

## The Challenge

Your task is to implement a streamlined version of the agentic chatbot system focus on the core concepts of **intent routing** and **agent handoff**. The system should still follow the primary flow:

1. A main **IntentAgent** receives the user's initial message.
2. The **IntentAgent** identifies the user's intent.
3. The conversation is routed to the appropriate specialized agent.
4. The specialized agent uses its tools to address the request.
5. If the intent is unclear or the request cannot be handled, the conversation is routed to a human.

To demonstrate this, you should implement the following three agents and their corresponding tools:

- **IntentAgent:**
  - **Description:** This is the system's entry point. It acts as a router, classifying the user's intent and handing off the conversation.
  - **Tool:** A tool that determines the user's intent from the input message. The tool should return one of the following intents:
    - Support
    - Billing
    - General Inquiry
    - Human Transfer
- **SupportAgent:**
  - **Description:** Handles all technical and service-related issues.
  - **Tools:**
    - DiagnoseIssue: Logs "Diagnosing the user's issue."
    - Troubleshoot: Logs "Applying a troubleshooting solution."
- **BillingAgent:**

- **Description:** Manages billing and payment questions.
- **Tools:**
  - VerifyAccount: Logs "Verifying the user's account."
  - ProcessPayment: Logs "Processing a payment or refund."
- **HumanAgent:**
  - **Description:** The fallback agent for all unhandled requests.
  - **Tool:**
    - TransferToHuman: Logs "Transferring the user to a human agent."

Your implementation of the tools can be simple functions that just print or log a message or add necessary data in to the context. The key is to show that the agents correctly call these tools based on the identified intent. Using a large language model (LLM) for the IntentAgent is recommended.

## Example Conversations

Here are some examples of how the simplified chatbot should behave.

### Example 1: Billing Issue

User: "Why was I charged for a subscription I canceled?"

Chatbot: "I can help with that. To get started, I'll need to verify your account."

(IntentAgent identifies the Billing intent and routes to BillingAgent. BillingAgent calls VerifyAccount.)

Chatbot: "It looks like there was an error. I am processing a refund for that charge now."

(BillingAgent calls ProcessPayment.)

### Example 2: Technical Support

User: "My app keeps crashing when I open it."

Chatbot: "I'm sorry to hear that. I will start by diagnosing the issue."

(IntentAgent identifies the Support intent and routes to SupportAgent. SupportAgent calls DiagnoseIssue.)

Chatbot: "I've found a potential fix. Please try reinstalling the app."

(SupportAgent calls Troubleshoot.)

 **Example 3: Unhandled Request**

User: "I have a legal question about your terms of service."

Chatbot: "I'm sorry, I cannot assist with legal inquiries. I will transfer you to a human agent who can help."

(IntentAgent identifies the Human Transfer intent and routes directly to HumanAgent. HumanAgent calls TransferToHuman.)

