ASSIGNMENT 2:

SALES RECOMMENDATION AGENT
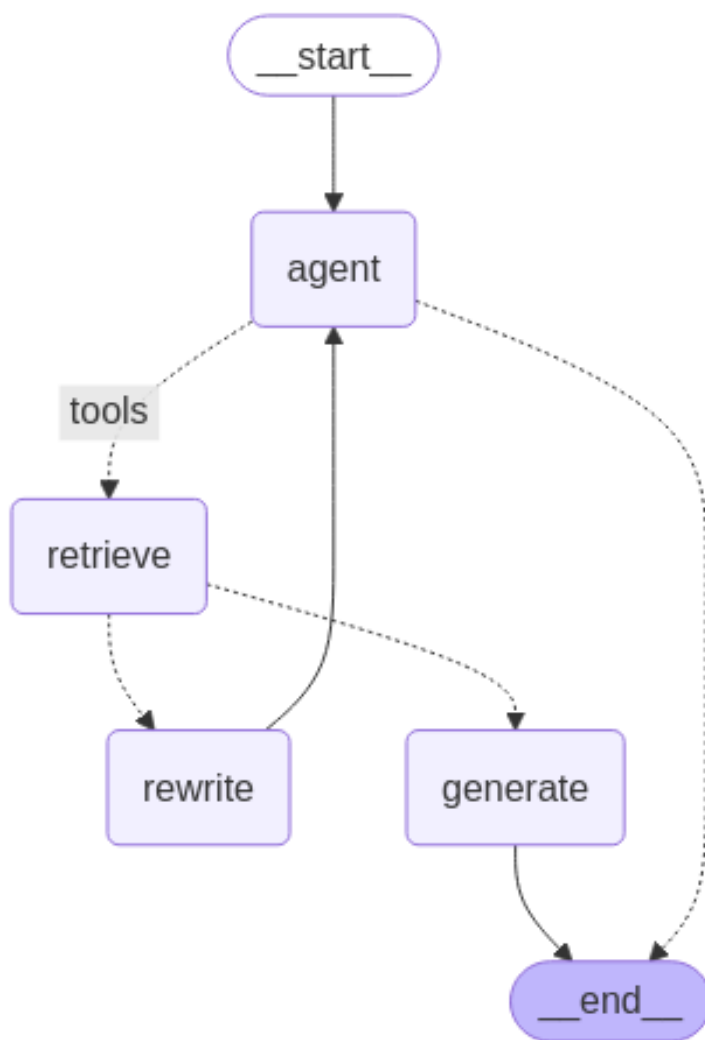
Kevin Geidel

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Northwestern University

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Requirement 1: Graph the Agent with LangChain/LangGraph

The construction of the agent and accompanying graph begins in cell 2 (see appendix). The actual assembly of the graph occurs in cell 5. However, some of the components, such as the retriever **ToolNode** and **AgentState** class, are built above. Following the logic in cell 5 we first instantiate an empty graph:

```
workflow = StateGraph(AgentState)
```

The `workflow` object has `add_node` and `add_edge` methods that allow us to assemble the components created in cells 2-6. The output is displayed graphically in cell 6 (reproduced below.)

Requirement 2: Load the Dell web pages

Loading the web pages occurs in in cell 2. A list of URLs are defined and based to the **WebBaseLoader**. The **RecursiveCharacterTextSplitter** chunks the documents into workable pieces. The result is a list of LangChain documents that each have a portion of each site. The documents are embedded and stored in the ChromaDB vector store.

Requirement 3: Inspect and comment on four queries

The first query sent to the agent was *'I want a dell computer for travel that has Intel® Core™ 7 150U.'* The response is reproduced below. While the response does not mention travel, specifically, it did recommend ultralight designs. Perhaps this was the agent addressing the travel component? These laptops do have intel 7 processors, so in that sense they are accurate.

