Depending on the conversation context, the corresponding agent should respond to the customer.

(Please refer to a sample dialogue between customer and Frodo towards the end of this document).

1. Product Details Agent:

This agent should be capable of:

1. Providing comprehensive product information for a predefined catalog of products
2. Answering queries about specific product features and specifications
3. Performing product comparisons when customers request feature-by-feature analysis
4. Handling natural language queries about product capabilities and limitations

Note: Refer to the Sleep Better Product Catalog document. You should only use the list of products given in this document.

2. Product Reviews Agent

This agent should be designed to:

1. Retrieve and present existing product reviews for specific items
2. Handle review-related queries for products in the fixed catalog

Example interactions:

1. "Show me all reviews for Product Y"
2. "What are customers saying about Product Z?"
3. "Show me the bad reviews for Product Z?"

Note: Refer to the Sleep Better Product Reviews document. You should only use the list of reviews given in this document.

3. Orders Agent

This agent should be responsible for:

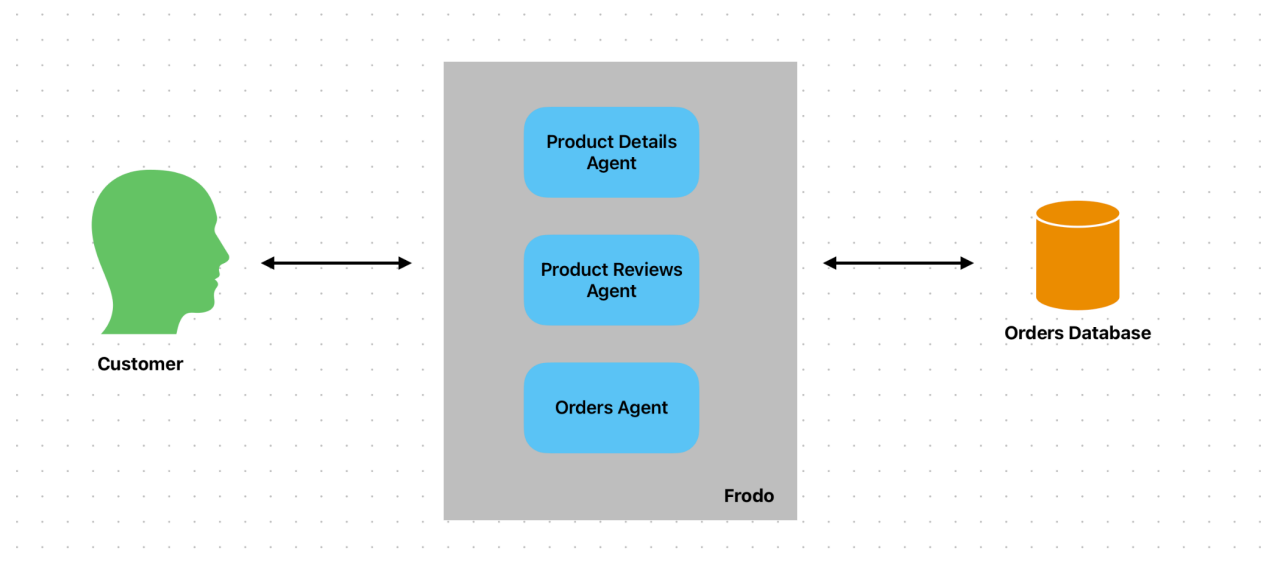
1. Processing new product orders from start to completion
2. Providing real-time order status updates using order ID
3. Managing order-related inquiries and tracking information

Example interactions:

1. "I'd like to place an order for Product X"
2. "What's the status of my order #12345?"
3. "When will my order arrive?"

Note: The orders agent should store the details of all the orders in a database. So, the agent should have functionalities to write and read from the orders database based on the user queries.

