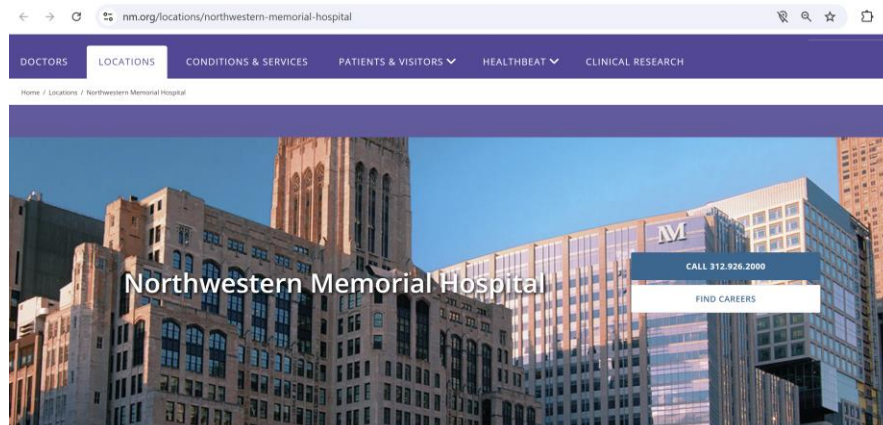# Assignment_4

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Overview:

In this assignment you will use Langchain/Langgraph framework to create multiple AI agents representing the different departments of Northwestern Memorial Hospital who will coordinate, synchronize, and act to answer patients/visitors questions.

Instructions:

1. Create venv that has Python 3.10
2. Activate the venv you created (venv\scripts\activate)
3. pip install langchain==0.3.13
4. pip install langgraph== 0.2.60
5. pip install openai== 1.58.1
6. Use the venv that you have created to implement all requirements listed under the Requirements section.
7. Store all items listed under the Deliverables section in a ZIP file
8. Follow the steps listed under Submission sections for your assignment submission.
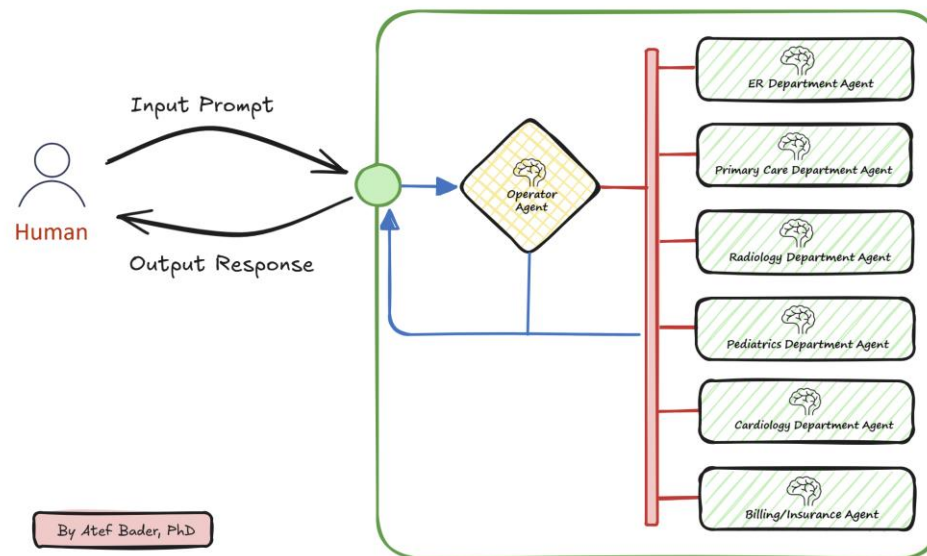
Submission:

1. Submit your assignment as a SINGLE ZIP file on Canvas by the due date.
2. All deliverables listed under the Deliverables section must be submitted in a ZIP file that has the name: Assignment_1_Your_LastName.zip

Deliverables:

1. All source code that you installed, compiled and built on your personal computer.
2. PDF document report that has your answers (source-code snippet, input, output, your commentaries) for every requirement listed below.
3. Panopto video recording (5 to 10 minutes) of a live run/demo of your code on your personal development computer.

Requirements:

1. Use Langchain/Langgraph framework to create an IPYNB script to build the graph for the AI agents representing the different departments of Northwestern Memorial Hospital who will coordinate, synchronize, and act to answer patients/visitors' questions.

2. Create a graph using Langchain/Langgraph to capture the following architecture process the incoming inquiries by the patients/visitors:

3. Create an operator agent that is responsible to process the initial input prompt received from the patient/visitor and route the message to the target agent based on the classified intent of the received message. The following is the list of available departments:
   - ER Department
   - Primary Care Department
   - Radiology Department
   - Pediatrics Department
   - Cardiology Department
   - Billing/Insurance Department

4. Create an AI agent for every department listed above.

5. The operator Agent will be responsible to identify the "intent" of the question/inquiry using the OpenAI LLM model. Consider the following prompt in your design and implementation:

```
prompt = (

    f"Classify the user's intents based on the following input: '{message}'. "

    "Possible intents include: ER, primary_care, radiology, pediatrics, cardiology, billing_insurance"

    "Return all relevant intents as a comma-separated list without any duplication. "

    "Ensure that each intent is distinct and only included if it is clearly relevant to the input."

)
```

6. Use ChatGPT to generate a data sample of 10 questions/answers for every department that you will use for development and testing. Store these in your datastore that the AI Agents will use to answer the questions from patients/visitors. The following is a sample of data generated by ChatGPT for pediatrics department AI Agent:

> Q: What vaccines are required for a 2-year-old?
>
> A: DTaP, Hib, Polio, and MMR are commonly recommended.
>
> Q: My child has a fever; when should I worry?
>
> A: Call if it's over 100.4°F for infants or lasts more than 3 days.
>
> Q: Is a cough normal after a cold?
>
> A: Yes, it may persist for 1-2 weeks but monitor for wheezing.
>
> Q: Can teething cause diarrhea?
>
> A: Mild loose stools can occur, but persistent diarrhea warrants a visit.
>
> Q: What foods should I avoid introducing to a 6-month-old?
>
> A: Avoid honey and choking hazards like nuts.

7. Provide 6 runs that will demonstrate a fully functional application where the Operator AI Agent can route the message successfully to the target department AI Agent who will respond to the inquiry received for every scenario listed below:
   - How can I tell if my child has RSV (Respiratory Syncytial Virus)?
   - Can I visit my friend in the ER, and are there any restrictions?
   - How should I prepare for a CT scan, and are there any dietary restrictions?
   - I want to check if my recent test result has been reviewed by my primary care physician yet?
   - Do you have any available appointments with a cardiologist next week?
   - Can you help me understand my recent medical bill and whether my insurance covered the costs?