The second query, displayed below, included specific requirements on the desired memory. The response address this but also includes other options that have different memory specifications.

```
  1  query_agent('I want a dell computer that has Intel® Core™ Ultra 7 165U vPro® and 1 TB SSD?')
✓ 4.3s                                                                                        Python
---CALL AGENT---
"Output from node 'agent':"
'---'
{ 'messages': [ AIMessage(content='', additional_kwargs={'tool_calls': [{'index': 0, 'id': 'call_2eTsfpcityOD6FwaOpsGU48c', 'function': {'arguments': '{"query":"Dell la
---CHECK RELEVANCE---
---DECISION: DOCS RELEVANT---
"Output from node 'retrieve':"
'---'
{ 'messages': [ ToolMessage(content='Core™ Ultra 5 135U, vPro®Windows 11 ProIntel® Graphics16 GB DDR5256 GB SSD14" Non-Touch FHD Tech Specs  Select Selected Configurati
---GENERATE---
"Output from node 'generate':"
'---'
{ 'messages': [ 'For your specifications, I recommend the Dell laptops with '
                'the Intel® Core™ Ultra 5 135U, vPro®, and 16 GB RAM. You can '
                'choose between configurations with either a 256 GB SSD priced '
                'at $1,399.00 or a 512 GB SSD priced at $1,659.00. Both '
                'options feature a 14" Non-Touch FHD display.']}
```

```
  1  # This response did not retrieve the proper processor.
  2  # There are very specific recommendations but they are not matching the requested specs
✓ 0.0s                                                                                        Python
```



```
  1  query_agent('I want a light weight XPS computer with Intel® Core™ Ultra 7 165U vPro® and 1 TB SSD.')
✓ 4.2s                                                                                        Python
---CALL AGENT---
"Output from node 'agent':"
'---'
{ 'messages': [ AIMessage(content='', additional_kwargs={'tool_calls': [{'index': 0, 'id': 'call_4fmN5yufGTNWD7nVT3jZXx8F', 'function': {'arguments': '{"query":"lightwe
---CHECK RELEVANCE---
---DECISION: DOCS RELEVANT---
"Output from node 'retrieve':"
'---'
{ 'messages': [ ToolMessage(content='16:10 displays, enhanced audio, ultralight option and Intel® Core™ Ultra processor.1. Select base configuration14" 745514" 74502. S
---GENERATE---
"Output from node 'generate':"
'---'
{ 'messages': [ 'For your specifications, I recommend the Dell 14" 7455 with '
                'an Intel® Core™ Ultra 5 135U processor, 16 GB LPDDR5X memory, '
                'and a 256 GB SSD, priced at $1,659. Alternatively, you could '
                'consider the Dell 14" 7450 with similar specs but a 512 GB '
                'SSD for $1,399. Both options feature a 14" Non-Touch FHD '
                'display and enhanced audio.']}
```

```
  1  # The response does not mention it specifically but it did recommend a lightwight model.
  2  # The memory does not match the requested specs.
✓ 0.0s                                                                                        Python
```



```
  1  query_agent("What laptop has the intel 7 processor?")
✓ 5.2s                                                                                        Python
---CALL AGENT---
"Output from node 'agent':"
'---'
{ 'messages': [ AIMessage(content='', additional_kwargs={'tool_calls': [{'index': 0, 'id': 'call_32yr7lgayC2WAWhd3w1JYM2y', 'function': {'arguments': '{"query":"laptop
---CHECK RELEVANCE---
---DECISION: DOCS RELEVANT---
"Output from node 'retrieve':"
'---'
{ 'messages': [ ToolMessage(content='Dell Inspiron 14 2 in 1 Laptop 7440 with Intel processor | Dell\n\nlaptop with multiple modes, built with Intel Core processors and
---GENERATE---
"Output from node 'generate':"
'---'
{ 'messages': [ 'For a versatile laptop, consider the Dell Inspiron 14 2-in-1 '
                'Laptop 7440, which features a 13th Gen Intel® Core™ i5 '
                'processor, 16GB LPDDR5x memory, and a 14" FHD+ touch display. '
                'It is designed for multiple modes and is recommended with '
                'Windows 11 Pro for business use. The price is approximately '
                '$499.99, offering good value for its specifications.']}
```

Requirement 4: Response consistency

Requirement 5: Agent improvements