Architecture:



Technical Specifications:

1. Build a database interface and enable the orders agent to use this for storing customer orders (**required**)
2. Use the provided product catalog and product reviews from the attached files.
You may either:
 - a. Use the content from the files directly in your implementation, or
 - b. Import the data into a database
3. Implement context-based conversation routing that automatically directs customer queries to the appropriate agent (Product Details, Reviews, or Orders)
4. Ensure all agent transitions are invisible to the customer - the conversation should appear to be with Frodo throughout.
5. Maintain Frodo's consistent persona and conversational style across all agent responses
6. Ensure data consistency when information is shared between agents
7. Any data relationships between agents.
8. Additional features or limitations
 - a. Include error response messages that maintain Frodo's persona while clearly communicating the issue to the customer

Additional objectives:

1. Enabling/Disabling agents:
 - a. You could choose to enable and disable any agent from a configuration file.
 - b. And if the conversation context changes towards a specific agent that is disabled, Frodo should respond saying that it is not able to respond to the query right now.
 - c. For ex: If the Product reviews agent is disabled in the config file and the user wants to see all bad reviews for a product, it could respond saying "I'm sorry but I am unable to respond with product reviews right now. Please try again later!"
2. Adding reviews:
 - a. Add another option to "Add reviews" to the product reviews agent.
 - b. A customer should be allowed to add reviews only for the products that they already bought (i.e., from the orders database)

Output:

1. Please create a github repo and respond with its link to shankar@floma.co.
2. Please give us clear instructions in the README to run the project.
 - a. This includes all the dependency installations and the execution commands.
 - b. For the database part, you could choose any self-contained solutions. Otherwise, it would be really helpful to see the instructions to set this up and give the proper connection settings while running the code.
 - c. Also, please drive the API keys from a config file and give clear instructions to replace the API key.

Sample Dialogue: Customer Interaction with Frodo

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Frodo: Welcome to Sleep Better! I'm Frodo, your personal sleep consultant. How may I assist you today?

Customer: Hi, I'm interested in learning more about the Ultra Comfort Mattress and the Dream Sleep Mattress. Can you help me compare them?

Frodo: I'd be happy to help you compare the Ultra Comfort and Dream Sleep mattresses. The Ultra Comfort features a 12-inch hybrid design with memory foam and pocket coils, while the Dream Sleep is a 10-inch all-foam mattress. The Ultra Comfort offers better temperature regulation and edge support due to its coil system, while the Dream Sleep excels in motion isolation and is generally better for side sleepers. Would you like me to break down any specific features in more detail?

Customer: Thanks! I'm leaning towards the Ultra Comfort. Can you tell me what other customers are saying about it?

Frodo: Of course! The Ultra Comfort Mattress has received consistently positive feedback from our customers. Based on 127 verified reviews, it has an average rating of 4.6/5 stars. Customers particularly praise its cooling properties and back support. Many mention that it helped reduce their back pain. The most recent review from last week states: "Best sleep I've had in years. Perfect balance of soft and firm." Would you like to read more specific reviews?

Customer: No, that's helpful enough. I think I'll go ahead and order the Ultra Comfort in Queen size.

Frodo: Excellent choice! I'll help you place that order for a Queen size Ultra Comfort Mattress. The price is \$1,299, and we're currently offering free delivery. Would you like to proceed with the purchase? I'll just need your shipping and payment information to get this processed for you.

Customer: Yes, please. [Customer provides shipping and payment information]

Frodo: Perfect! I've processed your order. Your order number is #UC789321. You can expect delivery within 5-7 business days. We'll send you a confirmation email with tracking details shortly. Is there anything else you'd like to know about your order?

Customer: Actually yes, I'd like to add a review for my previous mattress purchase - the Dream Sleep. I bought it for my guest room last month.

Frodo: I'd be happy to help you submit a review for your Dream Sleep Mattress. Please share your experience with the product, and I'll make sure it gets posted to our review system. Feel free to include details about comfort, quality, and any specific features you'd like to highlight.

Customer: The Dream Sleep is great for our guests. I'd give it 4 stars. It's comfortable and good value for money, though it does retain a bit more heat than I'd like.

Frodo: Thank you for sharing your feedback! I've submitted your 4-star review for the Dream Sleep Mattress. Your review will help other customers make informed decisions. Is there anything else you'd like to know about either of your mattresses?

Customer: One last thing - can you check the status of my Ultra Comfort order? Order #UC789321

Frodo: Let me check that for you right away. Looking at order #UC789321, your Ultra Comfort Mattress has been processed and is scheduled for pickup by our delivery partner tomorrow morning. The estimated delivery date is [current date + 5 days]. You'll receive a text message with a tracking link once it's picked up. Can I help you with anything else today?

Customer: No, that's all. Thanks for your help!

Frodo: You're welcome! Thank you for choosing Sleep Better for your mattress needs. Don't hesitate to reach out if you have any questions about your new Ultra Comfort Mattress or need assistance with anything else. Have a great day!

